Curriculum vitae

Nombre : **Mariano Esteban Rodríguez**
https://poxvirusandvaccines.wordpress.com

Fecha: enero 2025

Apellidos: **ESTEBAN RODRÍGUEZ** Nombre: **MARIANO**

Apellidos: **ESTEBAN RODRÍGUEZ** Nombre: **MARIANO**
Fecha de nacimiento : **26/7/1944** Sexo: **V**

SITUACIÓN PROFESIONAL ACTUAL

Organismo: **CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS**
Facultad, Escuela o Instituto: **CENTRO NACIONAL DE BIOTECNOLOGIA**
Depto./Secc./Unidad estr.: **Departamento de Biología Molecular y Celular**
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Especialización (Códigos UNESCO): **242007**
Categoria profesional: **Profesor de Investigación** Fecha de inicio: **1987**
Situación administrativa
X Plantilla ☐ Contratado ☐ Interino ☐ Becario
☐ Otras situaciones especificar:

Dedicación A tiempo completo **X** ☐
A tiempo parcial

LÍNEAS DE INVESTIGACIÓN

Biología molecular y celular de poxvirus, interacción virus-célula, expresión génica, biología de sistemas, respuesta inmune, inmunomoduladores, citoquinas, interferones, vacunas, VIH/sida, malaria, leishmania, hepatitis C, chikungunya, ebola, zika, SARS-CoV-2, mpox, cáncer, virus oncolíticos.

FORMACIÓN ACADÉMICA

Titulación Superior	Centro	Fecha
Licenciatura en Farmacia	**Universidad de Santiago de Compostela**	**1967**
Licenciatura en C. Biológicas	**Universidad de Santiago de Compostela**	**1972**

Doctorado	Centro	Fecha
Dr. en Farmacia (Microbiología)	**Universidad de Santiago de Compostela**	**1970**

ACTIVIDADES ANTERIORES DE CARÁCTER CIENTÍFICO PROFESIONAL

Puesto	Institución	Fechas
Investigador Asociado	**National Inst. for Medical Research, Londres (UK)**	**1970-74**
Instructor	**Rutgers Medical School (NJ) USA**	**1974-77**
Profesor visitante	**Mol. Biol.Institut, University of Gent (Bélgica)**	**1978**
Assistant Professor	**State University of New York, Medical School, NY**	**1979-1982**
Associate Professor	**State University of New York, Medical School, NY**	**1982-1985**
Professor	**State University of New York, Medical School, NY**	**1985-1992**
Año Sábatico	**National Inst. for Medical Research, Londres (UK)**	**1987-1988**
Director	**Centro Nacional de Biotecnología, CSIC, Madrid**	**1992-2003**
Presidente	**Real Academia Nacional de Farmacia (RANF), Spain**	**2012-2018**

Idiomas (R = regular, B = bien, C = correctamente)

Idioma	Habla	Lee	Escribe
Inglés	**C**	**C**	**C**
Francés	**R**	**B**	**R**

PARTICIPACIÓN EN PROYECTOS DE I+D FINANCIADOS EN CONVOCATORIAS PÚBLICAS

Título del proyecto: Mechanism of action of interferon
Entidad financiadora: National Institutes of Health (NIH), USA
Duración, desde: 1983 hasta: 1986
Investigador responsable: Mariano Esteban

Título del proyecto: Thymidine kinase and interferon action.
Entidad financiadora: NIH (USA)
Duración, desde: 1983 hasta: 1986
Investigador responsable: Co-Principal Mariano Esteban

Título del proyecto: Mechanism of Antiviral Activity of Human Interferon
Entidad financiadora: Science and Technological Cooperation, Spain-USA
Duración, desde: 1986 hasta: 1988
Investigador responsable: Mariano Esteban

Título del proyecto: Mechanism of action of interferon
Entidad financiadora: NIH (USA)
Duración, desde: 1986 hasta: 1992
Investigador responsable: Mariano Esteban

Título del proyecto: Genetic variability and virulence of poxviruses
Entidad financiadora: National Science Foundation (NSF), USA
Duración, desde: 1987 hasta: 1991
Investigador responsable: Mariano Esteban

Título del proyecto: Genetic markers and attenuation of vaccinia virus
Entidad financiadora: Health Research Council of New York (USA)
Duración, desde: 1986 hasta: 1987
Investigador responsable: Mariano Esteban

Título del proyecto: Role of Poly A on virus induced inhibition of protein synthesis
Entidad financiadora: NIH (USA)
Duración, desde: 1987 hasta: 1990
Investigador responsable: Mariano Esteban

Título del proyecto: Pathogenesis of vaccinia virus
Entidad financiadora: HSC (USA)
Duración, desde: 1991 hasta: 1992
Investigador responsable: Mariano Esteban

Título del proyecto: Fusion proteins as immunogens against HIV infection
Entidad financiadora: NIH (USA)
Duración, desde: 1992 hasta: 1995
Investigador responsable: Mariano Esteban

Título del proyecto: Proteínas de fusión como vacunas recombinantes contra el SIDA
Entidad financiadora: CICYT
Duración, desde: 1992 hasta: 1995
Investigador responsable: Mariano Esteban

Título del proyecto: Uso de recombinantes atenuados de vaccinia como posible vacuna contra Leishmaniasis
Entidad financiadora: CAM
Duración, desde: 1992 hasta: 1993
Investigador responsable: Mariano Esteban

Título del proyecto: Obtención de vacunas recombinantes del virus vaccinia que expresan proteínas (gp46 y gp63) protectoras a la infección por Leishmania infantum.
Entidad financiadora: FIS
Duración, desde: 1994 hasta: 1996
Investigador responsable: Mariano Esteban

Título del proyecto: The role of intracellular membrane compartments in the assembly of viruses
Entidad financiadora: CE Human Capital and Mobility
Duración, desde: 1994 hasta: 1997
Investigador responsable: Mariano Esteban

Título del proyecto: Desarrollo de estrategias para controlar la infección por el virus de inmunodeficiencia human (VIH-1)
Entidad financiadora: CICYT
Duración, desde: 1995 hasta: 1998
Investigador responsable: Mariano Esteban

Título del proyecto: Mecanismos reguladores de crecimiento y muerte celular por interferones
Entidad financiadora: CICYT
Duración, desde: 1996 hasta: 1999
Investigador responsable: Mariano Esteban

Título del proyecto: European Action Progamme Against AIDS
Entidad financiadora: CE Biomed
Duración, desde: 1996 hasta: 1997
Investigador responsable: Mariano Esteban

Título del proyecto: European vaccine against AIDS
Entidad financiadora: CE biomed 2. Programme PL 96-2515
Duración, desde: 1996 hasta: 1998
Investigador responsable: Mariano Esteban

Título del proyecto: Molecular and cellular principles of membrane virus biosynthesis and infection
Entidad financiadora: European Union, FMRX-CT98-0225
Duración, desde: 1998 hasta: 2001
Investigador responsable: Mariano Esteban

Título del proyecto: Malaria vaccine: attenuated influenza and vaccinia vectors
Entidad financiadora: NIH (USA). AI36526.05
Duración, desde: 1998 hasta: 2003
Investigador responsable: Mariano Esteban

Título del proyecto: Estrategias de terapia génica en las infecciones por VIH
Entidad financiadora: Comunidad de Madrid. 08.6/0020/1997
Duración, desde: 1998 hasta: 2001
Investigador responsable: Mariano Esteban

Título del proyecto: Mecanismo de inducción de apoptosis por los interferones: papél de las enzimas proteina quinasa (PKR) y sistema 2-5A sintetasa/RnasaL.
Entidad financiadora: Ministerio de Educación y Cultura, PM-98-0112
Duración, desde: 1999 hasta:2002
Investigador responsable: Mariano Esteban

Título del proyecto: Modulación de la respuesta inmune frente a antígenos del virus de la inmunodeficiencia humana (VIH)
Entidad financiadora: Comisión Interministerial de Ciencia y Tecnologia (CICYT), SAF98-0056,
Duración, desde: 1998 hasta: 2001
Investigador responsable: Mariano Esteban

Título del proyecto: Development of immunogenic and safe vaccinia virus vaccines.

Entidad financiadora: European Union. BIOTECH Program. PL970456
Duración, desde: 1998 hasta: 2001
Investigador responsable: Mariano Esteban

Título del proyecto: Effector and memory anti-malaria CD8+ cell responses.
Entidad financiadora: National Institutes of Health (NIH), 1 RO1 AI44375-01
Duración, desde: 1999 hasta: 2003
Investigador responsable: Mariano Esteban

Título del proyecto: Project Leader of the EuroVac Cluster, European Vaccine Effort Against HIV/AIDS
Entidad financiadora: Fifth Framework Programme, QLRT-PL1999-01321
Duración, desde:2000 hasta: 2003
Investigador responsable: Mariano Esteban

Título del proyecto: European Vaccine against AIDS
Entidad financiadora: Programme EVA CFAR, QLRT-PL1999-00609
Duración, desde: 2000 hasta: 2003
Investigador responsable: Mariano Esteban

Título del proyecto: Visceral Leishmaniasis Vaccine-Murine Model Studies
Entidad financiadora: National Institutes of Health (NIH), 5R01AI45044-02
Duración, desde: 1999 hasta: 2003
Investigador responsable: Mariano Esteban

Título del proyecto: Desarrollo de una vacuna contra Leishmaniasis
Entidad financiadora: Comunidad Autonoma de Madrid (CAM), 08.2/0057/2000
Duración, desde: 2001 hasta: 2003
Investigador responsible: Mariano Esteban

Título del proyecto: Desarrollo de una vacuna contra Leishmaniasis
Entidad financiadora: Comunidad Autonoma de Madrid (CAM), 08.2/0057/2000
Duración, desde: 2001 hasta: 2003
Investigador responsible: Mariano Esteban

Principal investigator. Desarrollo de una vacuna contra leishmaniasis. Comunidad Autónoma de Madrid (CAM) 08.2/0057/2000-2001.

Project Leader of the EuroVac Cluster, European Vaccine Effort Against HIV/AIDS, Fifth Framework Programme, QLRT-PL1999-01321, Euros 500.000, 2000-2005

Concerted Action, Fifth Framework Programme, European Vaccine against Aids (EVA) CFAR, QLRT-PL1999-00609, 2000-2003.

Principal investigator. Contract with MOLOGEN, Germany, 2000-2001

Principal investigator. Contract with ITALFARMACO, Spain, 2001

Principal investigator. Premio IBERDROLA Ciencia y Tecnología, Profesores Visitantes, 2000-2003

Principal Investigator. Desarrollo de nuevas herramientas moleculares para el estudio del virus de la hepatitis C y su aplicación a morfogénesis, estructura, resistencia del virus a interferon y caracterización de la respuesta inmune al virus. BIO2000-0340-P4, 2001-2003. 171.649 euros.

Principal investigator. Diseño y utilización del virus vaccinia como vacuna contra distintas enfermedades: análisis de la interacción virus-célula y modulación de la respuesta inmune. BIO2001-2269, 2001-2003, 170.000 Euros

Principal investigator. Analysis of the molecular mechanism of hepatitis C virus (HCV) resistance to antiviral therapy. EU QLK2-CT-2002-00954. 2002-2005, 124.313 Euros

Coordinator. Increasing the potency of vaccinia MVA vaccines. EU QLK2-CT-2002-01867. 2002-2006. 220.000 euros

Principal investigator. European vaccine effort against HIV/AIDS (EuroVac III). QLK2-CT-2002-01431. 2002-2007. 50.000 euros

Principal investigator. Potenciación de la respuesta inmune (sistémica y de mucosas) frente al virus de la inmunodeficiencia humana (VIH-1). FIPSE, 2002-2006, 209.365 Euros

Principal Investigator. Vaccine strategies for combined targeting of innate and adaptive immune pathways (VaccTIP). EU-2004-012161. 2005-2007. 177.000 euros

Principal Investigator. Host immune activation optimised vaccinia virus vectors for vaccine development (MVACTOR). LSHP-CT-2006-037536. 2006-2009. 175.000 euros

Principal investigator. Diseño de nuevas vacunas tanto preventivas como terapéuticas para las enfermedades de mayor prevalencia: sida, hepatitis C y cáncer de próstata. BIO2004-03954. 2004-2007. 180.000 euros.

Principal Investigator. Desarrollo de vacunas contra enfermedades prevalentes. Fundación Botín 2005-2010. 1.100.000 euros.

Principal Investigator. Caracterización funcional y utilización de la proteína quinasa (PKR) inducida por los interferones como mediador de apoptosis e inhibidor tumoral. 2005-2008. 150.000 euros.

Principal Investigator. Pox T cell vaccine Discovery Consortium (PTVDC). Foundation Bill y Melinda Gates. $1.500.000. 2006-2013.

Principal Investigator. Red de SIDA, ISCIII-RETIC-RD06/006. 2007-2010. 248.000 euros.

Principal Investigator. Modificación genetica y optimización inmunológica de una vacuna (MVA-B) contra el VIH-1 subtipo B. Fundación para la Investigación y la Prevención del Sida (FIPSE). 2007-2009. 172.374 euros

Principal Investigator. Biología del virus vaccinia y su aplicación como vacuna contra enfermedades prevalentes. SAF2008-02036. 2008-2013. 654.000 euros

Principal Investigator. Optimización de la vacuna española (MVA-B) contra el VIH/SIDA. Fundacion para la Investigación y la Prevención del Sida (FIPSE). 36-0731-09. 2010-2013. 259.391 euros

Co-Principal Investigator. Estudio en fase I abierto para evaluar la seguridad e inmunogenicidad de la vacuna frente al VIH-1 MVA-B en pacientes infectados por VIH crónicos en tratamiento antirretroviral (RISVAC03). EudraCT 2099-016578-34. 2010-2011. 411.000 euros

Co-Principal Investigator. Desarrollo de una vacuna frente al VIH: Estudio de los cambios en la biología de células dendríticas humanas tras interacción con distintos inmunógenos. Fondo de Investigaciones Sanitarias (FIS). 2010-2013. 227.000 euros

Principal Investigator. Desarrollo y optimización de vectores virales vacunales contra subtipos B/F de VIH-1 circulantes en Argentina y países limítrofes. Cooperación Interuniversitaria en Investigación Científica con Argentina. A/025293/09. 2010-2011. 23.000 euros

Coinvestigator. Red Temática en SIDA. ISCIII-RETIC, RD12/0017/0038. 2013—2017. 178.250 euros

Principal Investigator. A Novel Replication Competent Flavivirus-based HIV Vaccine Platform, ie RepliVax®, as a Priming Component for Improving Antibody Response. Foundation Bill and Melinda Gates. 2012-2017. 510.000 euros.

Principal Investigator. ICRES: Integration of Chikungunya Research. EU 7th Framework Program. Grant agreement 261202. 2011-2014. 50.000 euros.

Principal Investigator. Mecanismo de acción de vacunas. CSIC-201420E064. 2014-2017. 135.000 euros

Principal Investigator. Vacunas frente a enfermedades humanas prevalentes y optimización de la respuesta immune humoral y cellular. 2014-2017. SAF2013-45232-R. 592.900 euros

Principal Investigator. European HIV Vaccine Alliance (EHVA): an EU platform for the discovery and evaluation of novel prophylactic and therapeutic vaccine candidates. EU H2020, number 681032. 2016-2023. 415.000 euros

Principal Investigator. Red Temática de Investigación Cooperativa en Salud: Red Española de Investigación en Sida (RIS). RD16/0025/0014. 2017-2021. 132.000 euros.

Principal investigator. Evaluating a combination of Immune-based Therapies to Achieve a Functional Cure of HIV Infection (HIVACAR). H2020-731626. 2017-2022. 408.000 euros

Co-Principal investigator. Vacunas frente a enfermedades humanas prevalentes: papel de ISG15. SAF2017-88089-R. 2017-2020. 332.000 euros.

Principal investigator: Desarrollo de una vacuna MVA-COVID-19 expresando antígenos del SARS-CoV-2. PIE-CSIC 2020-2021. 105.000 euros; 2022-2025. 400.000

Principal investigator: CoV2-BMEP and CoV2-TMEP: two novel polyvalent multiepitopic vaccines against SARS-CoV2. La CaixaImpulse. 2020-2023- 298.000 euros.

Co-investigator. Development of a vaccine, MVA-COVID-19, expressing SARS-CoV-2 antigens. Instituto de Salud Carlos III. 2020-2021. 750.000 euros

Principal investigator. Preclinical development of innovative mRNA/MVA vaccines against SARS-CoV2. Instituto de Salud Carlos III. Fondo COVID-19 (COV20_00214). 2020-2021. 300.000 euros

Principal investigator. Desarrollo de una vacuna frente a COVID-19. Ferrovial. 125.000. 2020-2025

Co-PI.: Impact of the vector MVA-ISG15 in the infection by SARS-COV-2/COVID-19. Susana Guerra/ Mariano Esteban. PDC2021-121307-I00. 01/12/2021-31/8/2025. 130.000 euros

Co-Principal Investigator: Desarrollo, función inmune y eficacia de candidatos vacunales frente al SARS-CoV-2/COVID-19 basados en el vector poxvirus MVA. MICINN, Spanish Research Agency grant PID2020-114481RB-I00 (Juan García Arriaza/ Mariano Esteban). 1/09/2021-31/08/2025. 484.000 euros.

Principal investigator (Mariano Esteban/Juan García Arriaza). Título del proyecto: Grupo Pandemias – W8 Vacunas. Grupo Temático 4 de Terapias y Vacunas, Subtemática 4d de Vacunas. Subproyecto “Development of MVA Vaccine”. (SGL2103047). Entidad financiadora: PTI Salud Global, CSIC, Ministerio de Ciencia e Innovación, España. Mecanismo de Recuperación y Resiliencia de la Unión Europea. Duración, desde: 01/01/2021 hasta: 31/12/2022 (2 años). Cuantía de la subvención: 5.653.161 € (incluye presupuesto para CRO y viales lote GMP vacuna).

Principal Investigator. Donaciones ayuda investigación COVID-19. 2020-. 41.675€.

Co-Principal Investigator. Impact of the vector MVA-ISG15 in the infection by SARS-CoV-2/COVID-19. MICINN, Spanish Research Agency grant PDC2021-121307-100 (Susana Guerra/Mariano Esteban). 2021-2023. 149.000 euros.

Principal Investigator. CZ Veterinaria. 2022-2025. 139.000€

Principal Investigator: Sustainable COVID-19 Vaccination for Long-term Immunity and Effectiveness. Acronym: EU-Horizon SOLVE. EU263610_1 -101137185. Ref HE/CL1-HLTH/0423. 01/01/2024-31/12/2028.1,03 million euros.

Principal Investigator. Proyecto europeo de Defensa: European Strategic alliance for research, development and innovation on medical countermeasures against CBRN threats (RESILIENCE). Activity 5: "New generation vaccines for orthopox viruses (VACC)". RESILIENCE-R-2023 (101168024), 01/11/2024-31/10/2027. CNB-CSIC (999.738,75 euros).

Co-Investigator. Development and characterization of pan-flavivirus vaccine candidate (FLAVIVACCINE). 101137006. EU-Horizon-HLTH-2023-DISEASE 03-18. 01/01/2024-31/12/2027 (IP Juan Garcia-Arriaza). 1.228.696 euros.

-Development of novel viral vectored vaccines against Marburgviruses inducing robust and cross-reactive protection (MARVAX). 101137183. HORIZON-HLTH-2023-DISEASE-03-18. PI: Juan García Arriaza. 01/12/2023-30/11/2027. 1.242.042,50 euros.

PUBLICACIONES / PUBLICATIONS

1. Kerr, I.M., Dobos, P., Martin, E.M., Metz, D.H. and **Esteban**, M. (1972). Protein synthesis in interferon-treated and virus infected cells. Federation of European Biochemical Societies Academic Press. Vol. 22:45-64.

2. Metz, D.H. and **Esteban**, M. (1972). Interferon inhibits viral protein synthesis in L-cells infected with vaccinia virus. Nature 238:385-388

3. Friedman, R.M.; **Esteban**, M., Metz, D.H., Tovell, D.R. and Kerr, I.M. (1972). Translation of RNA by L-cell extracts: Effect of interferon. FEBS Letters 24:273-77.

4. Friedman, R.M., Metz, D.H. **Esteban**, R.M., Tovell, D.R., Ball, L.A., and Kerr, I.M. (1973). Mechanism of interferon action. Inhibition of viral messenger ribonucleic acid (RNA) translation in L-cell extracts. J. Virol. 10: 1184-1198.

5. **Esteban**, M. and Metz, D.H. (1973). Early viral protein synthesis in vaccinia infected L-cells. J. Gen. Virol. 19:201-216.

6. **Esteban**, M. and Metz, D.H. (1973). Inhibition of early vaccinia virus protein synthesis in interferon-treated chicken embryo fibroblasts. J. Gen. Virol. 20:111-115.

7. Fournier, F., Tovell, D.R., **Esteban**, M., Metz, D.H., Ball, L.A., and Kerr, -I.M. (1973). The translation of vaccinia mRNA in animal cell-free systems. FEBS Letters 30:268-272.

8. Kerr, I.M. Friedman, R.M., **Esteban**, M., Brown, R.E., Ball, L.A., Metz, D.H., Risby, D., Tovell, D.R., and Sonnabend, J.A. (1973) The control of protein synthesis in interferon-treated infected cells. In "Advances in the Biosciences" II Pergamon Press. Vieweg, 109-126.

9. **Esteban**, M. and Kerr, I.M. (1974) The synthesis of Encephalomyocarditis virus polypeptides in infected L-cell and cell-free systems. Eur.J. Biochem. 45:567-576.

10. Metz, D.H., **Esteban**, M., and Danielescu, G. (1975) The effect fo interferon on the formation of virus polyribosome in L-cell infected with vaccinia virus. J. Gen. Virol. 27:197-209.

11. Metz, D.H., **Esteban**, M., and Danielescu, G. (1975). The formation of polyribosomes in L-cells infected with vaccinia virus. J. Gen. Virol.27:181-195

12. **Esteban**, M. (1975). Interferon inhibits the translation of viral mRNA in animal cell-free systems. In "Effects of interferon on cells, viruses and the Immune System", ed. Geraldes (Academic Press, London) 549-562.

13. **Esteban**, M. (1977). Rifampicin and Vaccinia DNA. J. Virol. 21:796-801.

14. **Esteban**, M. and Holowczak, J.A. (1977). Replication of vaccinia DNA in mouse L cells. I. In vivo DNA synthesis. Virology 78:57-75.

15. **Esteban**, M. and Holowczak, J.A. (1977). Replication of vaccinia DNA in mouse L-cells. I. In vitro DNA synthesis in cytoplasmic extracts. Virology 78:76-86.

16. **Esteban**, M. and Holowczak, J.A. (1977). Replication of vaccinia DNA in mouse L-cells. III. Intracellular forms of vaccinia DNA. Virology 82: 308-322.

17. **Esteban**, M., Flores, L. and Holowczak, J.A. (1977). Model for vaccinia virus DNA replication. Virology 83: 467-473.

18. **Esteban**, M., Flores, L. and Holowczak, J.A. (1977). Topography of vaccinia virus DNA. Virology 82; 163-181.

19. **Esteban**, M. and Holowczak, J.A. (1978). Replication of vaccinia DNA in mouse L-cells. IV. Protein synthesis and viral DNA replication. Virology 86:376-390.

20. Cabrera, C.V. and **Esteban**, M. (1978). A simple procedure to purify intact -DNA from vaccinia virus. J. Virol. 25: 442-445.

21. Soloski, M.J., **Esteban**, M. and Holowczak, J. (1978). DNA-binding proteins in the cytoplasm of vaccinia infected mouse L-cells. J. Virol. 25: 263-273.

22. Mc Carron, R.J., Cabrera, C.V., **Esteban**, M., Mc Allister, W.T. and Holowczak, J.A. (1978). Structure of vaccinia DNA: Analysis of the viral genome by restriction endonucleases. Virology 86: 88-101.

23. Cabrera, C.V., **Esteban**, M., Mc Carron, R.J., Mc Allister, W.T and

Holowczak, J.A. (1978). Vaccinia virus transcription: Hybridization of mRNA to restriction fragments of vaccinia DNA. Virology 86: 102-114.

24. Bablanian, R., **Esteban,** M., Baxt, B. and Sonnabend, J.A. (1978). Studies on the mechanism of vaccinia virus cytophatic effects: I. Inhibition of protein synthesis in infected cell is associated with virus-induced RNA synthesis. J. Gen. Virol. 39: 39l-402.

25. Bablanian, R., Baxt, B., Sonnabend, J.A., and **Esteban**, M. (1978). Studies on the mechanism of vaccinia virus cytophatic effects: II. Early cell rounding is associated with virus polypeptide synthesis. J. Gen. Virol. 39: 403-413.

26. **Esteban**, M., Soloski, M., Cabrera, C.V. and Holowczak, J.A. (1979). Replication of vaccinia DNA and studies on the structure of the virus chromosome. Cold Spring Harbor Symposia Quantitative Biology. Vol. XLIII. DNA: Replication and recombination. 789-799.

27. Soloski, M.J., Cabrera, C.V., **Esteban**, M. and Holowczak, J.A. (1979). Studies concerning the structure and organization of the vaccinia virus nucleoid. Virology 99, 209-217.

28. **Esteban**, M. and Holowczak, J.A. Vaccinia virus DNA replication. (1980). In "Microbiology" (ed. D. Schlesinger) ASM publication 275-280.

29. Bablanian, R., Coppola, G., Scribani, S. and **Esteban**, M. (1981). Inhibition of protein synthesis by vaccinia virus. The effect of UV-irradiated virus in the inhibition of protein synthesis. Virology 112, 1-12.

30. Bablanian, R., Coppola, G., Scribani S. and **Esteban**, M. (1981). Inhibition of protein synthesis by vaccinia virus. The role of low molecular weight viral, RNA in the inhibition of protein synthesis. Virology 112, 13-24.

31. Carrasco, L. and **Esteban**, M. (1982). Modification of membrane permeability in vaccinia virus-infected cells. Virology 117, 62-69.

32. Pellicer, A. and **Esteban**, M. (1982). Gene-transfer, stability and biochemical properties of animal cells transformed with vaccinia DNA. Virology 122, 363-380.

33. Santoro, M.G., Jaffe, B.M., Garaci, E. and **Esteban**, M. (1982). Antiviral effect of prostaglandins of the A series: Inhibition of vaccinia virus replication in cultured cells. J. Gen. Virol. 63, 435-440.

34. Lewis, J.A., Mengheri, E. and **Esteban**, M. (1983). Induction of an antiviral state by interferon requires thymidine kinase. Proc. Natl. Acad. Sci. USA 80, 26-30.

35. Mengheri, E., **Esteban**, M. and Lewis, J.A. (1983). Thymidine kinase genes and the induction of an antiviral response. FEBS Letters 157, 301-305.

36. **Esteban**, M., Cabrera, C. and Holowczak, J.A. (1983). Electron microscopic studies of transcriptional complexes released from vaccinia cores during RNA-synthesis in vitro: methods for fractionation of

transcriptional complexes. J. Virol. Methods 7, 73-92.

37. Santoro, G., Jaffe, B.M. and **Esteban**, M. (1983). Prostaglandin A inhibits the replication of vesicular stomatitis virus: effect on virus glycoprotein. J. Gen. Virol. 64, 2797-2801.

38. Santoro, G.M., Jaffe, B., Paez, E. and **Esteban**, M. (1983). The relationship between the antiviral action of interferon and prostaglandins in virus-infected murine cells. Biochem. Biophys. Res. Commun. 116, 442-448.

39. Benavente, J., **Esteban**, M., Jaffe, B. and Santoro, G.M. (1984). Selective inhibition of viral gene expression as the mechanism for the antiviral action of PGA_1 in vaccinia virus-infected cells, J. Gen. Virol. 65, 599-608.

40. **Esteban**, M. (1984). Analysis of replicating vaccinia DNA in interferon treated, virus infected cells. J. Interferon Research 4, 179-192.

41. **Esteban**, M. (1984). Defective vaccinia virus particles in interferon-treated, infected cells. Virology 133, 220-227.

42. Boni, C., **Esteban**, M. and Pellicer, A. (1984). Expression of cloned vaccinia DNA sequences introduced into animal cells. J. Gen. Virol 65, 1245-1251.

43. **Esteban**, M., Benavente, J. and Paez, E. (1984). Effect of interferon on integrity of vaccinia virus and ribosomal RNAs in infected cells. Virology 134, 40-51.

44. Paez, E. and **Esteban**, M. (1984). Resistance of vaccinia virus to interferon is related to an interference phenomenon between the virus and the interferon system. Virology 134, 12-28.

45. Paez, E. and **Esteban**, M. (1984). Nature and mode of action of vaccinia virus products that block activation of the interferon-mediated ppp(A2'p)nA-synthetase. Virology 134, 29-39.

46. Lewis, J.A. and **Esteban**, M. (1984). Induction of an antiviral response and 2',5'oligo A synthetase by interferon in several thymidine kinase deficient cell-lines. Virology 134, 464-469.

47. Benavente, J., Paez, E. and **Esteban**, M. (1984). Indiscriminate degradation of RNAs in interferon-treated, vaccinia virus infected mouse L cells. J. Virol 51, 866-871.

48. Paez, E and **Esteban**, M. (1985). Interferon inhibits marker rescue of vaccinia virus. J. Interferon Research 5, 247-256.

49. **Esteban**, M. and Paez E. (1985). Antiviral and antiproliferative properties of interferons: Mechanism of action. Progress in Medical Virology; ed. J. Melnick vol. 32, 159-173.

50. Perucho, M. and **Esteban**, M. (1985). Inhibitory effect of interferon on the genetic and oncogenic transformation by viral and cellular genes. J. Virol 54, 229-232.

51. Paez, E., Dallo, S. and **Esteban**, M. (1985). In vivo generation of a dominant 8 Md deletion at the left terminus of vaccinia DNA. Proc. Natl. Acad. Sci. U.S.A. 82, 3365-3369.

52. Paez, E. and **Esteban**, M. (1985). Interferon prevents the generation of spontaneous deletions at the left terminus of vaccinia DNA. J. Virol. 56,75-84.

53. **Esteban**, M., Cabrera, C.V. and Holowczak, J.A. (1985). Biochemical and electron microscopic studies of the transcription of vaccinia DNA by RNA polymerase from E. coli: Localization and characterization of trancriptional complexes. J. Virol. Methods 12, 111-133.

54. Rodriquez, J.F., Janeczko, R. and **Esteban**, M. (1985). Isolation and characterization of neutralizing monoclonal antibodies to vaccinia virus. J. Virol. 56, 482-488.

55. **Esteban**, M. and Paez, E. (1985). The 2-5A system and vaccinia virus. Prog. Clin. Biol Res 202, 25-34.

56. **Esteban**, M., Benavente, J. and Paez, E. (1986). Mode of sensitivity and resistance of vaccinia virus replication to interferon. J. Gen. Virol. 67, 801-808.

57. Rodriguez, J.F., Kahn, J. and **Esteban**, M. (1986). Molecular cloning, encoding sequences and expression of the nucleic acid dependent phosphohydrolase gene of vaccinia virus. Proc. Natl. Acad. Sci. USA 83, 9566-9570.

58. **Esteban**, M. and Paez, E. (1986). Mechanism of antiproliferative action of interferon: prevention of DNA sequence alterations. In "Interferons as cell growth inhibitors and antitumor factors: UCLA symposia on Molecular and Cellular Biology. Alan R. Liss, Inc. New York pp 4-15.

59. Paez, E. and **Esteban**, M. (1987). Inhibition of host protein synthesis by -DNA viruses (Adenovirus, Herpesvirus and Poxvirus): Mechanism of action. In "Mechanisms of Viral Toxicity in Animal Cells." (ed. L. Carrasco). CRC Press publication pp. 59-90.

60. Zabagno, G., Jaffe, B. and **Esteban**, M. (1987). Role of Prostaglandins and Nonsteroidal Anti-Inflamatory Drugs in the Pathogenicity of Vaccinia -Virus. J. Gen. Virol. 68, 593-600.

61. Janeczko, R., Rodriguez, J.F. and **Esteban**, M. (1987). Studies on the mechanism of entry of vaccinia virus in animal cells. Archives of Virology 92, 135-150.

62. Rodriquez, J.F., Paez, E. and **Esteban**, M. (1987). A 14,000 Mr envelope protein of vaccinia virus is involved in cell fusion and forms covalently linked trimers. J. Virol 61, 395-404.

63. Dallo, S., **Esteban**, M. (1987). Isolation and characterization of attenuated mutants of vaccinia virus. Virology 159, 408-422.

64. Dallo, S., Rodriguez, J.F. and **Esteban**, M. (1987). A 14K envelope

protein of vaccinia virus with an important role in virus-host cell interactions is altered during virus persistence and determines the plaque size phenotype of the virus. Virology 159, 408-422.

65. Paez, E., Dallo, S. and **Esteban**, M. (1987). Virus attenuation and identification of structural proteins of vaccinia virus that are selectively modified during virus persistence. J. Virol. 61, 2642-2647.

66. Rodriguez, J.F. and **Esteban**, M. (1987). Mapping and nucleotide sequence of the vaccinia virus gene that encodes a 14K fusion protein. J. Virol. 61, 3550-3554.

67. Maa, J-S, and **Esteban**, M. (1987). Structural and functional studies of a 39,000 Mr immunodominant protein of vaccinia virus. J. Virol. 61, 3910-3919.

68. Paez, E. and **Esteban**, M. (1987). Resistance of vaccinia virus to interferons: Modulation of the 2-5A system in interferon-treated, vaccinia virus infected cells. Microbiologia SEM 3, 163-178.

69. Rodriguez, J.F., Rodriguez, D., Rodriguez, J-R., McGowan, E. and **Esteban**, M. (1988). Expression of the firefly luciferase gene in vaccinia virus: A highly sensitive gene marker to follow virus dissemination in tissues of infected animals. Proc. Natl. Acad. Sci. USA 85, 1667-1671.

70. Paez, E. and **Esteban**, M. (1988). Stability of vaccinia virus DNA during - persistent infections: Accumulation of left-end deletions and of tandem repeats at both ends of the viral genome and prevention by interferon. Virology 163 145-154.

71. Bablanian, AR., Goswani, S.K., **Esteban**, M. and Banerjee, A.K. (1988). Selective inhibition of protein synthesis by synthetic and vaccinia virus-core synthesized poly (riboadenylic acids). Virology 161, 366-373.

72. Feduchi, E., **Esteban**, M. and Carrasco, L. (1988). Reovirus Type 3 synthesizes proteins in interferon-treated Hela cells without reversing the antiviral state. Virology 164, 420-426.

73. Santoro, G., Favalli, C., Mastino, A., Jaffe, B.M., **Esteban**, M. and Garaci, E. (1988). Antiviral activity of a synthetic analog of prostaglandin A in mice infected with influenza A virus. Arch. Virology 99, 89-100.

74. Rodriguez, J.F. and **Esteban**, M. (1989). The plaque size phenotype as a selectable marker in the selection of recombinants of vaccinia virus. J. Virol. 63, 997-1001.

75. Rodriguez, D., Rodriguez, J-R., Rodriguez, J.F., Trauber, D. and **Esteban**, M. (1989). Highly attenuated vaccinia virus mutants for the generation of safe recombinant viruses. Proc. Natl. Acad. Sci. USA 86, 1287-1291.

76. Portela, A., Rodriguez, J.R., Rodriguez, D., Rodriguez, J.F., Garcia-Barreno, B., Melero, J.A. and **Esteban**, M. (1989). Expression of the fusion(F) protein of human respiratory syncytial virus using an attenuated strain of vaccinia virus. In Genetics and Pathogenicity of Negative Strand Viruses. (A. Flamand, D. Kolakofsky and B.W.J. Mahy, ed) pp 74-78.

Elsevier Science Pub. N.Y.

77. Dallo, S., Maa, J-S., Rodriguez, J.R., Rodriguez, D. and **Esteban**, M. (1989). Humoral immune response elicited by highly attenuated variants of vaccinia virus and by an attenuated recombinant expressing HIV-1 envelope protein. Virology 173, 323-329.

78. Gong, S., Lai, C., Dallo, S. and **Esteban**, M. (1989). A single point mutation Asp for Ala-25 in the 14KDa membrane protein of vaccinia virus induces a size change that leads to small plaque-size phenotype of the virus. J. Virol. 63, 4507-4514.

79. Maa, J-S., Rodriguez, J-F. and **Esteban**, M. (1990). Structural and functional characterization of a cell surface binding protein of vaccinia virus. J. Biol. Chem. 265, 1569-1577.

80. Gong, S., Lai, C. and **Esteban**, M. (1990). Vaccinia virus induces cell fusion at acid pH and this activity is mediated by the N-terminus of the 14 Kda virus envelope protein. Virology 178, 81-91.

81. Lai, C., Gong, S. and **Esteban**, M. (1990). Structural and functional properties of the 14 KDa envelope protein of vaccinia virus synthesized in Escherichia coli. J. Biol. Chem. 265, 22174-22180.

82. Rodriguez, D., Zhou, Y., Rodriguez, J.R., Durbin, R.K., Jimenez, V., McAllister, W.T. and **Esteban**, M. (1990). Regulated expression of nuclear genes by T3 RNA polymerase and lac repressor using recombinant vaccinia virus vectors. J. Virol. 64, 4851-4857.

83. Kahn, J. and **Esteban**, M. (1990). Identification of the point mutation in two vaccinia virus nucleoside triphosphate phosphohydrolase 1 temperature-sensitive mutants and role of this DNA-dependent ATPase enzyme in virus gene expression. Virology 74, 459-471.

84. Lai, C., Gong, S. and **Esteban**, M. (1991). The 32 KDa envelope protein of vaccinia virus synthesized in Escherichia coli binds with specificity to cell surfaces. J. Virol. 65, 499-504.

85. Rodriguez, D., Rodriguez, J.R., Ojakian, G.K. and **Esteban**, M. (1991). Vaccinia virus preferentially enters polarized epithelial cells through the basolateral surface. J. Virol. 65, 494-498.

86. Rodriguez, J.R., Rodriguez, D. and **Esteban**, M. (1991). Structural properties of HIV-1 envelope fused with the 14 KDa vaccinia virus envelope protein. Virology 181, 742- 748.

87. Bablanian, R., Goswami, S.K., **Esteban, M.**, Banerjee, A.K. and Merrick, W.C. (1991). Mechanism of selective translation of vaccinia virus mRNAs: Differential role of poly A and initiation factors in the translation of viral and cellular mRNAs. J. Virol. 65, 4449-4460.

88. Lai, E., Gong, S. and **Esteban, M.** (1991). The purified 14KDa envelope protein of vaccinia virus produced in E.coli induces virus immunity in animals. J. Virol. 65, 5631-5635.

89. Rodriguez, J-R., Rodriguez, D. and **Esteban, M.** (1991). Interferon

treatment inhibits early events in vaccinia virus gene expression in infected mice. Virology 185, 929- 933.

90. Demkowicz, W.E., Maa, J-S and **Esteban, M.** (1992). Identification of vaccinia genes encoding proteins that are highly antigenic in animals and are immunodominant in vaccinated humans. J. Virol. 66, 386-398.

91. Rodriguez, D., Rodriguez, J-R and **Esteban, M.** (1992). Insertional inactivation of the vaccinia virus 32-Kilodalton gene is associated with attenuation in mice and reduction of viral gene expression in polarized epithelial cells. J. Virol. 66, 183-189.

92. Lee, S.B., Melkova, Z., Yan, W., Williams, B.R.G., Hovanessian, A. and **Esteban, M.** (1993). The interferon-induced double-stranded RNA-activates human p68 protein kinase potently inhibits protein synthesis in cultured cells. Virology 192., 380-385.

93. Lee, S.B. and **Esteban, M.** (1993). The interferon-induced double-stranded RNA- activated human p68 protein kinase inhibits the replication of vaccinia virus. Virology 193, 1037-1041

94. McMahon-Pratt, D., Rodriguez, D., Rodriguez, J.R., Zhang, Y., Manson, K., Bergman, C., Rivas, L., Rodriguez, J-F., Lohman, K.L., Ruddle, N.H. and **Esteban**, M. (1993). Recombinant GP46/M-2 vaccinia viruses protect against Leishmania infection. Infect. and Immun.61, 3351-3359.

95. Rodriguez, D., Rodriguez, J-R. and **Esteban, M.** (1993). The vaccinia 14KDa fusion protein forms a complex with the processed protein encoded by the vaccinia virus A17L gene. J. Virol. 67 ,3435-3440.

96. Li, S., Rodrigues, M., Rodriguez, D., Rodriguez, J.R., **Esteban, M.**, Palese, P., Nussenzweig, R.S. and Zavala, F. (1993). Priming with recombinant influenza virus followed by administration of recombinant vaccinia virus induces $CD8^+$ T-cell-mediated protective immunity against malaria. Proc. Natl. Acad. Sci. USA 90, 5214-5218.

97. Diaz-Guerra, M. and **Esteban, M.** (1993). Vaccinia virus nucleoside triphosphate phosphohydrolase I (NPH-I) controls early and late gene expression by regulating the rate of transcription. J. Virol. 67, 7561-7572.

98. Diaz-Guerra, M., Kahn, J.S. and **Esteban, M.** (1993). A mutation of the nucleoside triphosphate phosphohydrolase I (NPH-I) gene confers sensitivity of vaccinia virus to Interferon. Virology, 197, 485-491.

99. Bablanian, R., Scribani, S, and **Esteban, M** (1993). Amplification of polyadenylated small RNA sequences (POLADS) during superinfection correlates with the inhibition of viral and cellular protein synthesis. Cell. Mol. Biol. Res. 39, 243-255

100. Melkova, Z. and **Esteban, M**. (1994). Interferon-gamma severely inhibits DNA synthesis of vaccinia virus in a macrophage cell line. Virology 198, 731-735.

101. Lee. S.B. and **Esteban, M.** (1994). The interferon-induced human protein kinase (p68 kinase) induces apoptosis. Virology 199, 491-496.

102. Lee, S.B., Green, S., Mathews, M.B and **Esteban, M**. (1994). Activation of the double-stranded (dsRNA)-activated human protein kinase in vivo in the absence of its dsRNA binding domain. Proc. Natl. Acad. Sci. USA 91, 10551-10555.

103. Rodrigues, M., Li, S., Rodriguez, D., Rodriguez, J.R., Bacik,I., Bennink, J.R., Yewdell, J.W., Garcia-Sastre, A., **Esteban, M.,** Palese, P., Nussenzweig, R.S and Zavala, F. (1994). Influenza and vaccinia viruses expressing malaria CD8+ T and B cell epitopes: Comparison of their immunogenicity and capacity to induce protective immunity. J. Immunol.153, 4636-4648

104. Rodriguez, D., Rodriguez, J.R and **Esteban, M.** (1995). Enhanced proteolytic processing of the human immunodeficiency virus type I envelope protein in murine Ltk(-) cells. AIDS Res. and Human Retrovirus 11, 81-85

105. Miyahira, Y., Murata, K., Rodriguez, D., Rodriguez, J.R., **Esteban, M.**, Rodrigues, M and Zavala, F. (1995). Quantification of antigen specific CD8+ T cells using an ELISPOT assay. J. Immunol. Methods 181, 45-54.

106. Sodeik, B., Ericson, M., **Esteban, M.**, Niles, E.G and Griffiths, G. (1995). Assembly of vaccinia virus: Incorporation of two membrane proteins into the intracellular mature virus. J. Virol. 69, 3560-3574.

107. Rodriguez, D., **Esteban, M** and Rodriguez, J.R (1995). Vaccinia virus A17L gene product is essential for an early step in virion morphogenesis. J. Virol. 69, 4640-4648.

108. **Esteban**, Mariano (1995). Vaccinia virus vectors as potential vaccines against malaria. In " Combating Malaria" UNESCO/WHO, 65-74

109. Melkova, Z and **Esteban, M.** (1995). Inhibition of vaccinia virus replication by inducible expression of nitric oxide synthase. J. Immunol 155, 5711-5718.

110. Rodriguez, J.R., Rodriguez, D and **Esteban, M**. (1996). Poxvirus: su utilización como vacunas. En Microbiologia y Genética Molecular. Editado por J. Casadesús y F. Ruiz-Berraquero. Secretariado de la Universidad de Sevilla. Vol II, pp 821-847.

111. Suarez, P., Diaz-Guerra, M., Prieto, C., **Esteban, M.**, Castro, J.M., Nieto, A and Ortín, J. (1996). Open reading frame 5 of porcine reproductive and respiratory syndrome virus as a cause of virus-induced apoptosis. J. Virol. 70, 2876-2882.

112. Murata, K., Garcia-Sastre, A., Tsuji, M., Rodrigues, M., Rodriguez, D., Rodriguez, J-R., Nussenzweig, R., Palese, P., **Esteban, M** and Zavala, F (1996). Characterization of the in vivo primary and secondary CD8+ T cell responses induced by recombinant influenza and vaccinia viruses. Cell. Immunol.173, 96-107

113. Rodriguez, D., Risco, C., Rodriguez, J.R., Carrascosa, J.L and **Esteban, M** (1996). Inducible expression of vaccinia virus A17L gene provides a synchronized system to monitor sorting of viral proteins during

morphogenesis. J. Virol.70, 7641-7653.

114. **Esteban, M**., Rodriguez, D., Jimenez, V and Rodriguez, J.R (1996). Use of persistent infections with vaccinia virus recombinants to introduce alterations in foreign proteins: an aplication to HIV-1 env protein. Virus Research. 46, 45-56

115. Martin-Gallardo, A., Moratilla, M., Funes, J.M., Agromayor, M., Nuñez, A., Varas, A.J., Collado, M., Valencia, A., Lopez-Estebaranz and **Esteban, M**. (1996). Sequence analysis of Mollucum Contagiosum virus DNA region which includes the gene encoding protein kinase 2 and other genes with unique organization. Virus Genes 13, 19-29

116. Brun, A., Rivas, C., **Esteban, M.**, Escribano, J.M and Alonso, C. (1996). African Swine Fever Virus gene A179L, a viral homologue of bcl-2 protects cells from programme cell death. Virology 225, 227-230

117. Lee, S.B., Bablanian, R and **Esteban, M** (1996). Regulated expression of the interferon-induced protein kinase p68(PKR) by vaccinia virus recombinants inhibit the replication of vesicular stomatitis virus but not that of poliovirus. J. Interferon and Cytokine Res. 16, 1073-1078.

118. Nuñez, A., Funes, J.M., Agromayor, M., Moratilla, M., Vara, J., Lopez-Estebaranz, J. L., **Esteban, M** and Martín-Gallardo, A (1996). Detection and typing of Molluscum Contagiosum virus in skin lesions by using a simple lysis method and polymerase chain reaction. J. Medical Virology 50, 342-349.

119. Schwanig, M., **Esteban, M**., Ghislain C., Grandjean, Y., Jepsen, S and Roumiantzeff, M (1996). Models for scientific and economic interaction in vaccines R&D. Vaccine 14, 582-610.

120. Cudmore, S., Blasco, R., Vincentelli, R., Sodeik, B., **Esteban, M**., Griffiths, G and Krijnse-Locker, J (1996). A vaccinia virus core protein, p39, is membrane associated. J. Virol. 70, 6909-6921

121. Diaz-Guerra, M., Melkova, Z., and **Esteban, M** (1996). Inducible expression of the 2-5A synthetase/RNase L system results in inhibition of vaccinia virus replication. Virology 226,220-228.

122. Taylor, D.R., Lee, S.B., Romano, P. R., Marshak, D. R., Hinnebusch, A. G., **Esteban, M** and Mathews, M. B (1996). Authophosphorylation sites participate in the activation of the double-stranded RNA-activated protein kinase PKR. Mol. Cell. Biol. 16, 6295-6302.

123. Moratilla, M., Agromayor, M., Nuñez, A., Funes, J.M., Varas, A., Lopez-Estebaranz, J., **Esteban, M** and Martin-Gallardo, A (1997). A random DNA sequencing computer-based approach for the generation of a gene map of Molluscum Contagiosum virus. Virus Genes 14, 75-82.

124. Rodriguez, J.R., Risco, C., Carrascosa, J. L., **Esteban, M** and Rodriguez, D (1997). Characterization of early stages of vaccinia virus membrane biogenesis: implication of the 21 kDa and a newly identified 15 kDa envelope protein. J. Virol. 71, 1821-1833.

125. Lee, S.B., Rodriguez, D., Rodriguez, J.R and **Esteban, M** (1997). The

apoptosis pathway triggered by the interferon-induced protein kinase PKR is independent of eIF-2a phosphorylation, is initiated upstream of bcl-2 and involves ICE/CED3-like proteases. Virology 231, 81-88.

126. Melkova, Z., Lee, S.B and **Esteban, M** (1997). Bcl-2 prevents nitric oxide-mediated apoptosis and poly(ADP-ribose)polymerase cleavage. FEBS Letters 403, 273-278.

127. Diaz-Guerra, M., **Esteban, M** and Martinez, J.L (1997). Growth of E. coli in acetate as a sole carbon source is inhibited by ankyrin-like repeats present in the 2',5'-linked oligoadenylate-dependent human RNase L enzyme. FEMS Microbiology Letters 149, 107-113.

128. Diaz-Guerra, M., Rivas, C and **Esteban, M** (1997). Activation of the IFN-inducible enzyme RNase L causes apoptosis of animal cells. Virology, 235, 354-363.

129. Salmons, T., Kuhn, A., Schleich, S., Rodriguez, J.R., Rodriguez, D., **Esteban, M.**, Griffiths, G., and Krijnse Locker, J (1997). Vaccinia virus membrane proteins p8 and p16 are cotranslationally inserted into the rough ER and retained in the intermediate compartment. J. Virol. 71, 7404-7420.

130. Rodriguez, J.R., Risco, C., Carrascosa, J.L., **Esteban, M** and Rodriguez, D (1998). Vaccinia virus 15 kDa (A14L) protein is essential for assembly and attachment of viral crescents to virosomes. J. Virol.72, 12871296.

gg

131. Miyahira, Y., Garcia-Sastre, A., Rodriguez, D., Rodriguez, J.R., Tsuji, M., Palese, P., **Esteban, M**., Zavala and Nussenzweig, R.S (1998). Recombinant viruses expressing a human malaria antigen elicit a protective immune response in mice. Proc. Natl. Acad. Sci. USA. 95, 3954-3959.

gggg

132. Rivas, C., Gil, J., Melkova, Z., **Esteban, M** and Diaz-Guerra, M (1998). Vaccinia virus E3L protein is an inhibitor of the interferon (IFN)-induced 2-5A synthetase enzyme. Virology, 243, 406-414.

133. Gonzalo, R.M., Rodriguez, D., Rodriguez, J.R., Garcia-Sastre, A., Palese, P., and **Esteban, M** (1999). Enhanced CD8 T cell response to HIV_1 env by combined immunization with influenza and vaccinia virus recombinants. Vaccine 17, 887-892.

134. Gherardi, M and **Esteban, M** (1999). Mucosal and systemic immune responses induced after oral delivery of vaccinia virus recombinants. Vaccine 17, 1074-1083.

135. Rodriguez, D., J.R Rodriguez, J.R., Llorente., M., Vazquez, I., Lucas, P., **Esteban, M**., Martinez, C-A and del Real, G (1999). A human immunodeficiency virus type 1 Env-granulocyte-macrophage colony-stimulating factor fusion protein enhances the cellular immune response to Env in a vaccinia virus-based vaccine. J. Gen. Virol 80, 217-223.

136. Vazquez, M-I., Rivas, G., Cregut, D., Serrano, L., and **Esteban, M** (1998). The vaccinia virus 14kDa (A27L) fusion protein forms a triple coiled-coil structure and interacts with the 21 kDa (A17L) virus membrane protein through a C-terminal a-helix. J. Virol 72, 10126-10137

137. Diaz-Guerra, M., Rivas, C and **Esteban, M** (1999). Full activation of RNaseL in animal cells requires binding of 2-5A within ankyrin repeats 6 to 9 of this IFN-inducible enzyme. J. Interferon and Cytokine Research 19, 113-119.

138. Pavón, M and **Esteban, M** (1999). Identification by two-dimensional gel electrophoresis (2D-PAGE) of vaccinia virus and cellular phosphoproteins modified after inducible expression of the dsRNA-activated protein kinase (PKR). J. Interferon and Cytokine Research 19, 591-601.

139. Gil, J., Alcami, J., and **Esteban, M** (1999). Induction of apoptosis by double-stranded-RNA-dependent protein kinase (PKR) involves the alpha subunit of eukaryotic translation initiation factor 2 and NF-kB. Mol. Cell. Biol. 19, 4653-4663.

140. Vazquez, M-I and **Esteban, M** (1999). Identification of fuctional domains in the 14-Kilodalton envelope protein (A27L) of vaccinia virus. J. Virol 73, 9098-9109.

141. Gherardi, M., Ramirez, J.C., Rodriguez, Rodriguez, J.R., Gen-Ischiro, S., Zavala, F and **Esteban, M** (1999). IL-12 delivered from vaccinia virus recombinants attenuates the vector and enhances the cellular immune response against HIV-1 env in a dose-dependent manner. J. Immunology 162, 6724-6733.

142. Rodriguez, D., Rodriguez, J.R., Llorente, M., Lucas, P., **Esteban, M.,** Martinez-A, C and del Real, G (1999). Use of DNA priming and vaccinia virus boosting to trigger an efficient immune response to HIV-1 gp120. Gene Therapy and Molecular Biology 3, 179-187.

143. Risco, C., Rodriguez, J.R., Carrascosa, J.L **Esteban, M** and Rodriguez, D (1999). The Vaccinia virus 39 kDa protein (A4L gene) forms a stable complex with the p4a/4a major core protein early in morphogenesis. Virology 265, 375-386.

144. Rivas, C., Gil, J and **Esteban, M** (1999). Identification of functional domains of the interferon-induced enzyme PKR in cells lacking endogenous PKR. J. Interferon and Cytokine Research, 19, 1229-1236.

145. Gherardi, M.M., Ramirez, J.C., Rodriguez, D., Rodriguez, J.C., Sano, G-I., Zavala, F, and Esteban, M (1999). The cytokine IL-12 attenuates Vaccinia virus and enhances the cellular immune response against HIV-1 env in a dose-dependent manner. The Fourth European Conference on Experimental AIDS Research. Monduzzi Ed. p79-83.

146. Ramirez, J.C., Gherardi, M.M, and **Esteban, M** (2000). Biology of attenuated modified vaccinia virus Ankara recombinant vector in mice: Virus fate and activation of B and T cell immune responses in comparison with the western reserve strain and advantages as a vaccine. J. Virol 74 923-933.

147. Oliveira-Ferreira, J., Myahira, Y., Layton, G.T**., Esteban, M**., Rodriguez, D., Rodriguez, J.R., Nussenzweig, R.S and Zavala, F (2000). Immunogenicity of Ty-like particles bearing a CD8+ T cell epitope of the CS protein of Plasmodium yoelii. Vaccine 18, 1863-1869

148. Gil, J., **Esteban, M** and Roth, D. (2000). In vivo regulation of protein synthesis by phosphorylation of the alpha subunit of wheat eukaryotic initiation factor 2. Biochemistry. 39, 7521-7530.

149. Ding, D., Moskowitz, S.I., Li, R., Lee, S.B., **Esteban, M**., Tomaseli, K., Chan, J, and Bergold, P. J (2000). Acidosis induces necrosis and apoptosis of cultured hippocampal neurons. Experimental Neurology 162, 1-12

150. Gil, J., Alcami, J and **Esteban, M** (2000)**.** Activation of NF-kB by the dsRNA dependent protein kinase PKR involves the IkB kinase complex. Oncogene, 19, 1369-1378.

151. Gil, J and **Esteban, M** (2000). Apoptosis induction by the dsRNA-dependent protein kinase PKR: mechanism of action. Apoptosis 5, 107-114.

152. Collado, M., Rodriguez, D., Rodriguez, J.R., Vazquez, I., Gonzalo, R.M and **Esteban, M** (2000). Chimeras between the human inmunodeficiency virus (HIV-1) Env and vaccinia virus immunogenic proteins p14 and p39 generate broadly reactive antibodies and specific activation of CD8+ T cell responses to Env. Vaccine 18, 3123-3133.

153. Gil, J and **Esteban, M** (2000). The interferon induced protein kinase (PKR), triggers apoptosis through FADD-mediated activation of caspase 8 in a manner independent of Fas and TNF-a receptors. Oncogene 19, 3665-3674.

154. Gherardi, M.M., Ramirez, J.C and **Esteban**, M (2000). IL-12 enhancement of the cellular immune response against HIV-1 Env antigen in a DNA prime/vaccinia virus boost vaccine regimen is time and dose-dependent. J. Virol 74, 6278-6286.

155. **Esteban,** M and Patiño, C (2000). Identification by electron microscopy of the maturation steps in vaccinia virus morphogenesis inhibited by the interferon-induced enzymes, protein kinase (PKR), 2-5A synthetase and nitric oxide synthase (iNOS). J. Interferon and Cytokine Res. 20, 867-877.

156. Gil, J., **Esteban, M**, and Roth, D (2000. In vivo regulation of the dsRNA-dependent protein kinase PKR by the cellular glycoprotein p67. Biochemistry 39, 16016-16025.

157. Fernandez-Cruz, E., Navarro, J., Abad, M.L., Resino, R., Jimenez, J.L., Cantó, C., Diaz, L., Rodriguez, D., **Esteban, M**, and Muñoz-Fernandez, M.A (2000). Effect of a Gp 120-depleted inactivated HIV-1 immunogen (Remune TM) on the control of nuclear factor Kappa-B activation, cytokine production and augmentation of HIV-1 specific cytotoxic T lymphocytes. Fifth. Eur. Conf. Exp. AIDS Res. Monduzzi Edit. 105-111.

158. Zavala, F., Rodrigues, M., Rodriguez, D., Rodriguez, J.R., Nussenzweig, R.S and **Esteban, M** (2001). A striking property of vaccinia viruses: efficient inducers of in vivo expansion of primed CD8+ T cells. Virology 280, 155-159.

159. Gonzalo, R.M., Rodriguez, J.R., Rodriguez, D., Gonzalez-Aseguinolaza,

G., Larraga, V and **Esteban, M** (2001). Protective immune response against cutaneous leishmaniasis by prime/booster immunisation regimes with vaccinia virus recombinant expressing Leishmania infantum p36/LACK in combination with purified p36. Microbes and Infection 3, 701-711.

160. Gil, J., Rullas, J., Alcami, J, and **Esteban, M** (2001). The catalytic activity of dsRNA-dependent protein kinase, PKR, is required for NF-kB activation. Oncogene 20, 385-394.

161. Heljasvaara, R., Rodriguez, D., Risco, C., Carrascosa, J.L., **Esteban, M**, and Rodriguez, J.R (2001). The major core protein P4a (A10L gene) of vaccinia virus is essential for correct assembly of viral DNA into the nucleoprotein complex to form immature viral particles. J. Virol 75, 5778-5795.

162. Gil, J, and **Esteban, M** (2001). Mecanismo de acción de los interferones. Investigación y Ciencia, 299, 44-51.

163. Gherardi, M-M., Ramirez, J.C, and **Esteban, M** (2001). Towards a new generation of vaccines: the cytokine IL-12 as an adjuvant to enhance cellular immune responses to pathogens during prime-booster vaccination regimens. Histology and Histopathology 16, 655-667.

164. Gil, J, and **Esteban, M** (2001). Antiviral role of the dsRNA-dependent protein kinase, PKR. Recent Res. Devel. Virol. 3, 13-27.

165. Gomez, C.E, and **Esteban, M** (2001). Recombinant proteins produced by vaccinia virus vectors can be incorporated within the virion (IMV form) into different compartments. Arch.Virol.146, 875-892.

166. Wallengreen, K., Risco, C., Krinse-Locker, J., **Esteban, M**, and Rodriguez, D (2001). The A17L gene product of vaccinia virus is exposed on the surface of IMV. Virology 290, 143-152.

167. **Esteban, M** (2001). Retos de la biotecnología en la I+D+I en el siglo XXI. En "Notas de Opinión", Real Academia de Ciencias Morales y Políticas, p155-161.

168. **Esteban, M** (2001). The human genome and biomedicine: future goals. Editorial. Rev. Oncología 3, 119-120.

169. Gil, J., Rullas, J., Alcami, J, and **Esteban, M** (2001). MC159L protein from the poxvirus Molluscum contagiosum inhibits NF-kB activation and apoptosis induced by PKR. J. Gen. Virol 82, 3027-3034.

170. Risco, C., Rodriguez, J.R., López-Iglesias, C., Carrascosa, J.L., **Esteban, M**, and Rodriguez, D (2002). ERGIC membranes and vimentin filaments participate in vaccinia virus assembly. J. Virol. 76, 1839-1856.

171. Gomez, C.E., Rodriguez, D., Rodriguez, J.R., Abaitua, F., Duarte, C, and **Esteban, M** (2002). Enhanced CD8+ T cell immune response against a V3 loop multi-epitope polypeptide (TAB13) of HIV-1 Env after priming with purified fusion protein and booster with modified virus Ankara (MVA-TAB) recombinant: a comparison of humoral and cellular immune responses with the vaccinia virus Western Reserve (WR) vector. Vaccine 20, 961-

971.

172. Gonzalo, R.M., Del Real, G., Rodriguez, J.R., Rodriguez, D., Heljasvaara, R., Lucas, P, and **Esteban, M** (2002). A heterologous prime-boost regime using DNA and recombinant VV expressing Leishmania infantum-P36 antigen protects Balb/c mice from cutaneous leishmaniasis. Vaccine 20, 1226-1231.

173. Ramirez, J.C., Tapia, E, and **Esteban, M** (2002). Administration to mice of a monoclonal antibody that neutralizes the intracellular mature virus form of vaccinia virus limits virus replication efficiently under prophylactic and therapeutic conditions. J. Gen. Virol. 83, 1059-1067.

174. Agromayor, M., Ortiz, P., Lopez-Estebaranz, J.L., Gonzalez-Nicolas, J., **Esteban, M,** and Martin-Gallardo, A (2002). Molecular epidemiology of molluscum contagiosum virus and analysis of the host-serum antibody response in Spanish HIV-negative patients. J. Med. Virol 66, 151-158.

175. Humlova, Z., Vokurka, M., **Esteban, M**, and Melkova, Z (2002) Vaccinia virus induces apoptosis of infected macrophages. J. Gen. Virol. 83, 2821-2832.

176. Lopez-Fuertes, L., Perez-Jimenez, E., Vila-Coro, A.J., Sack, F., Moreno, S., Konig, S.A., Junghams, C., Wittig, B., Timon, M, and **Esteban, M** (2002). DNA vaccination with linear minimalistic (MIDGE) vectors confers protection against Leishmania major infection in mice. Vaccine 21, 247-257.

177. García, M.A., Guerra, S., Gil, J., Jimenez, J, and **Esteban, M** (2002). Antiapoptotic properties of the dsRNA-binding protein of vaccinia virus, E3L. Oncogene 21,8379-8387.

178. Gil, J., García, M.A, and **Esteban, M** (2002). Caspase 9 activation by the dsRNA-dependent protein kinase, PKR: molecular mechanism and relevance. FEBS Letters 529, 249-255.

179. Sanchez, A.B., Rodriguez, D., Garzon, A., Amorena, B., **Esteban, M**, and Rodriguez, J.R (2002). Visna Maedi virus Env protein expressed by a vacccinia virus recombinant induces cell-to-cell fusion in cells of different origins in the apparent absence of Env protelytic processing. Arch. Virol 147, 2377-2392.

180. Tapia, E., Pérez-Jimenez, E., Lopez-Fuertes, L., Gonzalo, R, and **Esteban, M** (2003). The combination of vectors expressing IL-12+IL-18 elicits high protective immune response against cutaneous leishmaniasis after priming with DNA-p36/LACK and the cytokines, followed by a booster with a vaccinia virus recombinant expressing p36/LACK. Microbes and Infection 5, 73-84.

181. Ramirez, J.C., Finke, D., **Esteban, M**., Kraehenbuhl, J.P, and Acha-Orbea, H (2003). Tissue distribution of Modified Vaccinia Virus Ankara (MVA) after mucosal or systemic administration. Arch. Virol. 148, 827-839

182. Gherardi, M.M., Nájera, J.L., Pérez-Jiménez, E., Guerra, S., García-Sastre, A, and **Esteban, M** (2003). Prime/boost immunization schedules based on influenza and vaccinia virus (VV) vectors (MVA and WR)

potentiate cellular immune responses against HIV-env protein systemically and in the genito-rectal draining lymph nodes. J. Virol 77, 7048-7057

183. Ramiro, M.J., Zárate, J.J., Hanke, T., Rodriguez, D., Rodriguez, J.R., **Esteban, M.,** Lucientes, J., Castillo, J.A, and Larraga, V (2003). Protection against Leishmania infantum visceral leihsmaniasis in dogs is achieved by immunization with heterologous prime-booster regime using LACK-expressing DNA and recombinant vaccinia virus. Vaccine 21, 2471-2484.

184. Guerra, S., López-Fernandez, L., Pascual-Montano, A., Muñoz, M., Harsman, K, and **Esteban, M** (2003). Cellular gene expression survey upon vaccinia virus infection of human HeLa cells. J. Virol 77, 6493-6506.

185. **Esteban, M.,** Garcia, M.A., Domingo-Gil, E., Arroyo, J., Nombela, C, and Rivas, C (2003). The latency protein LANA 2 from Kaposi´s sarcoma associated herpesvirus (KSHV) inhibits apoptosis induced by PKR but not RNase L activation. J. Gen.Virol 84, 1463-1470

186. Gherardi, M.M., Ramirez, J.C, and **Esteban, M** (2003). Interleukin-12 (IL-12) and IL-18 synergize to clear vaccinia virus infection: involvement of innate and adaptive components of the immune system. J. Gen. Virol. 84, 1961-1972.

187. Gonzalez-Lopez, C., Martinez-Costas, J., **Esteban, M**, and Benavente, J (2003). Avian reovirus σA protein is an inhibitor of the double-stranded RNA-dependent protein kinase PKR. J. Gen. Virol. 84,1629-1639.

188. Gallego-Gómez, J.C., Risco, C., Rodríguez, D., Cabezas, P., Guerra, S., Carrascosa, J.L, and **Esteban, M** (2003). Differences in virus-induced cell morphology and in virus maturation between the MVA and other strains (WR, Ankara, NYCBH) of vaccinia virus in infected human cells. J. Virol 77, 10606-10622.

189. Gonzalez-Aseguinolaza, G., Nakaya, Y., Molano, A., Dy, E., **Esteban, M**., Rodriguez, D., Rodriguez, J.R., Palese, P., Garcia-Sastre, A, and Nussenzweig, R.S (2003). Induction of protective immunity against malaria by prime/boost immunization with recombinant cold- adapted influenza and modified vaccinia virus Ankara viruses expressing a CD8+ T cell epitope derived from the cincumsporozoite protein of Plasmodium yoelii. J. Virol 77, 11859-11866.

190. Gómez, C.E., Abaitua, F., Rodriguez, D., Duarte, C, and **Esteban, M** (2003). Efficient CD8+ T cell response to HIV-env V3 loop epitope from multiple isolates by a DNA prime/vaccinia virus boost (rWR and rMVA strains) immunisation regime and enhancement by the cytokine IFN-γ. Virus Research 105, 11-22

191. Diderlaurent, A., Ramirez, J.C., Graff, M., Gherardi, M., Orbea, H-A., Wagner, H., **Esteban, M**., Kraehenbuhl, J-P, and Sirard, J-C (2004). Attenuated poxviruses expressing a synthetic HIV protein stimulate HLA-A2 restricted cytotoxic T cell responses. Vaccine 22, 3395-3403

192. Gil, J., García, M-A., Gómez-Puertas, P., Guerra, S., Rullás, J., Alcamí, J,

and **Esteban, M** (2004). TRAF family proteins link PKR with NF-kB activation. Mol. Cell. Biol. 24, 4502-4512.

193. Guerra, S., Lopez-Fernandez, L.A., Conde, R., Pascual-Montano, A., Harshman, K, and **Esteban, M**. (2004). Microarray Analysis Reveals Characteristic Changes of Host Cell Gene Expression in Response to Attenuated Modified Vaccinia Virus Ankara Infection of Human HeLa Cells. J Virol **78**(11): 5820-34.

194. Gherardi, M. M., Perez-Jimenez, E., Nájera, J.L and **Esteban, M** (2004). Induction of HIV immunity in the genital tract after intranasal delivery of a MVA vector: enhanced immunogenicity after DNA prime-modified vaccinia virus Ankara boost immunization schedule." J Immunol **172**(10): 6209-20.

195. **Esteban, M** (2004). Conceptos y futuras aplicaciones de la genómica, proteómica y bioinformática en el campo de la salud. En Genoma España, Salud Humana, pp 99-104

196. **Esteban, M** (2004). Desarrollo de nuevas vacunas basadas en poxvirus. En "Real Expedición Filantrópica de la Vacuna. Doscientos años de lucha contra viruela". Biblioteca de Historia de América, CSIC. p 333-345

197. Gil, J, and **Esteban, M** (2004). Vaccinia virus recombinants as a model system to analyze interferon-induced pathways. J. Interferon and Cytokine Research 24, 637-646

198. Guerra, S., Aracil, M., Conde, R., Bernad, A, and **Esteban, M** (2005). Wiskott-Aldrich Síndrome protein is needed for vaccinia virus pathogenesis. J. Virol. 79, 2133-2140

199. Cyrklaff, M., Risco, C., Fernández, J.J., Jiménez, M.V., **Esteban, M**., Baumeister, W, and Carrascosa, J.L (2005). Cryo-Electron tomography of vaccinia virus. Proc. Natl. Acad. Sci. USA. 102, 2772-2777

200. C. Munoz-Fontela., Garcia, M.A., Garcia-Cao, I., Collado, M., Arroyo, J., **Esteban**, M., Serrano, M and Rivas, C (2005). Resistance to viral infection of super p53 mice. Oncogene 24, 3059-3062

201. Gómez, C.E., Vandermeeren, A., García, M.A, Domingo, E, and **Esteban, M** (2005). Involvement of PKR and RNase L in translational control and induction of apoptosis after hepatitis C virus gene expression. Viroloy Journal 2(1): 81.

202. Dondji, B., Pérez-Jiménez, E., Goldsmith-Pestana**., Esteban, M**, and McMahon-Pratt, D (2005). Heterologous prime-boost vaccination using LACK antigen protects against murine visceral leishmaniasis. Infect. Immunity 73, 5286-5289.

203. Gonzalez, B., Reina, R., Garcia, I., Andres, S., Glaria, I., Alzueta, M., Mora, M.I Mora, Jugo, B.M., Arrieta-Aguirre, I., Lastra, J.M., Rodriguez, D., Rodriiguez, J.R., **Esteban, M**., Grillo, M.J., Blacklaws, B.A., Harkiss, G.D., Chebloune, Y., Lujan, L., Andres, D, and Amorena, B (2005). Mucosal immunization of sheep with a Maedi-Visna virus (MVV) env DNA vaccine protects against early MVV productive infection. Vaccine 23, 4342-4352.

204. Gherardi, M.M and **Esteban, M** (2005). Recombinant poxviruses as mucosal vaccine vectors. J. Gen. Virol. 86, 2925-2936.

205. Alcami, J., Munne, J., Muñoz-Fernandez, MA and **Esteban, M** (2005). Current situation in the development of a preventive HIV vaccine. Enferm. Infecc. Microbiol. Clin. 23 (suppl. 2), 15-24.

206. Abaitua, F., Rodríguez, J.R., Garzón, A., Rodríguez, D, and **Esteban, M** (2006). Improving recombinant MVA immune responses: Potentiation of the immune responses to HIV-1 with MVA and DNA vectors expressing env and the cytokines IL-12 and IFN-gamma. Virus Research 116, 11-20.

207. Ventoso, I., Sanz, M.A., Molina, S., Berlanga, J.J, Carrasco, L, and **Esteban, M** (2006). Translational resistance of late alphavirus mRNA to eIF-2 alfa phosphorylation: a strategy to overcome the antiviral effect of protein kinase PKR. Genes Development 20, 87-100.

208. Guerra, S., López-Fernández, L.A., Pascual-Montano, A., Nájera, J.L., Zaballos., A, and **Esteban, M** (2006). Host response to the attenuated poxvirus vector NYVAC: upregulation of apoptotic genes and NF-kB-responsive genes in infected HeLa cells. J. Virol 80, 985-998.

209. Pérez-Jimenez, E., Kochan, G., Gherardi, M.M and **Esteban, M** (2006). MVA-LACK as a safe and efficient vector for vaccination against leishmaniasis. Microbes and Infection 8, 810-822.

210. Rodriguez D., Bárcena, M., Möbius, W., Schleich, S., **Esteban**, **M**., Geerts W.J.C., Koster, A.J., Griffiths, G., and Krijnse Locker J (2006). A vaccinia virus lacking A10L: viral core proteins accumulate on structures derived from the endoplasmic reticulum. Cell. Microbiol. 8, 427-437.

211. E. Domingo and **Esteban, M** (2006). Role of mitochondria in apoptosis induced by the 2-5A system and mechanisms involved. Apoptosis 11, 725-738.

212. Nájera, J.L., Gómez, C.E., Domingo, E., Gherardi, M.M, and **Esteban, M** (2006). Cellular and biochemical differences between two attenuated poxvirus vaccine candidates (MVA and NYVAC) and role of C7L gene. J. Virol 80, 6033-6047.

213. **Esteban, M** (2006). Poxviridae. "VIRUS Patógenos". Editores Carrasco, L y J.M Almendral. HELICE, Madrid. Capítulo 12, pp 245-261.

214. **Esteban, M** (2006). Interferones y Vacunas como control de enfermedades prevalentes. Discurso de ingreso como Académico de Número en la Real Academia Nacional de Farmacia, 26 enero. Ed. Realigraf, p1-86

215. Guerra, S., López-Fernández, L.A., García, M.A., Zaballos, A., and **Esteban, M** (2006). Human gene profiling in response to active protein kinase PKR in infected cells: involvement of the transcription factor ATF-3 in PKR-induced apoptosis. J. Biol. Chem 281, 18734-18745

216. García, M.A., Gil, J., Ventoso, I., Guerra, S., Domínguez, E., Rivas, C, and **Esteban, M** (2006). The impact of protein kinase PKR in cell biology:

from antiviral to antiproliferative action. Microb. Mol. Biol. Reviews 70, 1032-1060.

217. Garcia, M.A., Collado, M., Muñoz, C., Mathew, A., Arroyo, J**., Esteban, M.**, Serrano, M, and Rivas, C (2006). Antiviral action of tumour suppressor ARF. The EMBO Journal 25, 4284-4292.

218. Gómez, C.E., Nájera, J.L., Pérez-Jiménez, E., Jiménez, V., Wagner, R., Graf, M., Franchette, M.J., Liljeström, P., Pantaleo, G., and **Esteban, M** (2007). Head-to-head comparison on the immunogenicity of two HIV/AIDS vaccine candidates based on the poxvirus strains MVA and NYVAC coexpressing in a single locus the HIV-1BX08 and HIV-1 Gag-Pol-Nef proteins of clade B. Vaccine 25, 2863-2885.

219. Gómez, C.E., Nájera, J.L., Jiménez, V., Goranson, E., Liljestöm, P., Bieler, K., Wild, J., Franchette, M.J., Pantaleo, G., Wolf, H., Wagner, R, and **Esteban, M**. Immunogenicity of HIV/AIDS vaccine candidates targetting HIV-1 Env/Gag-Pol-Nef antigens of clade C (2007). Vaccine 25, 1969-1992.

220. Muñoz-Fontela, C., García, M.A., Collado, M., Marcos-Villar, L., Gallego, P., **Esteban, M**, and Rivas, C (2007). Control of virus infection by tumour suppressors. Carcinogenesis 28, 1140-1144.

221. García, M.A., Meurs, E, and **Esteban, M** (2007). The dsRNA protein kinase PKR: virus and cell control. Biochimie 89, 799-811.

222. Gómez, C.E., Nájera, J.L., Domingo-Gil, E., Ochoa-Callejero, L., Gloria González-Aseguinolaza, **and Esteban, M** (2007). Virus distribution of the attenuated MVA and NYVAC poxvirus strains in mice. J. Gen. Virol 88, 2473-2478.

223. Guerra, S., Nájera, J.L., González, J.M., López, L., Climent, N., Gallart, T., Gatell, J.M, and **Esteban, M** (2007). Distinct gene expression profiling after infection of immature human monocyte-derived dendritic cells by the attenuated poxvirus vectors MVA and NYVAC. J. Virol 81, 8707-8721.

224. **Esteban, M** (2007). RNA interferente: del descubrimiento a sus aplicaciones. An. R. Acad. Nac. Farm., 73 (1), 97-124.

225. **Esteban, M (**2007**)**. Interferones y vacunas cómo control de enfermedades prevalentes. En "Bioquímica y Fisiopatología del Sistema Immune", eds, María Cascales Angosto & Pedro García Barreno. Instituto de España. 245-301

226. **Esteban, M** (2007). Desarrollo de vacunas contra el VIH/SIDA. Academia de Farmacia de Galicia (discurso de toma de posesión como Académico correspondiente, 28 marzo). An. R. Acad. Nac. Farm. 73, 1047-1078.

227. García, M.A., Muñoz-Fontela, C., Collado, M., Marcos-Villar, L., **Esteban, M**, and Rivas, C (2007). Novel and unexpected role for the tumor suppressor ARF in viral infection surveillance. Future Virology, 2, 625-629.

228. **F**raile-Ramos, A., Pelchen-Matthews, A., Risco, C., Rejas, M.T., Emery, V., Walker, A., Carrascosa, J.L., **Esteban, M**, and Marsh, M (2007). The

ESCRT machinery is not required for human cytomegalovirus envelopment. Cell Microbiol 9, 2955-2967.

229. Kochan, G., Escors, D., González, J.M., Casasnovas, J.M, and **Esteban, M** (2008). Membrane cell fusion activity of the vaccinia virus A17-A27 protein complex. Cell Microbiol 10, 149-164

230. Domingo-Gil, E., Pérez-Jiménez, E., Ventoso, I., Nájera, J.L, and **Esteban, M** (2008). Expression of the E3L gene of vaccinia virus in transgenic mice decreases the host resistance to vaccinia virus and Leishmania major infection. J. Virol 82, 254-267

231. Corbett, M., Bogers, W., Gerber, S., Genin, C., Didierlaurant, A., Oostermeijer, H., Gómez, C.E., **Esteban, M.**, Koopman, G., Heeney, J.L., van der Burg, S., Kraehenbuhl, J.P, and Le Pape, A (2008). Aerosol immunisation with the recombinant poxvirus vaccine vectors NYVAC and MVA is safe and immunogenic. Proc. Natl. Acad. Sci. USA 105, 2046-2051.

232. Mooij, P., Balla-Jaghjoorsingh, S.S., Koopman, G., Beenhakker, N., van Haaften, P., Baak, I., Nieuwenhuis, I., Kondova, I., Wagner, R., Wolf, H., Gómez, C.E., Nájera,J.L., Jiménez,V., **Esteban, M**, and Heeney, J.L (2008). Differential CD4+ versus CD8+ T cell responses elicited by different Poxvirus-based human immunodeficiency virus type I vaccine candidates provide comparable efficacies in primates. J. Virol 82, 2975-2988.

233. Harari A, Bart PA, Stöhr W, Tapia G, Garcia M, Medjitna-Rais E, Burnet S, Cellerai C, Erlwein O, Barber T, Moog C, Liljestrom P, Wagner R, Wolf H, Kraehenbuhl JP, **Esteban M**, Heeney J, Frachette MJ, Tartaglia J, McCormack S, Babiker A, Weber J, Pantaleo G.(2008). An HIV-1 clade C DNA prime, NYVAC boost vaccine regimen induces reliable, polyfunctional, and long-lasting T cell responses. J. Exp Med. 2008 Jan 21;205(1):63-77**.**

234. Dondji, B., Deak, E., Goldsmith-Pestana, K., Pérez-Jiménez, E., **Esteban, M**., Yammaura, T, and McMahon-Pratt, D (2008). Intradermal activation of NFKTi cells during DNA priming in heterologous prime-boost vaccination enhances effector and memory T cell responses and protection against Leishmania major infection. Eur. J. Immunol 38, 706-719.

235. Bart, P-A., Goodall, R., Barber, T., Harari, A., Guimaraes-Walker, A., Khonkarly, M., Shepperd, N., Bangala, Y., Frachette, M-J., Wagner, R., Liljeström, P., Krahenbuhl, J-P., Girard, M., Goudsmit, J., **Esteban, M**., Heeney, J., Sattentau, Q., McCormack, S., Babiker, A., Pantaleo, G, and Weber, J (2008). EVO1: A phase I trial in healthy HIV negative volunteers to evaluate a clade C HIV vaccine, NYVAC-C undertaken by the EuroVacc consortium. Vaccine 26, 3153-3161**.**

236. Gómez, C.E., Nájera, J.L., Krupa, M, and **Esteban, M** (2008). The poxvirus vectors MVA and NYVAC as gene delivery systems for vaccination against infectious diseases and cancer. Current Gene Therapy 8, 97-120**.**

237. Guerra, S., Cáceres-Nuñez, A., Horak, I, and **Esteban, M** (2008). Vaccinia virus E3 protein prevents the antiviral action of ISG15. PLoS

Pathogens 4 (7).08

238. Gómez, C.E., Nájera, J.L., Krupa, M, and **Esteban, M** (2008). Poxvirus vectors and their use as vaccines. European Infectious Disease 2, 80-83**.**

239. Vandermeeren, A., Gómez, C.E, Domingo-Gil, E, and **Esteban, M** (2008). Subcellular forms and biochemical events triggered in human cells by HCV polyprotein expression from a viral vector. Virology Journal 5: 102**.**

240. Chichón, F.J., Rodríguez, M.J., Risco, C., Fraile-Ramos, A., Fernández, J.J., **Esteban, M** and Carrascosa, J.L (2009). Membrane remodelling during vaccinia virus morphogenesis. Biology of Cell 101, 401-414**.**

241. Gómez, C.E., Nájera, J.L., Sanchez, R., Jiménez, V and **Esteban, M** (2009). Multimeric soluble CD40L ligand (sCD40L) efficiently enhances specific cellular immune responses during DNA prime and boost with attenuated poxvirus vectors MVA and NYVAC expressing HIV antigens. Vaccine 27, 3165-3174.

242. Delaloye, J., Roger, T., Steiner-Tardivel, Q-G., Leroy, D., Knaup, R.M., Akira, S., Petrilli, V., Tschopp, J., Pantaleo, G., Gómez, C.E., Perdiguero, B., **Esteban, M** and Calandra, T (2009). Cross-activation of TLR-2-TLR6, MDA-5 and the NALP3 inflammasome for innate immune sensing of modified vaccinia virus Ankara (MVA). PLoS Pathogens 5 (6).

243. García, M.A., Gallego,P., Campagna, M., González-Santamaria, J., Martínez, G., Marcos-Villar, L., Vidal A., **Esteban, M** and Rivas, C (2009). Activation of NF-kB pathway by virus infection requires Rb expression. PLoS ONE 4 (7)**.**

244. Carrascosa, J.L., Chichón, F.J., Pereiro, E., Rodríguez, M.J., Fernandez, J.J., **Esteban, M**., Heim, S., Guttman, P, and Schneider, G (2009). Cryo-X-ray tomography for detection of vaccinia virus membranes and inner compartments. J. Structural Biol 168,234-239.

245. **Esteban, M** (2009). Un Nobel esperado: descubrimiento de los agentes causales del SIDA y del cáncer cervical. Ann. Real. Acad. Nac. Farmacia 75, 77-98.

246. Perdiguero, B and **Esteban, M** (2009). The interferon system and vaccinia virus evasion mechanisms. J. Interferon Cytokine Res 29, 581-598**.**

247. Wild, J., Fanchette, M.J., Jeffs, S., Vieira, S., **Esteban, M**., Lijeström, P., Pantaleo, G., Wolf, H, and Wagner, R (2009). Preclinical evaluation of the immunogenicity of C-type HIV-1 based DNA and NYVAC vaccines in the Balb/c mouse model. Viral Immunology 22, 309-319

248. Rodríguez, A.M., Gabriela T., Ferrer, F., Pascutti, F., Nájera, J.L., Mónaco, D.C**., Esteban, M**., Salomón, H., Calamante, G, and Gherardi, M (2009). Characterization of DNA and MVA vectors expressing NEF from HIV-1 CRF12-BF revealed high immune specificity with low cross-reactivity against subtype B. Virus Research 146, 1-12.

249. **Esteban, M** (2009). Attenuated poxvirus vectors MVA and NYVAC as promising vaccine candidates against HIV/AIDS. Human Vaccines 5 (12),

867-871

250. Cordeiro, J. V., Guerra, S., Arakawa, Y., Dodding, M.P., **Esteban, M** and Way, M (2009). F11-mediated inhibition of RhoA signalling enhances the spread of vaccinia virus in vitro and in vivo in an intranasal mouse model of infection. PLoS ONE 4 (12): e8506.

251. Cepeda, V., **Esteban, M**, and Fraile-Ramos, A (2009). Human cytomegalovirus final envelopment on membranes containing both trans-Golgi network and endosomal markers. Cell. Microbiol. 12, 386-404.

252. **Esteban. M** (2009). Hepatitis C and evasión of the Interferon system: a PKR paradigm. Cell Host & Microbes 6 (6), 495-497.

253. Domingo-Gil, E, Gonzalez, J.M, and **Esteban, M** (2010). Identification of cellular genes induced in human cells after activation of the OAS/RNaseL pathway by vaccinia virus recombinants expressing these antiviral enzymes. J. Interferon Cytokine Res 30, 171-188.

254. Gonzalez, J.M, and **Esteban, M** (2010). A poxvirus Bcl-2-like gene family involved in regulation of host immune response: sequence similarity and evolutionary history. Virology Journal 7: 59.

255. Guerra, S., Gonzalez, J.M., Climent, N., Reyburn, H., Lopez-Fernandez, L.A., Najera, J.L., Gomez, C.E., Garcia, F., Gatell, J.M., Gallart, T, and **Esteban, M** (2010). Selective induction of host genes by MVA-B, a candidate vaccine against HIV/AIDS. J. Virol 84, 8141-8152.

256. Najera, J.L., Gomez, C.E., Garcia-Arriaza, J, and **Esteban, M** (2010). Insertion of vaccinia virus C7L host range gene into NYVAC-B genome potentiates immune responses against HIV-1 antigens. PloS ONE 5 (6): e11406.

257. García, MA., Krupa, M and **Esteban, M** (2010). Antitumoral activity of oncolytic vaccinia virus expressing the interferon-induced ds-RNA dependent protein kinase PKR. An. Real Acad. Nac. Farm. 76, 327-342.

258. Pantaleo, G., **Esteban, M**., Jacobs, B and Tartaglia, J (2010). Poxvirus vector-based vaccines. Curr. Opin. HIV AIDS 5 (5) 391-396.

259. Garcia-Arriaza, J., Najera, J.L., Gomez, C.E, and **Esteban, M** (2010). Immunogenic profiling in mice of an candidate HIV/AIDS vaccine candidate (MVA-B) expressing four HIV antigens and potentiation by specific gene deletions. PLoS ONE 5 (8): e12395.

260. Wilks AB, Christian EC, Seaman MS, Sircar P, Carville A, Gomez CE, **Esteban M**, Pantaleo G, Barouch DH, Letvin NL, Permar SR (2010). Robust Vaccine-Elicited Cellular Immune Responses in Breast Milk following Systemic Simian Immunodeficiency Virus DNA Prime and Live Virus Vector Boost Vaccination of Lactating Rhesus Monkeys. J. Immunol 185, 7097-7106.

261. Perdiguero, B and **Esteban, M** (2011). Poxviruses and interferons. In Viruses and Interferon: Current Research. Ed. K. Mossman. Caiser Academic Press. Norfolk, UK. pp 113-150.

262. García MA, Carrasco E, Aguilera M, Alvarez P, Rivas C, Campos JM, Prados JC, Calleja MA, **Esteban M**, Marchal JA, Aránega A (2011).The chemotherapeutic drug 5-fluorouracil promotes PKR-mediated apoptosis in a p53-independent manner in colon and breast cancer cells. PLoS One. 2011;6(8): e23887.

263. Campagna, M., Herranz, D., García, M.A., Marcos-Villar, L., González-Santamaría, J., Gallego, P, Gutierrez, S., Collado, M., Serrano, M., **Esteban, M**, and Rivas, C (2011). SIRT1 stablizes PML promoting its sumoylation. Cell Death and Differentiation 18, 72–79.

264. Krupa, M., Canamero, M., Gómez, C.E., Nájera, J.L and **Esteban, M** (2011). Immunization with DNA and vaccinia virus MVA vectors expressing PSCA and STEAP antigens reduces prostate cancer development. Vaccine 29, 1504-1513.

265. Flynn B.J., Kastenmueller K., Willie-Reece U., Tamara, G.D., Munir Alam S., Lindsay R.W.B., Salazar, A., Perdiguero B., Gomez C.E., **Esteban M.**, Park C.G., Trumpfheller C., Keler T., Pantaleo G., Steinman R.M, and Seder R.A (2011). Prime-boost immunization with proteín targeted to the dendritic cell receptor DEC205 followed by recombinant NYVAC induces robust Gag CD4 and CD8+ T cell responses in non human primates. Proc. Natl. Acad. Science USA. 108, 7131-7136.

266. Domingo-Gil, E. Toribio, R., Najera, JL, **Esteban, M**, and Ventoso, I (2011). Diversity in viral anti-PKR mechanisms: a remarkable case of evolutionary convergence. PLoS ONE 6, e16711.

267. Quakkelaar, E.D., Redeker, A., Haddad, E. K., Harari, A., McCaughey, S. M., Duhen, T., Filali-Mouhim, A., Goulet, J-P., Loof, N. M., Ossendorp, F., Perdiguero, B., Heinen, P., Gomez, C.E., Kibler, K. V., Koelle, D. M., Sékaly, R. P., Sallusto, F., Lanzavecchia, A., Pantaleo, G., **Esteban, M**., Tartaglia, J., Jacobs, B. L, and Melief, C. J. M (2011). Improved innate and adaptive immunostimulation by genetically modified HIV-1 protein expressing NYVAC vectors. PLoS ONE, 6, e16819.

268. Daniela C. Mónaco, Ana M. Rodríguez, María F. Pascutti, Mauricio Carobene, Juliana Falivene, Alejandro Gómez, Cynthia Maeto, Gabriela Turk, José L. Nájera, **Mariano Esteban,** M. Magdalena Gherardi (2011). T-Cell Immune Responses Against Env from CRF12_BF and Subtype B HIV-1 Show High Clade-Specificity that Can Be Overridden by Multiclade Immunizations. PLoS ONE 6 (2): e17185.

269. Climent, N., Guerra, S., García, F., Rovira, C., Miralles, L., Gómez, C.E., Piqué, N., Gil, C., Gatell, J.M., **Esteban, M**, and Gallart, T (2011). Dendritic cells exposed with MVA-based HIV-1 vaccine induce highly polyfunctional HIV-1-specific CD8+ T cell response in HIV-1-infected individuals. PLoS ONE 6 (5): e19644.

270. García F, Bernaldo de Quirós JC, Gómez CE, Perdiguero B, Nájera JL, Jiménez V, García-Arriaza J, Guardo AC, Pérez I, Díaz-Brito V, Conde MS, González N, Alvarez A, Alcamí J, Jiménez JL, Pich J, Arnaiz JA, Maleno MJ, León A, Muñoz-Fernández MA, Liljeström P, Weber J, Pantaleo G, Gatell JM, Plana M, **Esteban M.** (2011) Safety and immunogenicity of a modified pox vector-based HIV/AIDS vaccine

candidate expressing env, gag, pol, nef proteins of HIV-1 subtype B (MVA-B) in HIV-1-uninfected volunteers. Vaccine 29, 8309-8316.

271. Gómez CE, Nájera JL, Perdiguero B, García-Arriaza J, Sorzano CO, Jiménez V, González-Sanz R, Jiménez JL, Muñoz-Fernández MA, López Bernaldo de Quirós JC, Guardo AC, García F, Gatell JM, Plana M, **Esteban M.** (2011). The HIV/AIDS vaccine candidate MVA-B administered as a single immunogen in humans triggers robust, polyfunctional and selective effector memory T cell responses to HIV-1 antigens. Journal Virology 85, 11468-11478.

272. García-Arriaza J, Nájera JL, Gómez CE, Tewabe N, Sorzano CO, Calandra T, Roger T, Esteban M. (2011). A candidate HIV/AIDS vaccine (MVA-B) lacking vaccinia virus gene C6L enhances memory HIV-1-specific T-cell responses.PLoS One. 2011;6(8): e24244.

273. Perreau M., Welles H.C., Harari A., Hall O., Martin R., Maillard M., Dorta G., Bart P-A., Kremer E-J., Tartaglia J., Wagner R., **Esteban M**., Levy I, and Pantaleo G (2011). DNA-C/NYVAC-C vaccine regimen induces HIV-specific CD4 and CD8 T cell-responses in intestinal mucosa. J. Virol 85, 9854-9862.

274. Alan G. Goodman., Bertrand C Tanner., Stewart T Chang., **Mariano Esteban** and Michael G Katze (2011). Virus infection rapidly activates the p58IPK pathway, delaying peak kinase activation to enhance viral replication. Virology 417, 27-36.

275. González-Santamaría J, Campagna M, García MA, Marcos-Villar L, González D, Gallego P, Lopitz-Otsoa F, Guerra S, Rodríguez M, **Esteban M**, Rivas C. (2011). Regulation of vaccinia virus E3 protein by SUMO. J Virol. 85:12890-900.

276. Goodman A. G., Heinen P.P., Guerra S., Vijayan A., Sorzano CO., Gomez C.E and **Esteban M** (2011). A human multi-epitope recombinant **vaccinia virus** as a universal T cell vaccine candidate against influenza virus. PLoS ONE 6, 10. e25938.

277. Kibler KV, Gomez CE, Perdiguero B, Wong S, Huynh T, Holechek S, Arndt W, Jimenez V, Gonzalez-Sanz R, Denzler K, Haddad EK, Wagner R, Sékaly RP, Tartaglia J, Pantaleo G, Jacobs BL, **Esteban M. (2011**). Improved NYVAC-Based Vaccine Vectors. PLoS ONE. 2011;6(11): e25674.

278. Gómez CE, Nájera JL, Krupa M, Perdiguero B, **Esteban M.** (2011). MVA and NYVAC as vaccines against emergent infectious diseases and cancer. Curr Gene Ther. 11(3):189-217.

279. Guerra S, Abaitua F, Martínez-Sobrido L, **Esteban M**, García-Sastre A, Rodríguez D (2011) Host-Range Restriction of Vaccinia Virus E3L Deletion Mutant Can Be Overcome In Vitro, but Not In Vivo, by Expression of the Influenza Virus NS1 Protein. PLoS ONE. 2011;6(12): e28677.

280. Chichon J.F., Rodriguez M.J., Pereiro E., Chiapi M., Perdiguero B., Guttman S., Rehbein S., Scheneider G., **Esteban M**, and Carrascosa J.L

(2012). Cryo X-ray nano-tomography of vaccinia virus infected cells. J Struct Biol 177, 202-211.

281. Falivene J, Del Médico Zajac MP, Pascutti MF, Rodríguez AM, Maeto C, Perdiguero B, Gómez CE, **Esteban M**, Calamante G, Gherardi MM (2012). Improving the MVA Vaccine Potential by Deleting the Viral Gene Coding for the IL-18 Binding Protein. PLoS ONE. 2012;7(2): e32220.

282. Gómez CE, Perdiguero B, Jiménez V, Filali-Mouhim A, Ghneim K, Haddad EK, Quakkelaar ED, Delaloye J, Harari A, Roger T, Duhen T, Sékaly RP, Melief CJ, Calandra T, Sallusto F, Lanzavecchia A, Wagner R, Pantaleo G, **Esteban M.**(2012). Systems Analysis of MVA-C Induced Immune Response Reveals Its Significance as a Vaccine Candidate against HIV/AIDS of Clade C. PLoS ONE 7(4): e35485.

283. Rodríguez D, González-Aseguinolaza G, Rodríguez JR, Vijayan A, Gherardi M, Rueda P, Casal JI, **Esteban M** (2012). Vaccine Efficacy against Malaria by the Combination of Porcine Parvovirus-Like Particles and Vaccinia Virus Vectors Expressing CS of Plasmodium. PLoS ONE 7(4): e34445.

284. Gómez CE, Perdiguero B, Nájera JL, Sorzano CO, Jiménez V, González-Sanz R, **Esteban M** (2012). Removal of Vaccinia Virus Genes That Block Interferon Type I and II Pathways Improves Adaptive and Memory Responses of the HIV/AIDS Vaccine Candidate NYVAC-C in Mice. J. Virol 86, 5026-5038.

285. Vijayan A, Gómez CE, Espinosa DA, Goodman AG, Sanchez-Sampedro L, Sorzano CO, Zavala F, **Esteban M** (2012). Adjuvant-like Effect of Vaccinia Virus 14K Protein: A Case Study with **Malaria** Vaccine Based on the Circumsporozoite Protein. J. Immunol. 15;188(12):6407-17.

286. Gómez CE, Perdiguero B, Garcia-Arriaza J, **Esteban M** (2012). Poxvirus vectors as HIV/AIDS vaccines in humans. Hum. Vaccin. Immunother. 8(9): 1192-207.

287. Sánchez-Sampedro L, Gómez CE, Mejías-Pérez E, Sorzano CO, **Esteban M**. (2012). High Quality Long-Term CD4(+) and CD8(+) Effector Memory Populations Stimulated by DNA-LACK/MVA-LACK Regimen in Leishmania major BALB/c Model of Infection. PLoS ONE;7(6): e3885.

288. Lucero, M.C., Diaz-Brito, V., Murillo, B. YT., Carretero S. C., Sala M., Casadesús, C., Conde M. S., Jimenez J. L., Pich J., Arnaiz J. A., Leon A., Perez I., Muñoz-Fernandez M. A., Gatell J. M., Plana M**., Esteban M.**, Bernaldo de Quiros J. C and Garcia F. (2012). Reasons for Not Participating in a Phase 1 Preventive **HIV** Vaccine Study in a Resource-Rich Country. AIDS Patient Care STDS (7):379-382.

289. García-Arriaza J, Arnáez P, Jiménez JL, Gómez CE, Muñoz-Fernández MÁ, **Esteban M**. (2012). Vector replication and expression of **HIV**-1 antigens by the **HIV**/AIDS vaccine candidate MVA-B is not affected by **HIV**-1 protease inhibitors. Virus Res. 167(2):391-6.

290. Pattacini L, Mize GJ, Graham JB, Fluharty TR, Graham TM, Lingnau K, Wizel B, Perdiguero B, **Esteban M**, Pantaleo G, Shen M, Spies GA,

McElrath MJ, Lund JM (2012). A novel HIV vaccine adjuvanted by IC31 induces robust and persistent humoral and cellular immunity. PLoS One ;7(7): e42163.

291. González-Santamaría J, Campagna M, Ortega-Molina A, Marcos-Villar L, de la Cruz-Herrera CF, González D, Gallego P, Lopitz-Otsoa F, **Esteban M**, Rodríguez MS, Serrano M, Rivas C (2012). Regulation of the tumor suppressor PTEN by SUMO. Cell Death Dis. 27;3: e393.

292. Perdiguero B, Gómez CE, Nájera JL, Sorzano CO, Delaloye J, González-Sanz R, Jiménez V, Roger T, Calandra T, Pantaleo G, **Esteban M** (2012). Deletion of the Viral Anti-Apoptotic Gene F1L in the HIV/AIDS Vaccine Candidate MVA-C Enhances Immune Responses against HIV-1 Antigens. PLoS One ;7(10): e48524.

293. Quinn KM, Da Costa A, Yamamoto A, Berry D, Lindsay RW, Darrah PA, Wang L, Cheng C, Kong WP, Gall JG, Nicosia A, Folgori A, Colloca S, Cortese R, Gostick E, Price DA, Gomez CE, **Esteban M**, Wyatt LS, Moss B, Morgan C, Roederer M, Bailer RT, Nabel GJ, Koup RA, Seder RA. (2013). Comparative Analysis of the Magnitude, Quality, Phenotype, and Protective Capacity of Simian Immunodeficiency Virus Gag-Specific CD8+ T Cells following Human-, Simian-, and Chimpanzee-Derived Recombinant Adenoviral Vector Immunization. J. Immunol. 190, 2720-2735.

294. Sánchez-Sampedro L, Gómez CE, Mejías-Pérez E, Pérez-Jiménez E, Oliveros JC, **Esteban M** (2013). Attenuated and replication competent **Vaccinia Virus** strains M65 and M101 with distinct biology and immunogenicity as potential vaccine candidates against pathogens. J. Virol. 12, 6955-6974

295. Gómez CE, Perdiguero B, Cepeda MV, Mingorance L, García-Arriaza J, Vandermeeren A, Sorzano CO, **Esteban M** (2013**)**. High, broad, polyfunctional and durable T cell immune responses induced in mice by a novel **hepatitis C** virus (HCV) vaccine candidate based on MVA expressing the near full-length HCV genome (MVA-HCV). J. Virol. 13, 7282-7300

296. García-Arriaza J, Arnáez P, Gómez CE, Sorzano CO, **Esteban M** (2013)**.** Improving Adaptive and Memory Immune Responses of an HIV/AIDS Vaccine Candidate MVA-B by Deletion of **Vaccinia Virus** Genes (C6L and K7R) Blocking Interferon Signaling Pathways. PLoS One. 2013 Jun 27;8(6):e66894.

297. Caceres A., Perdiguero B., Gomez C.E., Cepeda M., Caelles, C., Sorzano CO, and **Esteban M** (2013). Involvement of the cellular phosphatase DUSP1 in **vaccinia virus** infection. PLoS Pathog. 2013;9(11):e1003719. doi: 10.1371

298. E. Yángüez, A. García-Culebras, A. Frau, C. Llompart, K.-P. Knobeloch, S. Gutierrez-Erlandsson, A. García-Sastre, **M. Esteban**, A. Nieto & S. Guerra (2013). ISG15 regulates peritoneal macrophages functionality against viral infection. PLoS Pathog. 2013;9(10):e1003632. doi: 10.1371

299. Di Pilato M, Mejías-Pérez E, Gómez CE, Perdiguero B, Sánchez-Sorzano

CO, **Esteban M** (2013). New **vaccinia virus** promoter as potential candidate for future vaccines. J Gen Virol. 2013 Dec;94 Pt 12:2771-6.

300. Perdiguero B, Gómez CE, Di Pilato M, Sorzano CO, Delaloye J, Roger T, Calandra T, Pantaleo G, **Esteban M**. (2013). Deletion of the Vaccinia Virus Gene A46R, Encoding for an Inhibitor of TLR Signalling, Is an Effective Approach to Enhance the Immunogenicity in Mice of the HIV/AIDS Vaccine Candidate NYVAC-C. PLoS One. 2013 Sep 17;8(9):e74831

301. Gómez CE., Perdiguero B., García-Arriaza J, and **Esteban M** (2013). Clinical applications of attenuated MVA poxvirus strain. Expert Rev Vaccines. 2013 Dec;12(12):1395-416.

302. Cepeda V and Esteban M (2014). Novel insights on the progression of intermediate viral forms in the morphogenesis of **vaccinia virus**. **Virus** Res. 183:23-9.

303. García-Arriaza J., Cepeda V., Hallengärd D., Sorzano C.O., Kümmerer B.M., Liljeström P., & **Esteban M** (2014). A Novel Poxvirus-based Vaccine (MVA-CHIKV) is Highly Immunogenic and Protects Mice against Chikungunya Infection. J Virol. 2014 Mar;88(6):3527-47.

304. McKay PF, Cope AV, Mann JF, Joseph S, **Esteban M**, Tatoud R, Carter D, Reed SG, Weber J, Shattock RJ (2014). Glucopyranosyl Lipid A Adjuvant Significantly Enhances **HIV** Specific T and B Cell Responses Elicited by a DNA-MVA-Protein **Vaccine** Regimen. PLoS One. 23;9(1):e84707. doi: 10.1371/journal.pone.0084707.

305. García-Arriaza J, Gómez CE, Sorzano CO, **Esteban M**. (2014). Deletion of the **vaccinia virus** N2L gene encoding an inhibitor of IRF3 improves the immunogenicity of MVA expressing HIV-1 antigens. J Virol. 2014 Mar; 88(6):3392-410.

306. Marchal JA, Lopez GJ, Peran M, Comino A, Delgado JR, García-García JA, Conde V, Aranda FM, Rivas C, **Esteban M** , Garcia MA (2014). The impact of **PKR** activation: from neurodegeneration to cancer. FASEB J. May; 28(5):1965-74

307. García-Arriaza J, **Esteban M** (2014). Enhancing poxvirus vectors vaccine immunogenicity. Hum Vaccin Immunother. May 5; 10(8):2235-44

308. de la Cruz-Herrera CF, Campagna M, García MA, Marcos-Villar L, Lang V, Baz-Martínez M, Gutiérrez S, Vidal A, Rodríguez MS, **Esteban M**, Rivas C (2014). Activation of the Double-stranded RNA-dependent Protein Kinase **PKR** by Small Ubiquitin-like Modifier (SUMO). J Biol Chem. Sep 19;289(38):26357-67.

309. Hallengärd D, Lum FM, Kümmerer BM, Lulla A, Lulla V, García-Arriaza J, Fazakerley JK, Roques P, Le Grand R, Merits A, Ng LF, **Esteban M**, Liljeström P (2014). Prime-boost immunization strategies against **Chikungunya** virus. J Virol. 2014 Nov;88(22):13333-43.

310. Knudsen ML, Ljungberg K, Kakoulidou M, Kostic L, Hallengärd D, García-Arriaza J, Merits A, **Esteban M**, Liljeström P (2015). Kinetic and phenotypic analysis of CD8+ T cell responses after priming with

alphavirus replicons and homologous or heterologous booster immunizations. J Virol. Nov; 88(21):12438-51

311. Knudsen ML, Ljungberg K, Tatoud R, Weber J, **Esteban M**, Liljeström P (2015). Alphavirus Replicon DNA Expressing **HIV** Antigens Is an Excellent Prime for Boosting with Recombinant Modif ied Vaccinia Ankara (MVA) or with **HIV** gp140 Protein Antigen. PLoS One. Feb 2;10(2):e0117042.

312. Delaloye J, Filali-Mouhim A, Cameron MJ, Haddad EK, Harari A, Goulet JP, Gomez CE, Perdiguero B, **Esteban M**, Pantaleo G, Roger T, Sékaly RP, Calandra T (2015). Interleukin 1- and type I interferon-dependent enhancement of the innate immune profile of a NYVAC-**HIV**-1 Env-Gag-Pol-Nef vaccine vector with dual deletion of type I and type II interferon-binding proteins. J Virol. Apr;89(7):3819-32

313. Daszkiewicz L, Vázquez-Mateo C, Rackov G, Ballesteros-Tato A, Weber K, Madrigal-Avilés A, Di Pilato M, Fotedar A, Fotedar R, Flores JM, **Esteban M**, Martínez-A C, Balomenos D (2015). Distinct **p21** requirements for regulating normal and self-reactive T cells through IFN-γ production. Sci Rep. Jan 9;5:7691. doi: 10.1038/srep07691.

314. Perdiguero B, Gómez CE, Cepeda V, Sánchez-Sampedro L, García-Arriaza J, Mejías-Pérez E, Jiménez V, Sánchez C, Sorzano CÓ, Oliveros JC, Delaloye J, Roger T, Calandra T, Asbach B, Wagner R, Kibler KV, Jacobs BL, Pantaleo G, **Esteban M** (2015). Virological and Immunological Characterization of Novel NYVAC-Based **HIV**/AIDS Vaccine Candidates Expressing Clade C Trimeric Soluble gp140(ZM96) and Gag(ZM96)-Pol-Nef(CN54) as Virus-Like Particles. J Virol. Jan 15;89(2):970-88.

315. Mothe B, Climent N, Plana M, Rosàs M, Jiménez JL, Muñoz-Fernández MÁ, Puertas MC, Carrillo J, Gonzalez N, León A, Pich J, Arnaiz JA, Gatell JM, Clotet B, Blanco J, Alcamí J, Martinez-Picado J, Alvarez-Fernández C, Sánchez-Palomino S, Guardo AC, Peña J, Benito JM, Rallón N, Gómez CE, Perdiguero B, García-Arriaza J, **Esteban M**, López Bernaldo de Quirós JC, Brander C, García F; on behalf of the RISVAC-03 Study Group (2015) Safety and immunogenicity of a modified vaccinia Ankara-based HIV-1 vaccine (MVA-B) in HIV-1-infected patients alone or in combination with a drug to reactivate latent HIV-1. J Antimicrob Chemother. Jun;70(6):1833-42

316. Mooij P, Koopman G, Drijfhout JW, Nieuwenhuis IG, Beenhakker N, Koestler J, Bogers WM, Wagner R, **Esteban M**, Pantaleo G, Heeney JL, Jacobs BL, Melief CJ. (2015). Synthetic long peptide booster immunization in rhesus macaques primed with replication competent NYVAC-C-KC induces a balanced CD4/CD8 T-cell and antibody response against the conserved regions of HIV-1 (2015).J Gen Virol. Feb 9. pii: vir.0.000074. doi: 10.1099/vir.0.000074. [Epub ahead of print].

317. Di Pilato M, Mejías-Pérez E, Zonca M, Perdiguero B, Gómez CE, Trakala M, Nieto J, Nájera JL, S Sorzano CO, Combadière C, Pantaleo G, Planelles L, **Esteban M** (2015). NFκB activation by modified vaccinia virus as a novel strategy to enhance neutrophil migration and HIV-specific T-cell responses. Proc Natl Acad Sci U S A. 2015 Mar 4 17;112(11):E1333-42. doi: 10.1073/pnas.

318. Sánchez-Sampedro L, Perdiguero B, Mejías-Pérez E, García-Arriaza J, Di Pilato M, **Esteban M** (2015). The Evolution of Poxvirus Vaccines. Viruses. Apr 7;7(4):1726-1803.

319. Hulot SL, Korber B, Giorgi EE, Vandergrift N, Saunders KO, Balachandran H, Mach LV, Lifton MA, Pantaleo G, Tartaglia J, Phogat S, Jacobs B, Kibler K, Perdiguero B, Gomez CE, **Esteban M**, Rosati M, Felber BK, Pavlakis GN, Parks R, Lloyd K, Sutherland L, Scearce R, Letvin NL, Seaman MS, Alam SM, Montefiori D, Liao HX, Haynes BF, Santra S (2015). Comparison of immunogenicity in rhesus macaques of transmitted-founder, HIV-1 group M consensus and trivalent mosaic Envelope vaccines formulated as a DNA prime, NYVAC and Envelope protein boost. J Virol. June 15;89(12):6462-80.

320. Ahola T, Courderc T, Ng LF, Hallengärd D, Powers A, Lecuit M, **Esteban M**, Merits A, Roques P, Liljeström P (2015). Therapeutics and vaccines against chikungunya virus. Vector Borne Zoonotic Dis. 2015 Apr;15(4): 250-7. doi: 10.1089/vbz.2014.1681.

321. Di Pilato M, **Esteban M** (2015). Neutrophil and vaccine. Cell Cycle. Jun 3;14(11):1615-6.

322. Di Pilato M, Sánchez-Sampedro L, Mejías-Pérez E, Sorzano CO, **Esteban M** (2015). Modification of promoter spacer length in vaccinia virus as a strategy to control the antigen expression. J Gen Virol. Aug;96(8):2360-71doi: 10.1099/vir.0.000183.

323. Shen X, Duffy R, Howington R, Cope A, Sadagopal S, Park H, Pal R, Kwa S, Ding S, Yang OO, Fouda GG, Le Grand R, Bolton D, **Esteban M**, Phogat S, Roederer M, Amara R, Picker LJ, Seder RA, McElrath MJ, Barnett S, Permar SR, Shattock R, DeVico AL, Felber BK, Pavlakis GN, Pantaleo G, Korber BT, Montefiori DC, Tomaras GD (2015). Vaccine Induced Epitope Specific Antibodies to SIVmac239 Envelope Are Distinct from Those Induced to the **HIV**-1 Envelope in Non-Human Primates. J Virol. 2015 Aug;89(16):8643-50.

324. García-Arriaza J, Perdiguero B, Heeney J, Seaman M, Montefiori DC, Labranche C, Yates NL, Shen X, Tomaras GD, Ferrari G, Foulds KE, McDermott A, Kao SF, Roederer M, Hawkins N, Self S, Yao J, Farrell P, Phogat S, Tartaglia J, Barnett SW, Burke B, Cristillo A, Weiss D, Lee C, Kibler K, Jacobs B, Asbach B, Wagner R, Ding S, Pantaleo G, **Esteban M** (2015). Head-to-head comparison of poxvirus NYVAC and ALVAC vectors expressing identical HIV-1 clade C immunogens in prime/boost combination with Env protein in non-human primates. J Virol. 2015 Aug;89(16):8525-39. doi: 10.1128/JVI.01265-15.

325. Vijayan A, García-Arriaza J, Raman SC, Conesa JJ, Chichón FJ, Santiago C, Sorzano CÓ, Carrascosa JL, **Esteban M (**2015). A Chimeric HIV-1 gp120 Fused with Vaccinia Virus 14K (A27) Protein as an HIV Immunogen. PLoS One. 2015 Jul 24;10(7):e0133595

326. Gómez CE, Perdiguero B, García-Arriaza J, Cepeda V, Sánchez-Sorzano CÓ, Mothe B, Jiménez JL, Muñoz-Fernández MÁ, Gatell JM, López Bernaldo de Quirós JC, Brander C, García F, **Esteban M** (2015**)**. A Phase I Randomized Therapeutic **MVA-B** Vaccination Improves the Magnitude

and Quality of the T Cell Immune Responses in HIV-1-Infected Subjects on HAART.PLoS One. 2015 Nov 6;10(11):e0141456.

327. Rallon NI, Mothe B, Lopez Bernaldo DE Quiros JC, Plana M, Ligos JM, Montoya M, Muñoz MA, **Esteban M**, Garcia F, Brander C, Benito JM; RISVAC03 Study Group (2015). Balance between activation and regulation of **HIV**-specific CD8+ T-cell response after modified vaccinia Ankara B therapeutic vaccination. AIDS. 20;30(4):553-62

328. Fernández-Escobar M, Nájera JL, Baldanta S, Rodriguez D, Way M, **Esteban M**, Guerra S (2015). Suppression of NYVAC infection in HeLa cells requires RNase L but is independent of PKR activity. J Virol. 2015 Dec 9. 90(4):2135-41. doi: 10.1128/JVI.02576-15.

329. Asbach B, Kliche A, Köstler J, Perdiguero B, **Esteban M**, Jacobs BL, Montefiori DC, LaBranche CC, Yates NL, Tomaras GD, Ferrari G, Foulds KE, Roederer M, Landucci G, Forthal DN, Seaman MS, Hawkins N, Self SG, Sato A, Gottardo R, Phogat S, Tartaglia J, Barnett SW, Burke B, Cristillo AD, Weiss DE, Francis J, Galmin L, Ding S, Heeney JL, Pantaleo G, Wagner R.(2016). Potential To Streamline Heterologous DNA Prime and NYVAC/Protein Boost HIV Vaccine Regimens in Rhesus Macaques by Employing Improved Antigens. J Virol. 2016 Mar 28;90(8):4133-49. doi: 10.1128/JVI.03135-15. Print 2016 Apr 15.

330. Sánchez-Sampedro L, Mejías-Pérez E, S Sorzano CÓ, Nájera JL, **Esteban M**.(2016). NYVAC vector modified by C7L viral gene insertion improves T cell immune responses and effectiveness against leishmaniasis. Virus Res. 2016 Mar 29; 220:1-11. doi: 10.1016/j.virusres.2016.03.007.

331. de la Cruz-Herrera CF, Baz-Martínez M, Lang V, El Motiam A, Barbazán J, Couceiro R, Abal M, Vidal A, **Esteban M**, Muñoz-Fontela C, Nieto A, Rodríguez MS, Collado M, Rivas C (2016). Conjugation of SUMO to p85 leads to a novel mechanism of PI3K regulation. Oncogene. Jun 2;35(22):2873-80. doi: 10.1038/onc.2015.356. Epub 2015 Sep 28.

332. Wicklein B, Darder M, Aranda P, Martin del Burgo M.A, del Real G, **Esteban M**, and Ruiz-Hitzky E (2016). Clay-lipid nanohybrids: towards influenza vaccines and beyond. Clay Minerals 51, 529-538.

333. Ljungberg K, Kümmerer B.M, Roques P, **Esteban M,** Merits A, and Liljeström P (2016). Vaccines Against Chikungunya Virus Infection. Springer International Publishing Switzerland. C.M Okeoma (ed.), *Chikungunya Virus*, DOI 10.1007/978-3-319-42958-8_4

334. Joseph S, Quinn K, Greenwood A, Cope AV, McKay PF, Hayes PJ, Kopycinski JT, Gilmour J, Miller AN, Geldmacher C, Nadai Y, Ahmed MI, Montefiori DC, Dally L, Bouliotis G, Lewis DJ, Tatoud R, Wagner R, **Esteban M**, Shattock RJ, McCormack S, Weber J (2017). A Comparative Phase I Study of Combination, Homologous Subtype-C DNA, MVA, and Env gp140 Protein/Adjuvant **HIV** Vaccines in Two Immunization Regimes. Front Immunol. 2017 Feb 22;8:149. doi: 10.3389/fimmu.2017.00149.

335. Vijayan A, Mejías-Pérez E, Espinosa DA, Raman SC, Sorzano CO, Zavala F, **Esteban M** (2017). A prime/boost PfCS14K$_M$/MVA-sPfCS$_M$ vaccination protocol generates robust CD8$_+$ T cell and antibody

responses to *Plasmodium falciparum* circumsporozoite protein and protects mice against malaria. Clin Vaccine Immunol. 2017 Mar 15. pii: CVI.00494-16. doi: 10.1128/CVI.00494-16.

336. García-Arriaza J, Perdiguero B, Heeney JL, Seaman MS, Montefiori DC, Yates NL, Tomaras GD, Ferrari G, Foulds KE, Roederer M, Self SG, Borate B, Gottardo R, Phogat S, Tartaglia J, Barnett SW, Burke B, Cristillo AD, Weiss DE, Lee C, Kibler KV, Jacobs BL, Wagner R, Ding S, Pantaleo G, **Esteban M** (2017). HIV/AIDS Vaccine Candidates Based on Replication-Competent Recombinant Poxvirus NYVAC-C-KC Expressing Trimeric gp140 and Gag-Derived **Virus**-Like Particles or Lacking the Viral Molecule B19 That Inhibits Type I Interferon Activate Relevant HIV-1-Specific B and T Cell Immune Functions in Nonhuman Primates. J Virol. Apr 13;91(9). doi: 10.1128/JVI.02182-16. Print 2017 May 1.

337. Roques P, Ljungberg K, Kümmerer BM, Gosse L, Dereuddre-Bosquet N, Tchitchek N, Hallengärd D, García-Arriaza J, Meinke A, **Esteban M**, Merits A, Le Grand R, Liljeström P (2017). Attenuated and vectored vaccines protect nonhuman primates against Chikungunya virus. Journal Clinical Investigation Insight. 2017 Mar 23;2(6):e83527. doi: 10.1172/jci.insight.83527

338. Guardo AC, Gómez CE, Díaz-Brito V, Pich J, Arnaiz JA, Perdiguero B, García-Arriaza J, González N, Sorzano COS, Jiménez L, Jiménez JL, Muñoz-Fernández MÁ, Gatell JM, Alcamí J, **Esteban M**, López Bernaldo de Quirós JC, García F, Plana M; RISVAC02boost study (2017). Safety and vaccine-induced HIV-1 immune responses in healthy volunteers following a late MVA-B boost 4 years after the last immunization. PLoS One. 2017 Oct 24;12(10):e0186602.

339. Di Pilato M, Mejías-Pérez E, Sorzano COS, **Esteban M** (2017). Distinct Roles of Vaccinia Virus NF-κB Inhibitor Proteins A52, B15, and K7 in the Immune Response. J Virol. 2017 Jun 9;91(13). pii: e00575-17.

340. de la Cruz-Herrera CF, Baz-Martínez M, Motiam AE, Vidal S, Collado M, Vidal A, Rodríguez MS, **Esteban M**, Rivas C (2017). Phosphorylable tyrosine residue 162 in the double-stranded RNA-dependent kinase PKR modulates its interaction with SUMO. Sci Rep. 2017 Oct 25;7(1):14055.

341. Enamorado M, Iborra S, Priego E, Cueto FJ, Quintana JA, Martínez-Cano S, Mejías-Pérez E, **Esteban M**, Melero I, Hidalgo A, Sancho D (2017). Enhanced anti-tumour immunity requires the interplay between resident and circulating memory CD8+ T cells. Nat Commun. 2017 Jul 17;8:16073.

342. Rosás-Umbert M, Mothe B, Noguera-Julian M, Bellido R, Puertas MC, Carrillo J, Rodriguez C, Perez-Alvarez N, Cobarsí P, Gomez CE, **Esteban M**, Jímenez JL, García F, Blanco J, Martinez-Picado J, Paredes R, Brander C (2017) Virological and immunological outcome of treatment interruption in HIV-1-infected subjects vaccinated with MVA-B. PLoS One. 2017 Sep 27;12(9):e0184929.

343. Lorente E, Barriga A, García-Arriaza J, Lemonnier FA, **Esteban M**, López D (2017). Complex antigen presentation pathway for an HLA-A*0201-restricted epitope from Chikungunya 6K protein. PLoS Negl Trop Dis. Oct 30;11(10):e0006036.

344. Gomez, CE, Perdiguero B, Sanchez-Corzo C, Sorzano COS and **Esteban M** (2017). Immune Modulation of NYVAC-Based HIV Vaccines by Combined Deletion of Viral Genes that Act on Several Signalling Pathways. Viruses. 10, 7; Dec 27;10(1). pii: E7. doi: 10.3390/v10010007.doi:10.339

345. Mejías-Pérez E, Carreño-Fuentes L, **Esteban M** (2017). Development of a Safe and Effective Vaccinia Virus Oncolytic Vector WR-Δ4 with a Set of Gene Deletions on Several Viral Pathways. Mol Ther Oncolytics. 2017 Dec 5;8:27-40. doi: 10.1016/j.omto.2017.12.002.

346. Lydia R. Meador, Sarah A. Kessansb, Jacquelyn Kilbourne, Karen V. Kibler,Giuseppe Pantaleo, Mariano Esteban Roderiguez, Joseph N. Blattman, BertramL. Jacobs, Tsafrir S. Mor (2017). A heterologous prime-boosting strategy with replicating Vaccinia virus vectors and plant-produced HIV-1 Gag/dgp41 virus-like particles. Virology. 2017Jul; 507:242-256. doi: 10.1016/j.virol.2017.04.008.

347. Saunders KO, Santra S, Parks R, Yates NL, Sutherland LL, Scearce RM, Balachandran H, Bradley T, Goodman D, Eaton A, Stanfield-Oakley SA, Tartaglia J, Phogat S, Pantaleo G, **Esteban M**, Gomez CE, Perdiguero B, Jacobs B, Kibler K, Korber B, Montefiori DC, Ferrrari G, Vandergrift N, Liao HX, Tomaras GD, Haynes BF (2018). Immunogenicity of NYVAC prime-protein boost HIV-1 envelope vaccination and SHIV challenge of nonhuman primates. J Virol. 2018 Feb 7. pii: JVI.02035-17.

348. Lázaro-Frías A, Gómez-Medina S, Sánchez-Sampedro L, Ljungberg K, Ustav M, Liljeström P, Muñoz-Fontela C, **Esteban M**, García-Arriaza J (2018). Distinct Immunogenicity and Efficacy of Poxvirus-based Vaccine Candidates against Ebola Virus expressing GP and VP40 Proteins. J Virol. 2018 Mar 7. pii: JVI.00363-18. doi: 10.1128/JVI.00363-18.

349. Fernández L, Carrillo E, Sánchez-Sampedro L, Sánchez C, Ibarra-Meneses AV, Jimenez MA, Almeida VDA, **Esteban M**, Moreno J (2018). Antigenicity of *Leishmania*-Activated C-Kinase Antigen (LACK) in Human Peripheral Blood Mononuclear Cells, and Protective Effect of Prime-Boost Vaccination With pCI-neo-LACK Plus Attenuated LACK-Expressing Vaccinia Viruses in Hamsters. Front Immunol. 2018 Apr 23;9:843. doi: 10.3389/fimmu.2018.00843.

350. Öhlund P, García-Arriaza J, Zusinaite E, Szurgot I, Männik A, Kraus A, Ustav M, Merits A, **Esteban M**, Liljeström P, Ljungberg K (2018). DNA-launched RNA replicon vaccines induce potent anti-Ebolavirus immune responses that can be further improved by a recombinant MVA boost. Sci Rep. Aug 20;8(1):12459. doi: 10.1038/s41598-018-31003-6

351. Perdiguero B, Raman SC, Sánchez-Corzo C, Sorzano COS, Valverde JR, **Esteban M**, Gómez CE (2018). Potent HIV-1-Specific CD8 T Cell Responses Induced in Mice after Priming with a Multiepitopic DNA-TMEP and Boosting with the HIV Vaccine MVA-B. Viruses. 2018 Aug 13;10(8). pii: E424. doi: 10.3390/v10080424.

352. Marín MQ, Pérez P, Gómez CE, Sorzano CÓS, **Esteban M**, García-Arriaza J (2018). Removal of the C6 Vaccinia Virus Interferon-β Inhibitor in the

Hepatitis C Vaccine Candidate MVA-HCV Elicited in Mice High Immunogenicity in Spite of Reduced Host Gene Expression. Viruses. 2018 Aug 8;10(8). pii: E414. doi: 10.3390/v10080414.

353. Asbach B, Kibler KV, Köstler J, Perdiguero B, Yates NL, Stanfield-Oakley S, Tomaras GD, Kao SF, Foulds KE, Roederer M, Seaman MS, Montefiori DC, Parks R, Ferrari G, Forthal DN, Phogat S, Tartaglia J, Barnett SW, Self SG, Gottardo R, Cristillo AD, Weiss DE, Galmin L, Ding S, Heeney JL, **Esteban M**, Jacobs BL, Pantaleo G, Wagner R (2018). Priming with a potent **HIV**-1 DNA vaccine frames the quality of immune responses prior to a poxvirus and protein boost. J Virol. 2018 Nov 14. pii: JVI.01529-18. doi: 10.1128/JVI.01529-18

354. Kibler KV, Asbach B, Perdiguero B, García-Arriaza J, Yates NL, Parks R, Stanfield-Oakley S, Ferrari G, Montefiori DC, Tomaras GD, Roederer M, Foulds KE, Forthal DN, Seaman MS, Self S, Gottardo R, Phogat S, Tartaglia J, Barnett S, Cristillo AD, Weiss D, Galmin L, Ding S, Heeney JL, **Esteban M**, Wagner R, Pantaleo G, Jacobs BL (2018). Replication-competent NYVAC-KC yields improved immunogenicity to **HIV**-1 antigens in rhesus macaques, compared to non-replicating NYVAC. J Virol. 2018 Nov 14. pii: JVI.01513-18. doi: 10.1128/JVI.01513-18.

355. Pérez P, Q Marín M, Lázaro-Frías A, Jiménez de Oya N, Blázquez AB, Escribano-Romero E, S Sorzano CÓ, Ortego J, Saiz JC, Esteban M, Martín-Acebes MA, García-Arriaza J (2018). A Vaccine Based on a Modified Vaccinia Virus Ankara Vector Expressing Zika Virus Structural Proteins Controls Zika Virus Replication in Mice. Sci Rep. 2018 Nov 26;8(1):17385. doi: 10.1038/s41598-018-35724-6.

356. Lorente E, Martín-Galiano AJ, Barnea E, Barriga A, Palomo C, García-Arriaza J, Mir C, Lauzurica P, **Esteban M**, Admon A, Lopez D (2019). Proteomics analysis reveals that structural proteins of the virion core and involved in gene expression are the main source for HLA class II ligands in vaccinia virus-infected cells. J Proteome Res. 2019 Jan 10. doi: 10.1021/acs.jproteome.8b00595

357. Marín MQ, Pérez P, Ljungberg K, Sorzano CÓS, Gómez CE, Liljeström P, **Esteban M**, García-Arriaza J (2019) Potent Anti-Hepatitis C (HCV) T Cell Immune Responses Induced in Mice Vaccinated with DNA-launched RNA Replicons and MVA-HCV. J Virol. 2019 Jan 23. pii: JVI.00055-19. doi: 10.1128/JVI.00055-19. [Epub ahead of print]

358. Perdiguero B, Sánchez-Corzo C, Sorzano COS, Saiz L, Mediavilla P, **Esteban M**, Gómez CE (2019) A Novel MVA-Based HIV Vaccine Candidate (MVA-gp145-GPN) Co-Expressing Clade C Membrane-Bound Trimeric gp145 Env and Gag-Induced Virus-Like Particles (VLPs) Triggered Broad and Multifunctional HIV-1-Specific T Cell and Antibody Responses. Viruses. 2019 Feb 16;11(2). pii: E160. doi: 10.3390/v11020160.

359. Lorente E, Barriga A, Barnea E, Palomo C, García-Arriaza J, Mir C, **Esteban M**, Admon A, López D (2019). Immunoproteomic analysis of a Chikungunya poxvirus-based vaccine reveals high HLA class II immunoprevalence. PLoS Negl Trop Dis. 2019 Jul 5;13(7):e0007547. doi: 10.1371/journal.pntd.0007547. [Epub ahead of print]

360. Perdiguero B, Sánchez-Corzo C, S Sorzano CO, Mediavilla P, Saiz L, **Esteban M**, Gómez CE (2019). Induction of Broad and Polyfunctional HIV-1-

Specific T Cell Responses by the Multiepitopic Protein TMEP-B Vectored by MVA Virus. Vaccines (Basel). 2019 Jun 29;7(3). pii: E57. doi: 10.3390/vaccines7030057.

361. Perdiguero B, Gómez CE, **Esteban M** (2019). Bioluminescence Imaging as a Tool for Poxvirus Biology. Methods Mol Biol. 2019; 2023:269-285. doi: 10.1007/978-1-4939-9593-6_17.

362. Meador LR, Kessans SA, Kilbourne J, Kibler KV, Pantaleo G, **Esteban M**, Blattman JN, Jacobs BL, Mor TS. Corrigendum to "A heterologous prime-boosting strategy with replicating Vaccinia virus vectors and plant-produced HIV-1 Gag/dgp41 virus-like particles" [Virology 507 (2017) 242-256]. Virology. 2019 Jun 6. pii: S0042-6822(19)30139-4. doi: 10.1016/j.virol.2019.05.018..

363. Pantaleo G, Janes H, Karuna S, Grant S, Ouedraogo GL, Allen M, Tomaras GD, Frahm N, Montefiori DC, Ferrari G, Ding S, Lee C, Robb ML, **Esteban M**, Wagner R, Bart PA, Rettby N, McElrath MJ, Gilbert PB, Kublin JG, Corey L; NIAID HIV Vaccine Trials Network (2019). Safety and immunogenicity of a multivalent HIV vaccine comprising envelope protein with either DNA or NYVAC vectors (HVTN 096): a phase 1b, double-blind, placebo-controlled trial. Lancet HIV. 2019 Nov;6(11):e737-e749. doi: 10.1016/S2352-3018(19)30262-0. Epub 2019 Oct 7.

364. Couto E, Diaz-Brito V, Mothe B, Guardo AC, Fernandez I, Ugarte A, Etcheverry F, Gómez CE, **Esteban M**, Pich J, Arnaiz JA, López Bernaldo de Quirós JC, Brander C, Plana M, García F, Leal L (2019). Comparison of Safety and Vector-Specific Immune Responses in Healthy and HIV-Infected Populations Vaccinated with MVA-B. Vaccines (Basel). 2019 Nov 7;7(4). pii: E178. doi: 10.3390/vaccines7040178.

365. Pérez P, Marín MQ, Lázaro-Frías A, Sorzano CÓS, Di Pilato M, Gómez CE, **Esteban M**, García-Arriaza J. (2019). An MVA Vector Expressing HIV-1 Envelope under the Control of a Potent Vaccinia Virus Promoter as a Promising Strategy in HIV/AIDS Vaccine Design. Vaccines (Basel). 2019 Dec 6;7(4). pii: E208. doi: 10.3390/vaccines7040208.

366. Raman SC, Mejías-Pérez E, Gomez CE, García-Arriaza J, Perdiguero B, Vijayan A, Pérez-Ruiz M, Cuervo A, Santiago C, Sorzano COS, Sánchez-Corzo C, Moog C, Burger JA, Schorcht A, Sanders RW, Carrascosa JL, **Esteban M**. (2019). The Envelope-Based Fusion Antigen GP120C14K Forming Hexamer-Like Structures Triggers T Cell and Neutralizing Antibody Responses Against HIV-1. Front Immunol. 2019 Dec 4;10:2793. doi: 10.3389/fimmu.2019.02793.

367. Giel-Moloney M, **Esteban M**, Oakes BH, Vaine M, Asbach B, Wagner R, Mize GJ, Spies AG, McElrath J, Perreau M, Roger T, Ives A, Calandra T, Weiss D, Perdiguero B, Kibler KV, Jacobs B, Ding S, Tomaras GD, Montefiori DC, Ferrari G, Yates NL, Roederer M, Kao SF, Foulds KE, Mayer BT, Bennett C, Gottardo R, Parrington M, Tartaglia J, Phogat S, Pantaleo G, Kleanthous H, Pugachev KV. (2019). Recombinant HIV-1 vaccine candidates based on replication-defective flavivirus vector. Sci Rep. 2019 Dec 27;9(1):20005. doi: 10.1038/s41598-019-56550-4.

368. Perdiguero B, Gómez CE, García-Arriaza J, Sánchez-Corzo C, Sorzano CÓS, Wilmschen S, von Laer D, Asbach B, Schmalzl C, Peterhoff D, Ding S, Wagner R, Kimpel J, Levy Y, Pantaleo G, **Esteban M**. (2019). Heterologous

Combination of VSV-GP and NYVAC Vectors Expressing HIV-1 Trimeric gp145 Env as Vaccination Strategy to Induce Balanced B and T Cell Immune Responses. Front Immunol. 2019 Dec 18;10:2941. doi: 10.3389/fimmu.2019.02941.

369. Pérez P, Marín MQ, Lázaro-Frías A, Sorzano CÓS, Gómez CE, **Esteban M**, García-Arriaza J (2020). Deletion of Vaccinia Virus A40R Gene Improves the Immunogenicity of the HIV-1 Vaccine Candidate MVA-B. Vaccines (Basel). 2020 Feb 6;8(1). pii: E70. doi: 10.3390/vaccines8010070.

370. María Q. Marín, Kwinten Sliepen, Juan García-Arriaza, Sylvie Koekkoek, Patricia Pérez, Carlos Óscar S. Sorzano, Carmen E. Gómez, Rogier W. Sanders, and **Mariano Esteban** (2020). Optimized Hepatitis C Virus (HCV) E2 Glycoproteins and their Immunogenicity in Combination with MVA-HCV. Vaccines (Basel) 2020 Sep; 8(3): 440. Published online 2020 Aug5. doi: 10.3390/vaccines8030440

371. Juan García-Arriaza, María Q. Marín, Jesús Merchán-Rubira, Sara M. Mascaraque, Miguel Medina, Jesús Ávila, Félix Hernández, and **Mariano Esteban** (2020). Tauopathy Analysis in P301S Mouse Model of Alzheimer Disease Immunized with DNA and MVA Poxvirus-Based Vaccines Expressing Human Full-Length 4R2N or 3RC Tau Proteins. Vaccines (Basel) 2020 Mar; 8(1): 127. Published online 2020 Mar 13. doi: 10.3390/vaccines8010127.

372. **Esteban M** and Garcia-Arriaza J (2020). Towards the Spanish vaccine against SARS-CoV-2, responsible for the pandemic COVID-19. Anales RANM. 137 (02), 234-238. DOI: 10.32440/ar.2020.137.02.rev18

373. Jorge Sanchez, Elena Gonçalves, Anuska Llano, Pedro Gonzáles, María Fernández-Maldonado, Annika Vogt, Angele Soria, Susana Perez, Samandhy Cedeño, Marco Antonio Fernández, Julien Nourikyan, Simon de Bernard, Carmela Ganoza, Eric Pedruzzi, Olivia Bonduelle, Beatriz Mothe, Carmen E. Gòmez, **Mariano Esteban**, Felipe Garcia, Javier R. Lama, Christian Brander, Behazine Combadiere. (2020). Immune Profiles Identification by Vaccinomics After MVA Immunization in Randomized Clinical Study. Front Immunol. 2020; 11: 586124. Published online 2020 Nov 10. doi: 10.3389/fimmu.2020.586124.

374. Villadiego J, Ramírez-Lorca R, Cala F, Labandeira-García JL, **Esteban M**, Toledo-Aral JJ, López-Barneo J. (2020). Is Carotid Body Infection Responsible for Silent Hypoxemia in COVID-19 Patients? Function (Oxf). 2020 Nov 23;2(1):zqaa032. doi: 10.1093/function/zqaa032. eCollection 2021.

375. García-Arriaza J, Garaigorta U, Pérez P, Lázaro-Frías A, Zamora C, Gastaminza P, Del Fresno C, Casasnovas JM, Sorzano CÓS, Sancho D**, Esteban M**. (2021). COVID-19 vaccine candidates based on modified vaccinia virus Ankara expressing the SARS-CoV-2 spike induce robust T- and B-cell immune responses and full efficacy in mice.J Virol. 2021 Jan 7:JVI.02260-20. doi: 10.1128/JVI.02260-20.

376. Di Pilato M, Palomino-Segura M, Mejías-Pérez E, Gómez CE, Rubio-Ponce A, D'Antuono R, Pizzagalli DU, Pérez P, Kfuri-Rubens R, Benguría A, Dopazo A, Ballesteros I, Sorzano COS, Hidalgo A, **Esteban M**, Gonzalez SF (2021). Neutrophil subtypes shape HIV-specific CD8 T-cell responses after vaccinia virus infection. NPJ Vaccines. 2021 Apr 12;6(1):52. doi: 10.1038/s41541-021-00314-7.

377. Gómez CE, Perdiguero B, **Esteban M**. (2021). Emerging SARS-CoV-2 Variants and Impact in Global Vaccination Programs against SARS-CoV-2/COVID-19. Vaccines (Basel). 2021 Mar 11;9(3):243. doi: 10.3390/vaccines9030243.

378. El Motiam A, de la Cruz-Herrera CF, Vidal S, Seoane R, Baz-Martínez M, Bouzaher YH, Lecona E, **Esteban M**, Rodríguez MS, Vidal A, Collado M, Rivas C. (2021).SUMOylation modulates the stability and function of PI3K-p110beta. Cell Mol Life Sci. 2021 Apr 8. doi: 10.1007/s00018-021-03826-6.

379. García-Ayllón MS, Moreno-Pérez O, García-Arriaza J, Ramos-Rincón JM, Cortés-Gómez MÁ, Brinkmalm G, Andrés M, León-Ramírez JM, Boix V, Gil J, Zetterberg H, **Esteban M**, Merino E, Sáez-Valero. (2021). Plasma ACE2 species are differentially altered in COVID-19 patients. FASEB J. 2021 Aug;35(8):e21745. doi: 10.1096/fj.202100051R.

380. Pérez P, Martín-Acebes MA, Poderoso T, Lázaro-Frías A, Saiz JC, Sorzano CÓS, **Esteban M**, García-Arriaza J. (2021). The combined vaccination protocol of DNA/MVA expressing Zika virus structural proteins as efficient inducer of T and B cell immune responses. Emerg Microbes Infect. 2021 Dec;10(1):1441-1456. doi: 10.1080/22221751.2021.1951624.

381. García-Arriaza J, **Esteban M**, López D. (2021). Modified Vaccinia Virus Ankara as a Viral Vector for Vaccine Candidates against Chikungunya Virus. Biomedicines. 2021 Aug 31;9(9):1122. doi: 10.3390/biomedicines9091122.

382. Gómez CE, Perdiguero B, Usero L, Marcos-Villar L, Miralles L, Leal L, Sorzano CÓS, Sánchez-Corzo C, Plana M, García F, **Esteban M**. (2021). Enhancement of the HIV-1-Specific Immune Response Induced by an mRNA Vaccine through Boosting with a Poxvirus MVA Vector Expressing the Same Antigen. Vaccines (Basel). 2021 Aug 27;9(9):959. doi: 10.3390/vaccines9090959.

383. Del Fresno C, García-Arriaza J, Martínez-Cano S, Heras-Murillo I, Jarit-Cabanillas A, Amores-Iniesta J, Brandi P, Dunphy G, Suay-Corredera C, Pricolo MR, Vicente N, López-Perrote A, Cabezudo S, González-Corpas A, Llorca O, Alegre-Cebollada J, Garaigorta U, Gastaminza P, **Esteban M**, Sancho D. (2021). The Bacterial Mucosal Immunotherapy MV130 Protects Against SARS-CoV-2 Infection and Improves COVID-19 Vaccines Immunogenicity. Front Immunol. 2021 Nov 18;12:748103. doi: 10.3389/fimmu.2021.748103. eCollection 2021.

384. Lázaro-Frías A, Pérez P, Zamora C, Sánchez-Cordón PJ, Guzmán M, Luczkowiak J, Delgado R, Casasnovas JM, **Esteban M**, García-Arriaza J. (2022). Full efficacy and long-term immunogenicity induced by the SARS-CoV2 vaccine candidate MVA-CoV2-S in mice. NPJ Vaccines. 2022 Feb 9;7(1):17. doi: 10.1038/s41541-022-00440-w.PMID: 35140227.

385. Pérez P, Lázaro-Frías A, Zamora C, Sánchez-Cordón PJ, Astorgano D, Luczkowiak J, Delgado R, Casasnovas JM, **Esteban M**, García-Arriaza (2022). A Single Dose of an MVA Vaccine Expressing a Prefusion-Stabilized SARS-CoV-2 Spike Protein Neutralizes Variants of Concern and Protects Mice From a Lethal SARS-CoV-2 Infection. Front Immunol. 2022 Jan 27;12:824728. doi: 10.3389/fimmu.2021.824728. eCollection 2021.PMID: 35154086.

386. Lorente E, Martín-Galiano AJ, Kadosh DM, Barriga A, García-Arriaza J, Mir C, **Esteban M,** Admon A, López D. (2022). Abundance, Betweenness Centrality, Hydrophobicity, and Isoelectric Points Are Relevant Factors in the Processing of Parental Proteins of the HLA Class II Ligandome. J Proteome Res. Jan 7. 21(1):164-171 doi: 10.1021/acs.jproteome.1c00662.PMID: 34937342.

387. Boudewijns R, Pérez P, Lázaro-Frías A, Van Looveren D, Vercruysse T, Thibaut HJ, Weynand B, Coelmont L, Neyts J, Astorgano D, Montenegro D, Puentes E, Rodríguez E, Dallmeier K, **Esteban M**, García-Arriaza J.(2022). MVA-CoV2-S Vaccine Candidate Neutralizes Distinct Variants of Concern and Protects Against SARS-CoV-2 Infection in Hamsters. Front Immunol. 2022 Mar 16;13:845969. doi: 10.3389/fimmu.2022.845969. eCollection 2022.PMID: 35371064.

388. Mooij P, García-Arriaza J, Pérez P, Lázaro-Frías A, Verstrepen BE, Böszörményi KP, Mortier D, Fagrouch, Z, Kiemenyi-Kayere G, Niphuis H, Acar RF, Meijer L, Stammes MA, Kondova I, Verschoor EJ, GeurtsvanKessel CH, De Bruin E, Sikkema RS, Luczkowiak J, Delgado R, Montenegro D, Puentes E, Rodríguez E, Bogers WMJM, Koopman G, **Esteban M** (2022). Poxvirus MVA expressing SARS-CoV-2 S protein induces robust immunity and protects rhesus macaques from SARS-CoV-2. Frontiers in Immunology. 13:845887. DOI: 10.3389/fimmu.2022.845887.

389. Jiménez de Oya N, Pérez P, Blázquez AB, Escribano-Romero E, **Esteban M**, Saiz JC, García-Arriaza J, Martín-Acebes MA (2022). Low immune cross-reactivity between West Nile virus and a Zika virus vaccine based on modified vaccinia virus Ankara. Pharmaceuticals. Volume 15, Issue 3. 10.3390/ph15030354

390. Perdiguero B, Asbach B, Gómez CE, Köstler J, Barnett SW, Koutsoukos M, Weiss DE, Cristillo AD, Foulds KE, Roederer M, Montefiori DC, Yates NL, Ferrari G, Shen X, Sawant S, Tomaras GD, Sato A, Fulp WJ, Gottardo R, Ding S, Heeney JL, Pantaleo G, **Esteban M**, Wagner R.(2022). Early and Long-Term HIV-1 Immunogenicity Induced in Macaques by the Combined Administration of DNA, NYVAC and Env Protein-Based Vaccine Candidates: The AUP512 Study. Front Immunol. 2022 Jul 22;13:939627. doi: 10.3389/fimmu.2022.939627.

391. Pérez P, Astorgano D, Albericio G, Flores S, Sánchez-Cordón PJ, Luczkowiak J, Delgado R, Casasnovas JM, **Esteban M**, García-Arriaza J (2022). Intranasal administration of a single dose of MVA-based vaccine candidates against COVID-19 induced local and systemic immune responses and protects mice from a lethal SARS-CoV-2 infection. Front Immunol. 2022 Sep 12;13:995235. doi: 10.3389/fimmu.2022.995235. eCollection 2022.PMID: 36172368 .

392. Lennol MP, García-Ayllón MS, **Esteban M**, García-Arriaza J, Sáez-Valero J. (2022). Serum angiotensin-converting enzyme 2 as a potential biomarker for SARS-CoV-2 infection and vaccine efficacy. Front Immunol. 2022 Oct 12;13:1001951. doi: 10.3389/fimmu.2022.1001951.

393. Garcia-Arriaza J and **Esteban M** (2022). The MVA-CoV2-S vaccine developed at the CNB-CSIC is highly immunogenic and completely effective against SARS-CoV-2/COVID-19: Future and opportunities. An. Real Acad. Farm.vol 88 (extra), 415-426.

394. Villadiego J, García-Arriaza J, Ramírez-Lorca R, García-Swinburn R, Cabello-Rivera D, Rosales-Nieves AE, Álvarez-Vergara MI, Cala-Fernández F, García-Roldán E, López-Ogáyar JL, Zamora C, Astorgano D, Albericio G, Pérez P, Muñoz-Cabello AM, Pascual A, **Esteban M**, López-Barneo J, Toledo-Aral JJ. (2023). Full protection from SARS-CoV-2 brain infection and damage in susceptible transgenic mice conferred by MVA-CoV2-S vaccine candidate. Nat Neurosci. 2023 Feb;26(2):226-238. doi: 10.1038/s41593-022-01242-y. Epub 2023 Jan 9.PMID: 36624276.

395. Aparicio B, Ruiz M, Casares N, Silva L, Egea J, Pérez P, Albericio G, **Esteban M**, García-Arriaza J, Lasarte JJ, Sarobe P. (2023). Enhanced cross-recognition of SARS-CoV-2 Omicron variant by peptide vaccine-induced antibodies. Front Immunol. 2023 Jan 24;13:1044025. doi: 10.3389/fimmu.2022.1044025. PMID: 36761163.

396. Usero L, Leal L, Gómez CE, Miralles L, Aurrecoechea E, Esteban I, Torres B, Inciarte A, Perdiguero B, **Esteban M,** García F, Plana M. (2023). The Combination of an mRNA Immunogen, a TLR7 Agonist and a PD1 Blocking Agent Enhances In-Vitro HIV T-Cell Immune Responses. Vaccines (Basel). 2023 Jan 28;11(2):286. doi: 10.3390/vaccines11020286.

397. Falqui M, Perdiguero B, Coloma R, Albert M, Marcos-Villar L, McGrail JP, Sorzano CÓS, **Esteban M**, Gómez CE, Guerra S. (2023). An MVA-based vector expressing cell-free ISG15 increases IFN-I production and improves HIV-1-specific CD8 T cell immune responses. Front Cell Infect Microbiol. 2023 May 29;13:1187193. doi: 10.3389/fcimb.2023.1187193. eCollection.

398. Perdiguero B, Marcos-Villar L, López-Bravo M, Sánchez-Cordón PJ, Zamora C, Valverde JR, Sorzano CÓS, Sin L, Álvarez E, Ramos M, Del Val M, **Esteban M,** Gómez CE. (2023). Immunogenicity and efficacy of a novel multi-patch SARS-CoV-2/COVID-19 vaccine candidate. Front Immunol. 2023 Jun 19;14:1160065. doi: 10.3389/fimmu.2023.1160065.

399. Perdiguero B, Pérez P, Marcos-Villar L, Albericio G, Astorgano D, Álvarez E, Sin L, Gómez CE, García-Arriaza J, **Esteban M.** (2023). Highly Attenuated Poxvirus-Based Vaccines Against Emerging Viral Diseases. J Mol Biol. 2023 Jun 8;435(15):168173. doi: 10.1016/j.jmb.2023.168173.

400. Abdelnabi R, Pérez P, Astorgano D, Albericio G, Kerstens W, Thibaut HJ, Coelmont L, Weynand B, Labiod N, Delgado R, Montenegro D, Puentes E, Rodríguez E, Neyts J, Dallmeier K, **Esteban M,** García-Arriaza J (2023). Optimized vaccine candidate MVA-S(3P) fully protects against SARS-CoV-2 infection in hamsters. Front Immunol. 2023 Oct 18;14:1163159. doi: 10.3389/fimmu.2023.1163159. eCollection 2023.PMID: 37920464.

401. Lázaro-Gorines R, Pérez P, Heras-Murillo I, Adán-Barrientos I, Albericio G, Astorgano D, Flores S, Luczkowiak J, Labiod N, Harwood SL, Segura-Tudela A, Rubio-Pérez L, Nugraha Y, Shang X, Li Y, Alfonso C, Adipietro KA, Abeyawardhane DL, Navarro R, Compte M, Yu W, MacKerell AD Jr, Sanz L, Weber DJ, Blanco FJ**, Esteban M**, Pozharski E, Godoy-Ruiz R, Muñoz IG, Delgado R, Sancho D, García-Arriaza J, Álvarez-Vallina L (2023). Dendritic Cell-Mediated Cross-Priming by a Bispecific Neutralizing AntibodyBoosts Cytotoxic T Cell Responses and Protects Mice against SARS-CoV-2. Adv Sci (Weinh). 2023 Oct 20:e2304818. doi: 10.1002/advs.202304818. PMID: 37863812

402. **Esteban M** (2023). Estado actual de la vacuna española (MVA-CoV2-S) frente al SARS-CoV-2/COVID-19 (2023). Gaceta Cultural. Ateneo Valladolid. Octubre, nº 99.

403. Perdiguero B, Hauser A, Gómez CE, Peterhoff D, Sideris E, Sorzano CÓS, Wilmschen S, Schaber M, Stengel L, Asbach B, Ding S, Von Laer D, Levy Y, Pantaleo G, Kimpel J, **Esteban M**, Wagner R. (2023). Potency and durability of T and B cell immune responses after homologous and heterologous vector delivery of a trimer-stabilized, membrane-displayed HIV-1 clade ConC Env protein. Front Immunol. 2023 Nov 17;14:1270908. doi: 10.3389/fimmu.2023.1270908. eCollection 2023.PMID: 38045703

404. Gómez-Carballa A, Albericio G, Montoto-Louzao J, Pérez P, Astorgano D, Rivero-Calle I, Martinón-Torres F, **Esteban M**, Salas A, García-Arriaza J. (2023). Lung transcriptomics of K18-hACE2 mice highlights mechanisms and genes involved in the MVA-S vaccine-mediated immune response and protection against SARS-CoV-2 infection. Antiviral Res. 2023 Dec;220:105760. doi: 10.1016/j.antiviral.2023.105760. Epub 2023 Nov 21.PMID: 37992765

405. Pérez P, Albericio G, Astorgano D, Flores S, Sánchez-Corzo C, Sánchez-Cordón PJ, Luczkowiak J, Delgado R, Casasnovas JM, **Esteban M,** García-Arriaza (2023). Preclinical immune efficacy against SARS-CoV-2 beta B.1.351 variant by MVA-based vaccine candidates. Front Immunol. 2023 Dec 12;14:1264323. doi:10.3389/fimmu.2023.1264323. eCollection 2023.PMID: 38155964

406. Esteban I, Pastor-Quiñones C, Usero L, Aurrecoechea E, Franceschini L, Esprit A, Gelpí JL, Martínez-Jiménez F, López-Bigas N, Breckpot K, Thielemans K, Leal L, Gómez CE, Sisteré-Oró M, Meyerhans A, **Esteban M**, Alonso MJ, García F, Plana M; COVARNA Consortium (2023). Assessment of Human SARS CoV-2-Specific T-Cell Responses Elicited In Vitro by New Computationally Designed mRNA Immunogens (COVARNA).Vaccines (Basel). 2023 Dec 22;12(1):15. doi: 10.3390/vaccines12010015.PMID: 38250827 .

407. Álvarez E, Falqui M, Sin L, McGrail JP, Perdiguero B, Coloma R, Marcos-Villar L, Tárrega C, **Esteban M**, Gómez CE, Guerra S. (2024). Unveiling the Multifaceted Roles of ISG15: From Immunomodulation to Therapeutic Frontiers. Vaccines (Basel). 2024 Feb 1;12(2):153.doi:10.3390/vaccines12020153.PMID: 38400136.

408. Marcos-Villar L, Perdiguero B, Anthiya S, Borrajo ML, Lou G, Franceschini L, Esteban I, Sánchez-Cordón PJ, Zamora C, Sorzano CÓS, Jordá L, Codó L, Gelpí JL, Sisteré-Oró M, Meyerhans A, Thielemans K, Martínez-Jiménez F, López-Vigas N, García F, Alonso MJ, Plana M, **Esteban M,** Gómez CE (2024). Modulating the immune response to SARS-CoV-2 by different nanocarriers delivering an mRNA expressing trimeric RBD of the spike protein: COVARNA Consortium. NPJ Vaccines. 2024 Mar 6;9(1):53. doi: 10.1038/s41541-024-00838-8.PMID: 38448450

409. Pérez P, Astorgano D, Albericio G, Flores S, Sánchez-Corzo C, Noriega MA, Sánchez-Cordón PJ, Labiod N, Delgado R, Casasnovas JM, **Esteban M,** García-Arriaza J. (2024). MVA-based vaccine candidates expressing SARS-

CoV-2 prefusion-stabilized spike proteins of the Wuhan, Beta or Omicron BA.1 variants protect transgenic K18-hACE2 mice against Omicron infection and elicit robust and broad specific humoral and cellular immune responses. Front Immunol. 2024 Aug 29;15:1420304.doi:10.3389/fimmu.2024.1420304. eCollection 2024.PMID: 39267752

410. Marcos-Villar L, Perdiguero B, López-Bravo M, Zamora C, Sin L, Álvarez E, Sorzano CÓS, Sánchez-Cordón PJ, Casasnovas JM, Astorgano D, García-Arriaza J, Anthiya S, Borrajo ML, Lou G, Cuesta B, Franceschini L, Gelpí JL, Thielemans K, Sisteré-Oró M, Meyerhans A, García F, Esteban I, López-Bigas N, Plana M, Alonso MJ, **Esteban M,** Gómez CE. (2024). Heterologous mRNA/MVA delivering trimeric-RBD as effective vaccination regimen against SARS-CoV-2: COVARNA Consortium. Emerg Microbes Infect. 2024 Dec;13(1):2387906. doi: 10.1080/22221751.2024.2387906. Epub 2024 Aug 8.PMID: 39087555

411.

PATENTES / PATENTS

-VECTORES RECOMBINANTES BASADOS EN EL VIRUS MODIFICADO DE ANKARA (MVA) COMO VACUNAS CONTRA LEISHMANIASIS. Solicitud de invención Nº 200501886, 30 Julio 2005; PCT/ES2006/070122. US Application Serial No. 11/989.614, filing date January 29, 2008. Concedido Título de Patente de Invención, Oficina Española de Patentes y Marcas, 16 Febrero, 2009. Nº publicación 2281252. Eva Pérez-Jiménez, Vicente Larraga y Mariano Esteban (licenciada).

- RECOMBINANT VECTORS BASED ON ANKARA MODIFIED VIRUS (MVA) AS PREVENTIVE AND THERAPEUTIC VACCINES AGAINST HIV. Carmen E. Gómez, José L. Nájera, Victoria Jiménez y Mariano Esteban- Application Number and priority date: P200501841, 27/07/2005 and P200600762 (24.03.2006)- International PCT Application: PCT/ES06/070114- Countries selected in National Phase: EU, US- Present situation: Exclusive license agreement to Laboratorios del Dr. Esteve S.A. y la Fundación Privada Institut de Recerca de la SIDA-CAIXA (Fundación Irsi-CAIXA). (30/06/2012). EU Patent has been granted (EP1921146 B1) and has been validated in the following countries: España, Francia, Austria, Bélgica, Dinamarca, Finlandia, Alemania, Grecia, Islandia, Irlanda, Italia, Letonia, Luxemburgo, Mónaco, Países Bajos, Portugal, Suecia, Suiza, Gran Bretaña, Polonia, Rumania y Chipre. US Patent has been granted (US 8,871,219 B2, 28/10/2014).

-MEJORAS INTRODUCIDAS EN EL OBJETO DE LA PATENTE PRINCIPAL Nº ES200501841 PARA VECTORES RECOMBINANTES BASADOS EN EL VIRUS MODIFICADO DE ANKARA (MVA) COMO VACUNAS PREVENTIVAS Y TERAPÉUTICAS CONTRA EL SIDA. Solicitud P200600762. 24 Marzo, 2006; PCT/ES2006/070114. Carmen E. Gómez, José L. Nájera, Victoria Jiménez y Mariano Esteban (licenciada)

-VECTORES EN LOS QUE SE INSERTA EL GEN C7L Y USO DE LOS MISMOS EN LA FABRICACION DE VACUNAS Y DE COMPOSICIONES PARA TERAPIA GÉNICA. Solicitud de Invención Nº200601240, 18 Mayo, 2006; PCT/ES2007/070091. José Luis Nájera, Carmen E. Gómez y Mariano Esteban.

-MODIFIED POXVIRUSES. US Provisional Patent Application No. 61/102,401. November 11, 2008. Michael Way, Antonio Postigo, Yoshiki Arakawa, Mariano Esteban, Susana Guerra.

--MODIFIED IMMUNIZATION VECTORS. US Patent 2,760,315, date 29/04/2018. Mariano Esteban, Bertram Jacobs, Giuseppe Pantaleo, Co-titularity with Arizona State University (AZ, USA), Centre Hospitalier Universitaire Vaudois (Switzerland) - International PCT Application: PCT/US10/032966- Countries selected in National Phase: EU, US, CA

-MÉTODO DE OBTENCIÓN DE DATOS ÚTILES PARA EVALUAR LA RESPUESTA AL TRATAMIENTO

CON 5-FLUOROURACILO (5-FU). Solicitud de invención Nº P201130247, 24 Febrero 2011. Gárcía Cháves M.A., Aguilera Gómez M., Calleja Hernández M.A., Marchal Corrales J.A., Esteban Rodríguez M., Carrasco Pardo E., Jiménez Gonzalez G., Aránega Jiménez A.

-VECTORES RECOMBINANTES BASADOS EN EL VIRUS MODIFICADO DE ANKARA (MVA) CON DELECIÓN EN EL GEN C6L COMO VACUNA CONTRA EL VHI/SIDA Y OTRAS ENFERMEDADES. Presentada ante la Oficina Española de Patentes y Marcas el 19 de Julio de 2011. Número de solicitud 201131230. PCT/ES2012/070521 Juan F. García-Arriaza, Carmen E. Gómez y Mariano Esteban.

-ADJUVANT EFFFECT OF PROTEIN A27 (14K) FROM VACCINIA VIRUS AND APPLICATIONS AS VACCINES. Presentada en la Oficina Española de Patentes y Marcas, 17 Noviembre de 2011. Nº solicitud P201131854. Aneesh Vijayan, Carmen E. Gómez and Mariano Esteban.

-MVA-HCV AS VACCINE AGAINST HEPATITIS C. Mariano Esteban., Beatriz Perdiguero y Carmen E. Gómez. Application Number and priority date: P201330467, 02/04/2013.- International PCT Application: PCT/ES2014/070246, 31/03/2014. On 09/10/2014 the mentioned International Patent Application has been published as WO 2014/162031. - Present situation: Exclusive license agreement to Plant Bioscience Limited (PBL) (6/05/2014) but sublicensing rights are available from PBL.

-MVA-CHIKV AS VACCINE AGAINST CHIKUNGUNYA VIRUS. Mariano Esteban, Juan García-Arriaza and Peter Liljeström. PCT/EP2014/076310, 2 Dic 2014- Present situation: Exclusive license agreement to Plant Bioscience Limited (PBL) (14/07/2014) but sublicensing rights are available from PBL (licenciada). WO2016/086980-A1, June 9, 2016.

-MVA-BASED VACCINE AGAINST COVID-19 EXPRESSING SARS-COV-2 ANTIGENS. Juan García Arriaza; Mariano Esteban Rodríguez. Número de publicación: WO 2021/260065 A1 (30/12/2021), Número de solicitud: PCT/EP2021/067245 (23/06/2021); EP20383017.9 (20/11/2020); EP20382558.3. (24/06/2020), PCT/EP2021/067245 (26/06/2021). Fecha de prioridad: 24/06/2020. Entidad titular: Consejo Superior de Investigaciones Científicas (CSIC) (100%)

-MVA-BASED VACCINE AGAINST COVID-19 EXPRESSING A PREFUSION-STABILIZED SARS-COV-2 S PROTEIN. Juan García Arriaza; Patricia Pérez Ramírez, Adrián Lázaro Frías, Mariano Esteban Rodríguez. Número de solicitud: EP21382557.3 (23/06/2021), EP21383245.4 (31/12/2021), PCT/EP2022/067271 (23/06/2022). Fecha de prioridad: 23/06/2021. EP 4108257. Entered on January 23, 2024 into National Phase in Europe. Entidad titular: Consejo Superior de Investigaciones Científicas (CSIC) (100%).

- COMPOUNDS FOR USE IN THE TREATMENT OF NON-INTEGRATED DNA VIRAL INFECTIONS" Juan García Arriaza, Guillen Albericio, Mariano Esteban. Esta solicitud de Patente internacional No. PCT/EP2024/053510 de fecha 12/02/2024 se publicó el pasado 15/08/2024 bajo el número WO 2024/165764 A1.

COLLABORATION WITH INDUSTRY AND DONATIONS

- NAME company: BIOFABRI S.L.U, SPAIN

Transferred products from CNB to Biofabri:

1) Vaccine SARS-CoV-2, based on the poxvirus MVA expressing the entire S protein from SARS-CoV-2, Wuhan strain MVA (named MVA-CoV2-S)

2) Vaccine SARS-CoV-2, based on the poxvirus vector MVA expressing the fusión stablized S protein (MVA-S(3P)).

Agreements:

- Confidenciality, May 7, 2020.
- Material Transfer Agreement (MTA), May 20, 2020, stock of MVA-CoV2-S (native full-lenght S from Wuhan strain).
- Material Transfer Agreement, February 23, 2021, MVA-CoV2-S(3P) (stabilized S protein from Wuhan strain).
- R&D contract, CNB-CSIC and CZ Veterinaria, July 25, 2020: CDTI project on vaccines against COVID-19.
- Contract for a phase I clinical trial with a CRO to evaluate tha security, reactogenicity and immunogenicity of the vaccine candidate MVA-CoV2-S(3P), Acronym: COVIMVA.
- CSIC agreement with WHO through Medicines Patent Pool for the donation of the vaccine MVA-CoV2-S(3P) for most needed third world countries.

Donations: numerous donations from private sector and society were provided to the laboratory for vaccine development during the SARS-CoV-2 pandemic.

ESTANCIAS EN CENTROS EXTRANJEROS/ FOREIGN CENTERS

Centro: National Institute for Medical Research, Mill Hill
Localidad: Londres País Reino Unido Fecha: 1970-74 Duración: 4 años
Tema: Vaccinia virus, action of interferon, translation

Centro: Departament of Microbiology. Rutgers Medical School
Localidad: New Jersey País USA Fecha: 1974-77 Duración: 4 años
Tema: Transcription and DNA replication of vaccinia virus

Centro: Molecular Biology Center. Ghent
Localidad: Ghent País Belgium Fecha: 1978 Duración: 6 meses
Tema: Cloning and sequencing of viruses

Centro: Departments of Biochemistry and Microbiology and Immunology, State University of New York (SUNY), Downstate Medical Center
Localidad: New York País USA Fecha: 1979-1993 Duración: 14 años
Tema: Viral pathogenesis, gene expressión, mechanism of action of interferons, vaccines against pathogens

CONTRIBUCIONES A CONGRESOS / MEETINGS

1. **Esteban**, M. and Regueiro, B. Mecanismo de accion del algunos antibioticos en el metabolismo de ribosomas del Streptococcus faecalis (enterococo). II Congreso Nacional de Microbiologia, Madrid, noviembre 1969.

2. **Esteban**, M. and Regueiro, B. Accion de la Nitrofurantoina sobre el metabolismo de ribosomas del Streptococcus faecalis (enterococo). I. Symposium international on the mechanism of action of antibiotics, Zaragoza, Spain October, 1970.

3. Metz, D.H., **Esteban**, M. and Danielescu, G. The processing of messenger - RNA in cells infected with vaccinia virus. The virus group Meeting, SGM, University of Warwick, Coventry, England, September 1, 1974.

4. Kerr, I.M., Dobos, P., Martin, E.M., Metz, D.H. and **Esteban**, M. Proteins synthesis in interferon-treated and virus-infected cells. FEBS, Varna, Bulgaria, September 1971.

5. **Esteban**, M. and Metz, D.H. Very early proteins synthesized in vaccinia infected cells. The virus group Meeting, SGM, Imperial College, London, April 1972.

6. Friedman, R.M., **Esteban**, M., Metz, D.H., Tovell, D.R., Kerr, I.M. and Williamson, R. Translation of RNA by cell-extracts: effect of interferon. FEBS, Amsterdam, Holland, August 1972, Abstract 476.

7. **Esteban**, M., Tovell, D.R., Friedman, R.M., Ball, L.A., Sonnabend, J.A. and Kerr, I.M. Inhibition of encephalomyocarditis (EMC) viral protein synthesis by interferon. International Congress of Biochemistry, Stockholm, Sweden, July 1973, Abstracts p. l75.

8. Friedman, R.M., Ball, L.A., Sonnabend, J.A., **Esteban**, M. and Kerr, I.M. Inhibition of viral mRNA translation: The mechanism of interferon action. International Congress of Biochemistry, Stockholm, Sweden, July 1973, p.l75.

9. Kerr, I.M., Friedman, R.M., **Esteban**, M., Brown, R.E., Ball, L.A., Metz, D.H., Risby, D., Tovell, D.R. and Sonnabend, J.A. The control of protein synthesis in interferon-treated cells. Workshop on virus-cell interactions, Berlin, January, 1973.

10. **Esteban**, M. Interferon inhibits the translation of viral mRNA in animal cell-free systems. Gulbenkian Institute of Science, Oeiras, Portugal, September l973.

11. **Esteban**, M. Characteristics of the interferon-mediated inhibitor(s) of viral mRNA translation in cell-free systems. The virus group meeting, SGM, University of Leicester, England, January l974.

12. **Esteban**, M. and Holowczak, J.A. The replication of vaccinia virus DNA. In vitro DNA synthesis in cytoplasmic cell-extracts from vaccinia virus infected L-cells. III. International Congress for Virology, Madrid, Spain, September 1975, Abstracts p. l74.

13. Bablanian, R. and **Esteban**, M. Vaccinia virus inducted inhibition of host protein synthesis is related to viral RNA synthesis. III. International Congress for Virology, Madrid, Spain, September 1975, Abstracts p. l0l.

14. **Esteban**, M., Cabrera, C.V. and Holowczak, J.A. l977. In vitro transcription of Vaccinia virus DNA:

Analysis of viral mRNA by Electronmicroscopy. Abstracts of the Annual Meeting, ASM, New Orleans; page 309.

15. Soloski, M.J., **Esteban**, M. and Holowczak, J.A. 1977. DNA binding proteins in vaccinia virus infected mouse L-cells. Abstracts of the Annual Meeting, ASM, New Orleans, p. 309.

16. Cabrera, C.V. and **Esteban**, M. 1977. Transcription del virus vaccinia: Cuantificacion y Localizacion del ARN con fragmentos de restriccion. VI Congreso Nacional de Microbiologia, Santiago de Compostela, Spain, Julio 6/9.

17. Soloski, M., **Esteban**, M. and Holowczak, J.A. 1977. Evidence for proteins linked to the termini of Vaccinia DNA molecules, Poxvirus Workshop. Cold Spring Harbor Laboratories, October, I2/I5.

18. Cabrera, C.V. and **Esteban**, M. 1977. A procedure for purification of intact DNA from Vaccinia virus. Poxvirus workshop. Cold Spring Harbor Laboratories, October, I2/I5.

19. McCarron, R.J., Cabrera, C.V., **Esteban**, M., McAllister, W.T. and Holowczak, J.A. I977. Structure of Vaccinia DNA: Analysis of the viral genome by restriction endonucleases. Poxvirus workshop. Cold Spring Harbor Laboratories, October, I2/I5.

20. **Esteban**, M., Cabrera C.V. and Holowczak, J.A. 1977. Proposed model for vaccinia DNA replication. Poxvirus workshop. Cold Spring Harbor Laboratories, October, I2/I2.

21. **Esteban**, M., Cabrera, C.V. and Holowczak, J.A. 1977. Transcription of vaccinia DNA by E. coli RNA polymerase: visualization and physical location of RNA transcripts. Poxvirus workshop. Cold Spring Harbor Laboratories, October I2/I2.

22. Cabrera, C.V., **Esteban**, M., McCarron, R.J., McAllister, W.T. and Holowczak, J.A. I977. Vaccinia virus transcription: Hybridization of mRNA to restriction fragments of vaccinia DNA. Poxvirus workshop. Cold Spring Harbor Laboratories, October I2/I5.

23. **Esteban**, M., Cabrera, C., Soloski, J. and Holowczak, J.A. 1978. Replication of vaccinia DNA. Synposium on DNA structure and replication. Cold Spring Harbor Laboratories. May/June.

24. Soloski, M., Cabrera, C.V., **Esteban**, M. and Holowczak, J.A. I978. Replication of vaccinia DNA. IV International Congress for Virology, The Hague, Holland, August 30/September. 6th Abstracts, p. 549.

25. Bablanian, R., **Esteban**, M. and Coppola, G.R. 1980. The role of vaccinia virus transcription in the inhibition of host protein synthesis. ASM Miami Beach, pp. 230.

26. Soloski, M., **Esteban**, M. and Holowczak, J.A. (1980). Vaccinia virus DNA replication. ICN-UCLA Symposia on Extrachromosomal DNA.

27. **Esteban**, M. and Pellicer, A. (I980). Gene transfer of vaccinia DNA into animal cells. Third Poxviruses and Iridoviruses Workshop Set p. I5-I8. Cold Spring Harbor Laboratory.

28. **Esteban**, M. and Benavente, J. (1981). Mechanism of action of interferon, VIII National Microbiology Congress. Sept. 28 - Oct. I. Madrid, Spain.

29. **Esteban**, M. and Benavente, J. (I981). The effect of interferon on protein synthesis in vaccinia virus infected cells. II International Congress for Interferon Research. Oct. I. San Francisco.

30. **Esteban**, M. (1982). An effect of interferon on initiation and elongation of vaccinia DNA synthesis. First annual meeting. ASV Cornell University, Ithaca, New York, August I-5.

31. Santoro, M.G. Jaffe, B.M., Garaci, E. and **Esteban**, M. (1982). Antiviral action of Prostaglandins of the A series: inhibition of the replication of vaccinia virus. V International Conference on Prostaglandins; Florence, May l8-2l, Italy.

32. Benavente, J. and **Esteban**, M. (1982). Mechanism of inhibition of vaccinia virus protein synthesis by interferon. Fourth Poxvirus-Iridovirus workshop, Cold Spring Harbor Laboratory, September 20-23.

33. Paez, E. and **Esteban**, M. (1982). Vaccinia virus can overcome the antiviral action of interferon in some cells. Fourth Poxvirus-Iridovirus workshop. Cold Spring Harbor Laboratory, September 20-23.

34. **Esteban**, M., Boni, C. and Pellicer, A. (l982). Phenotypic changes of cells transformed with vaccinia DNA. Fourth Poxvirus-Iridovirus workshop. Cold Spring Harbor Laboratory. September 20-23.

35. Santoro, G., Benavente, J., Paez, E., Jaffe, B. and **Esteban**, M. (1982). Inhibition of vaccinia virus protein synthesis by Prostaglandings of the A series. Fourth Poxvirus-Iridovirus workshop. Cold Spring Harbor Laboratory. September 20-23.

36. Lewis, J.A., Mengheri, E. and **Esteban**, M. (1982). Induction of an antiviral response by interferon requires thymidine kinase. III International Congress for Interferon Research. Miami, Florida; Nov. l-3.

37. Mengheri, E., **Esteban**, M. and J.A. Lewis (1982). Thymidine Kinase genes and interferon sensitivity. American Society for Cell Biology, 22nd Annual Meeting, Baltimore, Nov. 30-Dec.4.

38. Mengheri, E., **Esteban**, M. and Lewis, J.A. (1983). Thymidine Kinase genes and interferon sensitivity. 83rd Annual Meetings, American Society for Microbiology, New Orlenans, 6-ll March; T-86.

39. **Esteban**, M. (l984). Antiviral and antitumor properties of interferon: Mechanism of action. 3rd International Duran-Reynals Symposium on Viruses, Oncogenes and Cancer Barcelona, Spain, May 14-l7

40. **Esteban**, M., Benavente, J. and Paez, E. (l984). Indiscriminate degradationof RNAs in interferon-treated, virus infected mouse L cells. Third Annual Meeting of the American Society for Virology, Madison WI. July 22-26.

41. Paez, E. and **Esteban**, M. (1984). Interferon inhibits marker rescue of vaccinia virus. Third Annual Meeting of the American Society for Virology. Madison WI, July 22-26.

42. **Esteban**, M., Boni, C and Pellicer, A. (1984). Expression of cloned vaccinia DNA sequences introduced into animal cells. Fifth International Poxvirus/Irido virus Workshop. Madison WI, July 22-26.

43. Paez, E and **Esteban**, M. (1984). Resistance of vaccinia virus to interferons: Activation of the 2-5A synthetase/endoribonucleare system and interference by viral proteins. Fifth International Poxvirus/Irido-virus Workshop, Madison. WI. July 22-26.

44. **Esteban**, M. and Paez, M. (1985). The 2-5A system in interferon-treated vaccinia virus infected cells. Conference on "The 2-5A system" Toronto, Canada, June 2-5, 1985.

45. Paez, E. and **Esteban**, M. (1985). Interferon prevents the generation of spontaneous deletions at the left terminus of vaccinia virus DNA. Conference on "The 2-5A system." Toronto, Canada, June 2-5, 1985.

46. **Esteban**, M. (1986). Mechanism of antiproliferative action of interferons. In "Interferons as cell growth inhibitors and antitumor factors." UCLA Symposia, April 6-12, Steamboat Springs, Colorado (Invited participant).

47. Rodriguez, J.F., Paez, E. and **Esteban**, M. (1986). A 14K envelope protein of vaccinia virus is involved in virus-induced cell fusion. Six International Poxvirus/Iridovirus Workshop. Cold Spring Harbor Laboratory, New York, Sept. 24-28.

48. Kahn, J., Rodriguez, J.F. and **Esteban**, M. (1986). Molecular cloning, encoding sequence and expression of vaccinia virus nucleic acid dependent nucleoside triphosphatase gene. Six International Poxvirus/Iridovirus Workshop. Cold Spring Harbor Laboratory, New York, Sept. 24-28.

49. Paez, E. and **Esteban**, M. (1986). Isolation and characterization of spontaneous deletion mutants of vaccinia virus. Six International Poxvirus/Iridovirus Workshop. Cold Spring Harbor Laboratory, New York, Sept. 24-28.

50. Paez, E. and **Esteban**, M. (1986). Isolation and characterization of spontaneous mutants of vaccinia virus sensitive to inhibition by interferon. Six International Poxvirus/Iridovirus Workshop. Cold Spring Harbor Laboratory, New York, Sept. 24-28.

51. Dallo, S., Maa, J-S. and **Esteban**, M. (1986). Isolation and characterization of attenuated mutants of vaccinia virus. Six International Poxvirus/Iridovirus Workshop. Cold Spring Harbor Laboratory, New York, Sept. 24-28.

52. Bablanian, R., Goswami, S.K., **Esteban**, M. and Banerjee A.K. (1986). Mechanism of selective inhibition of protein synthesis by vaccinia virus: role of poly A. Six International Poxvirus/Iridovirus Workshop. Cold Spring Harbor Laboratory, New York, Sept. 24-28.

53. Portela, A., Rodriquez, J.R., Rodriguez, D., Rodriguez, J.F., **Esteban**, M. and Melero, J.A. (1988) I Congreso Nacional de Virologia, Madrid, Spain. "Expression de la proteina de fusion del virus sincitial respiratorio en recombinantes del virus de la vacuna. p.19.

54. **Esteban**, M., Rodriquez, D., Rodriguez, J.R., Rodriguez, J.F., and Trauber, D. (1988) I Congreso Nacional de Virologia, Madrid, Spain 1988. "Attenuated vaccinia virus to generate safe recombinant vaccines". Simposio.

55. **Esteban**, M., Rodriquez, D., Rodriguez, J.R., and Rodriguez, J.F. (1988) II Congreso Nacional de Biotecnologia, Barcelona, Spain. "Vaccinia virus as an expression vector and a polyvalent vaccine". p.25.

56. **Esteban**, M., Rodriquez, D., Rodriguez, J.R., Rodriguez, J.F. (1988) III Congreso Luso-Espanol de Bioquimica. Santiago de Compostela, Spain. "Virus recombinantes atenuados de HIV-vaccinia como vacunas contra el SIDA". p.100.

57. Rodriguez, D., Rodriquez, J-R., Rodriguez, J.F., Trauber, D., and **Esteban**, M. (1988) VII International Meeting on Poxvirus-Iridovirus. Heidelberg, Germany. "Highly attenuated vaccinia virus mutants for the generation of safe recombinant viruses". p.93.

58. Maa, J.S., Rodriguez, J.F. and **Esteban**, M. (1988). Mode of entry of poxviruses into cells: structural and functional studies of vaccinia virus cell attachment and fusion proteins. VII International Meeting on Poxvirus-Iridovirus. Heidelberg, Germany, August 22-26. pg.66.

59. Portela, A., Rodriguez, D., Rodriguez, J-R., Rodriguez, J.F., **Esteban**, M. and Melero, J.A. (1988). "Expression of the fusion (F) protein of human respiratory syncytial virus using an attenuated strain of vacccinia virus". International Meeting on negative strand RNA virus. France

60. **Esteban**, M. (1989). Prevention of viral DNA sequence alterations by interferon. NATO, The Molecular basis of cell growth regulation, Mallorca, Spain, April 30-May 10.

61. **Esteban**, M., Irvine, M. and Kahn, J.S. (1989). Mechanism of resistance of vaccinia virus to interferons. Annual Meeting of the International Society for Interferon Research, Florence, Italy, Oct. 22-27.

62. **L**ai, C., Gong, S, and **Esteban, M** (1989). Structural and functional análisis of the 14 kDa membrane protein of vaccinia virus. Symposium on Life Sciences for the Chinese Students in the USA. Cambridge, Massachussets, USA, July 21-23, p98.

63. **Esteban**, M., Lai, C., Rodriguez, D. and Rodriguez, J.R. (1990) Functional characterization of the 32 KDa cell surface binding protein of vaccinia virus. 8th International Poxvirus/Iridovirus Meeting, Wintergreen, Virginia, USA, May 15-20, p 98.

64. Rodriguez, D., Zhou, Y., Rodriguez, J.R., Russell, U.D., Jimenez, V., McAllister, W.T. and **Esteban**, M. (1990) Regulated expression of nuclear genes by T3 RNA polymerase and lac repressor using recombinant vaccinia virus vectors. 8th International Poxvirus/Iridovirus Meeting, Wintergreen, Virginia, USA, May 15-20, p 143.

65. Lai, C., Gong, S. and **Esteban**, M. (1990) Vaccinia virus induces cell fusion at acid pH and this activity is mediated by the N-terminus of the 14KDa virus envelope protein. 8th International Poxvirus/Iridovirus Meeting, Wintergreen, Virginia, USA, May 15-20, p 109.

66. Gong, S., Lai, C. and **Esteban**, M. (1990). Mechanism of cell fusion induced by vaccinia virus. VIII International Congress of Virology, Berlin, August 26-31, p 77.

67. Rodriguez, J.R., Rodriguez, D. and **Esteban**, M. (1990). Chimeras of HIV-1 env and the 14KDa envelope protein of vaccinia virus. VIII International Congress of Virology, Berlin, August 26-31, p 357.

68. **Esteban**, M., Maa, J-S and Demkowicz, W.E. (1991). Indentification of vaccinia virus genes encoding immunodominant proteins in vaccinated humans. 10th Annual Meeting. American Society for Virology. Colorado State University, Fort Collins, July 7-11.

69. Diaz-Guerra, M. and **Esteban**, M. (1992). Role of vaccinia virus ATPase-I on viral gene expression. 9th International Congress on Poxviruses and Iridoviruses. Les Diablerets, Switzerland, Sept. 1-6, p.96.

70. Rodriguez, D., Rodriguez, J-R and **Esteban**, M. (1992). The 14KDa fusion protein of vaccinia virus forms a heterodimer. 9th International Congress on Poxviruses and Iridoviruses. Les Diablerets, Switzerland, Sept. 1-6,; p121.

71. Lee, S.B., Melkova, Z., Yan, W., Williams, B.R.G., Hovanessian, A. and **Esteban**, M. (1992). The interferon-induced double-sttranded RNA-activated human p68 protein kinase potently inhibits protein synthesis in cultured cells. 9th International Congress on Poxvirus and Iridoviruses. Les Diablerets, Switzerland, Sept. 1-6, p153.

72. Bablanian, R. and **Esteban**, M. (1992). Translational control of vaccinia virus-infected cells. Workshop on Translational Control. Cold Spring Harbor Laboratory, New York, Sept. 9-13.

73. Lee, S.B and **Esteban, M** (1993). The interferon-induced ds-RNA dependent human p68 protein kinase inhibits the replication of vaccinia virus. Annual Meeting of the International Society of Interferon Research. Toronto, Canada.

74. Lee, S.B and **Esteban, M** (1993). The interferon-induced ds-RNA dependent human p68 protein kinase induces apoptosis. IX International Congress of Virology, 8-13 August, Glasgow. U.K

75. **Esteban, M.** (1993). Vaccinia virus vectors as potential vaccines. First Workshop on "Molecular

Genetics in Modern Biotecnology", Mallorca. Spain.

76. **Esteban, M**. (1993). The interferon-induced ds-RNA dependent human p68 protein kinase as an inducer of apoptosis. Workshop on 'Viral Evasion of Host Defence Mechanisms". Fundacion Juan March, 20-22 September. Madrid. Spain.

77. **Esteban, M**. (1994). Vaccinia Virus Vectors as Potential Vaccines Against Malaria. UNESCO meeting on "Combating Malaria", 19-21 January. Paris. France.

78. Lee, S.B and **Esteban, M**. (1994). Vaccinia virus induces apoptosis and this process could involve a ds-RNA dependent protein kinase. 10th International Poxvirus/Iridovirus Meeting. April 30-May 5, Banff. Alberta. Canada.

79. Melkova, Z and E**steban, M**. (1994). Role of nitric oxide in the inhibition of vaccinia virus replication in macrophages by interferon-gamma. 10th International Poxvirus/Iridovirus Meeting. April 30-May 5. Banff. Alberta. Canada.

80. Lee, S.B., Greene, S., Mathews, M.B and **Esteban, M.** (1994). Activation of the double-stranded RNA (dsRNA)-activated human protein kinase in the absence of its dsRNA binding domain. Meeting on Translational Control. Cold Spring Harbor Laboratory, New York, August 24-28, USA.

81. **Esteban, M** and Lee, S.B (1994). Role of the interferon-induced human protein kinase(p68) in the induction of apoptosis. International Workshop on The Biochemistry and Regulation of Programme Cell Death. Fundación Juan March. May 33-25, Madrid, Spain.

82. **Esteban, M** (1994). Combined live virus immunization against pathogens. International Workshop on Resistance to Viral Infection. Fundación Juan March. June 20-22, Madrid, Spain.

83. Lee, S.B., Green, R., Mathews, M.B, and **Esteban, M**. (1994). Identification of a novel domain important for the activation of the double-stranded RNA-activated human protein kinase. BIOTEC 94. II Congreso Ibérico de Biotecnologia. 1-4 Octubre, Universidade do Algarve. Portugal.

84. Rodriguez, D., Rodriguez, J.R and **Esteban, M.** (1994). Vaccinia virus A17L gene product is essential for virus replication. BIOTEC 94. II Congreso Ibérico de Biotecnologia. 1-4 Octubre. Universidade do Algarve. Portugal.

85. **Esteban, M** (1994). Novel vaccine strategies against HIV. II International Symposium on HIV Therapeutic and Vaccine Strategies. Fundación Ramón Areces. October 27-28, Madrid, Spain.

86. Melková, Z., Lee, S.B and **Esteban, M** (1995). Bcl-2 prevents development of nitric oxide-mediated apoptosis. In " Molecular Biology and Pathophysiology of nitric oxide. Juan March Foundation. Madrid, June 5-7.

87. Melková, Z and **Esteban, M** (1995). Inhibition of vaccinia virus DNA replication by inducible expression of nitric oxide synthase. In " Molecular Biology and Pathophysiology of nitric oxide "Juan March Foundation. Madrid, June 5-7.

88. Rodriguez, D., Rodriguez, J.R and **Esteban, M** (1995). The product of the vaccinia virus A17L gene is essential for an early stage of viral morphogenesis. In IV National Congress of Virology. Madrid, September, 21-23, p129

89. Pavón, M., Jimenez, V and **Esteban, M** (1995). The human protooncogen Bcl-2 inhibits apoptosis induced by vaccinia virus. In IV National Congress of Virology. Madrid, September, 21-23, p200.

90. Suarez, P., Diaz-Guerra, M., Prieto, C., **Esteban, M**., Castro, J.M and Ortin, J (1995). The protein encoded by ORF-5 of PRRS virus induces apoptosis. In IV National Congress of Virology. Madrid,

September 21-23, p201.

91. Diaz-Guerra, M and **Esteban, M** (1995). Activation of the 2-5 A Synthetase/RNase L system during infection with vaccinia virus. In IV National Congress of Virology. Madrid, September 212-23, p227.

92. **Esteban, M**., Mathews, M.B and Lee, S.B (1995). Structure-function of the protein kinase p68 induced by interferons. In IV National Congress of Virology. Madrid, September 21-23, p161.

93. Collado, M., Rodriguez, J.R., Rodriguez, D and **Esteban,M** (1995). Chimeric proteins of HIV-vaccinia as immunogens. In IV National Congress of Virology. Madrid, September 21-23, p190.

94. Pavón, M and **Esteban, M** (1995). The protein kinase induced by interferons changes the pattern of phosphorylation of proteins in HeLa cells. In IV National Congress of Virology. Madrid, September 21-23, p220.

95. Melkova, Z and **Esteban, M** (1995). Inhibition of vaccinia virus replication by nitric oxide. In IV National Congress of Virology. Madrid, September 21-23, p221.

96. Diaz-Guerra, M., Melková, Z and **Esteban, M** (1995). Ability of the 2-5-Synthetase/RNase l system to inhibit the replication of vaccinia virus. Annual Meeting of the International Society for Interferon and Cytokine Research. Baltimore. November 6-11, p119.

97. Melková, Z and **Esteban, M** (1995). Inhibition of vaccinia virus replication by inducible expression of nitric oxide synthase. Annual Meeting of the International Society for Interferon and Cytokine Research. Baltimore. November 6-11, p131.

98. Martín-Gallardo, A., Moratilla, M., Agromayor, M., Funes, J.M Nuñez, A.J., Varas, A., Lopez-Estebaranz, J.L., Valencia, A., Collado, M and **Esteban, M**. (1996). Random DNA sequencing computer-based approach for the construction of a gene map of Molluscum Contagiosum virus. XI Poxvirus and Iridovirus Meeting. Toledo, Spain. May 4-9. p41

99. Moratilla, M., Agromayor, M., Nuñez, A., Funes, J.M**., Esteban, M** and Martin-Gallardo, A (1996). Sequencing and analysis of a DNA region from Molluscum Contagiosum virus that include the homolog of the vaccinia fusion protein. XI Poxvirus and Iridovirus Meeting. Toledo, Spain. May 4-9. p 62

100. Rodriguez, J.R., Rodriguez, D., Risco, C., Carrascosa, J.L and **Esteban, M**. (1996). Vaccinia virus A14L gene product is a component of the virion membrane. XI Poxvirus and Iridovirus Meeting. Toledo, Spain. May 4-9. p 63

101. Vazquez, M.I., Valencia, A., Serrano, L and **Esteban, M** (1996). Structural analysis of the membrane fusion protein (ORF A27L) of vaccinia virus. XI Poxvirus and Iridovirus Meeting. Toledo, Spain. May 4-9. p 79.

102. Rodriguez, D., Rodriguez, J.R., Risco, C., Carrascosa, J.L and **Esteban, M** (1996). Reversibility of vaccinia virus morphogenesis blockage caused by inhibition of VV A17L gene expression. XI Poxvirus and Iridovirus Meeting. Toledo, Spain. May 4-9. p 136.

103. Krijnse-Locker, J., Schleich, S., Rodriguez, D., **Esteban, M** and Griffiths, G (1996). The role of p21 (A17L) in the assembly of vaccinia virus from the intermediate compartment. XI Poxvirus and Iridovirus Meeting. Toledo, Spain. May 4-9. p 137.

104. Murata, K., Garcia-Sastre, A., Tsuji, M., Rodrigues, M., Rodriguez, D., Rodriguez, J.R., Nussenzweig, R., Palese, P**., Esteban, M** and Zavala, F (1996). Enhanced primary and secondary CD8+T cell responses by immunizing with live recombinants of influenza and vaccinia viruses expressing malaria antigens. XI Poxvirus and Iridovirus Meeting. Toledo, Spain. May 4-9. p 224.

105. Garcia-Sastre, A., Miyahira, Y., Zavala, F., Nussenzweig, R., Rodriguez, D., Rodriguez, J.R., **Esteban,** M and Palese, P (1996). Influenza vectors expressing B-cell and T-cell epitopes from the circumsporozoite protein of Plasmodium falciparum. In "Genetic Engineering of Viruses and Viral Vectors". Irvine, CA. June 8-11.

106. Pavón, M and **Esteban, M** (1996). Identification of modulators and new substrates of the interferon-induced ds-RNA activated protein kinase (PKR) by affinity binding assays. FEBS Meeting. Barcelona. July 8-12.

107. **Esteban, M** (1996). Role of interferon-induced enzymes in control of viral infections. In "Cytokines and Infectious Diseases". Juan March Foundation. Madrid. June 3-5.

108. Gonzalo, R., Rodriguez, D., Rodriguez, J.R., Garcia-Sastre, A., Palese, P, and **Esteban, M** (1997). Enhanced cellular immune response to HIV-1 env by combined imunization with influenza and vaccinia virus recombinants. 2nd European Conference on Experimental AIDS Research. Stockholm, Sweden. May 31-June 3, 1997. Abstract, 107-P3.

109. Collado, M., Rodriguez, D., Rodriguez, J.R., Gonzalo, R.M., Vazquez, I, and **Esteban, M** (1997). Modulation of the immune response elicited against HIV-env antigen through its fusion to vaccinia virus antigens. 2nd European Conference on Experimental AIDS Research. Stockholm, Sweden. May 31-June 3, 1997. Abstract, 108-P3.

110. Rodriguez, J.R., Rodriguez, D., Risco, C., Carrascosa, J.L and **Esteban, M** (1997). El producto del gen A14L del virus vacunal es esencial en estadios tempranos en la morfogénesis. V Congreso Nacional de Virologia. Santiago de Compostela. Septiembre 7-10. p289

111. Vazquez, M.I., Rivas, G., Blanco, F ., Serrano, L and **Esteban, M** (1997). Modelo estructural de la proteina de fusión de 14 KD (ORF A27L) del virus vacunal. V Congreso Nacional de Virologia. Santiago de Compostela. Septiembre 7-10. p294

112. Collado, M., Rodriguez, D., Rodriguez, J.R., Vazquez, M.I and **Esteban, M** (1997). Modulación de la respuesta inmune frente al antígeno env del VIH-1 mediante su fusión a antígenos del virus vaccinia. V Congreso Nacional de Virologia. Santiago de Compostela. Septiembre 7-10. p 313.

113. Vazquez, M.I., Serrano, L and **Esteban, M** (1997). Estudios in vitro e in vivo acerca de la interacción de las pproteinas codificadas por los genes A17L y A27L del virus vacunal. V Congreso Nacional de Virologia. Santiago de Compostela. Septiembre 7-10. p 31.

114. Rodriguez, J.R., Gonzalo, R.M., Rodriguez, D., Garcia-Sastre, A., Palese., and **Esteban, M** (1997). La inmunización combinada con virus recombiantes vaccinia aumenta la respuesta inmune celular contra antígenos de VIH-1. V Congreso Nacional de Virologia. Santiago de Compostela. Septiembre 7-10. p329

115. Rivas, C., Diaz-Guerra, M and **Esteban, M** (1997). La activación de la enzima inducible por el interferón RNasa L, expresada en células infectadas por un virus vaccinia recombinante induce apoptosis. V Congreso Nacional de Virologia. Santiago de Compostela. Septiembre 7-10. p 341

116. **Esteban, M**., Rodriguez, D., Rodriguez, J.R., Vazquez, I., Llorente, M., Lucas, P., Martinez, C and del Real, G (1998). Fusion of GM-CSF to HIV-1 env enhances the cellular immune response against env. Third European Conference on Experimental AIDS Research, Munich, Germany, February 28-March 3.

117. Vazquez, I., Rivas, G., Cregut, D., Serrano, L and **Esteban, M (**1998). Triple coiled-coil model for 14 kDa fusion protein (ORF A27L) of vaccinia virus: structural and functional analyses. XII International Poxvirus Symposium. St. Thomas, Virgin Islands, June 6-10

118. Rivas, C., Gil, J., Melkova, Z., **Esteban, M** and Diaz-Guerra, M (1998). Inhibition of the interferon (IFN)-induced 2-5 A synthetase by the E3L protein of vaccinia virus. XII International Poxvirus Symposium. St. Thomas, Virgin Islands, June 6-10

119. Gonzalo, R., Rodriguez, D., Gonzalez, G., Larraga, V., Rodriguez, J.R and **Esteban, M** (1998). Protection of mice against Leishmania infection by vaccinia virus recombiants. XII International Poxvirus Symposium. St. Thomas, Virgin Islands, June 6-10

120. Miyahira, Y., Garcia-Sastre., Rodriguez, D., Rodriguez, J.R., Tsuji, M., Palese, P., Zavala, F., Nussenzweig, R and **Esteban, M** (1998). Recombiant viruses expressing a human malaria antigen elicit a protective immune response in mice. XII International Poxvirus Symposium. St. Thomas, Virgin Islands, June 6-10

121. Risco, C., Rodriguez, J.R., Demkowicz, W., Heljasvaara, R., Carrascosa, J.L ., **Esteban, M** and Rodriguez, D (1998). The vaccinia virus 39 kDa protein forms a stable complex with the p4a/4a major core protein. XII International Poxvirus Symposium. St. Thomas, Virgin Islands, June 6-10

122. Gherardi, M and **Esteban, M** (1998). Oral immunization with recombinants of vaccinia virus induces mucosal and systemic immune responses to the vector and to the recombinant product HIV env. XII International Poxvirus Symposium. St. Thomas, Virgin Islands, June 6-10

123. Heljasvaara, R., Rodriguez, J.R., Risco, C., Carrascosa., **Esteban, M** and Rodriguez, D (1998). Phenotypic characterization of a conditional lethal vaccinia virus mutant that inducibly express the A10L gene. . XII International Poxvirus Symposium. St. Thomas, Virgin Islands, June 6-10.

124. Gil, J and **Esteban, M** (1998). Involvement of eIF-2a and IkBa in aspoptosis mediated by the dsRNA dependent protein kinase PKR. Second Joint Meeting of the International Society for Interferon and Cytokine Research. Jerusalem, Israel, 25-30 October.

125. **Esteban, M** (1999). Enhancement of the immune response to pathogens by prime/boost with DNA and vaccinia-MVA recombinants. ELMAU Workshop "The modified Vaccinia Ankara" in Vaccination and Immunotherapy. 28-31 January. Munich, Germany.

126. **Esteban, M**., Rodriguez, D., Rodriguez, J.R Garcia-Sastre, A., Palese, P., Zavala, F, and Nussenzweig, R (1999). Malaria vaccine: activation of potent and protective immune responses to malaria by combined immunization with recombinant viruses. In "Perspectives on Infectious Disease Research. EU Conference. Dresden, February 1-3.

127. Rodriguez, D., Rodriguez, J., Llorente, M., Lucas, P., **Esteban, M**., Martinez, C, and del Real, G. Use of DNA priming and vaccinia virus boosting to trigger an efficient immune response to HIV-1 gp120. In "Perspectives on Infectious Disease Research. EU Conference. Dresden, February 1-3.

128. Gil, J and **Esteban, M** (1999). Induction of apoptosis by the dsRNA dependent protein kinase PKR involves eIF-2a and NF-kB. In Regulation of Protein Synthesis in Eukaryotes. Juan March Workshop, March 8-12, Madrid, Spain.

129. Gherardi, M., Ramirez, J.C., Rodriguez, D., Rodriguez, J.R., Gen-Ichiro, S., Zavala, F., and **Esteban, M** (1999). IL-12 delivered from recombinant vaccinia virus attenuates the vector and enhances the cellular immune response against HIV-env in a dose-dependent manner. The fourth European Conference on Experimental AIDS Research. June 18-21.Tampere, Finland

130. Rodriguez, D., Rodriguez, J., Llorente, M., Lucas, P., **Esteban, M**., Martinez, C, and del Real, G. Use of DNA priming and vaccinia virus boosting to trigger an efficient immune response to HIV-1 gp120. The fourth European Conference on Experimental AIDS Research. June 18-21.Tampere, Finland

131. Gil, J., Alcami, J, and **Esteban, M** (1999). Mechanism of NF-kB activation of the interferon-induced enzyme PKR: role in apoptosis. III Joint meeting of the International Cytokine Society and International Society for Interferon and Cytokine Research. Paris, September 5-9.

132. Ramirez, J.C., Gherardi, M.M, and **Esteban, M** (1999). Caracterización in vivo de la multiplicación y respuesta inmune inducida por el virus vaccinia atenuado MVA en ratones. VI Congreso Nacional de Virologia. Majadahonda, Madrid, Octubre 24-27

133. Gil, J., Alcami, J, and **Esteban, M** (1999). Mecanismo de apoptosis inducida por la proteina antiviral PKR. . VI Congreso Nacional de Virologia. Majadahonda, Madrid, Octubre 24-27

134. Gherardi, M.M., Ramirez, J.C., Rodriguez, D., Rodriguez, J.R and **Esteban, M** (1999). Desarrollo de estrategias de vacunación frente al HIV basadas en recombinantes del virus vaccinia y la citoquina IL-12. . VI Congreso Nacional de Virologia. Majadahonda, Madrid, Octubre 24-27

135. Rodriguez, J.R., Heljasvaara, R., Risco, C., Carrascosa, J.L., **Esteban, M**, and Rodriguez, D (1999). La proteina p4a (gen A10L) del virus vaccinia es esencial para la maduración del virus. VI Congreso Nacional de Virologia. Majadahonda, Madrid, Octubre 24-27

136. Risco, C., Rodriguez, D., Rodriguez, J.R., **Esteban, M**. and Carrascosa,J.L.(1999). Immunogold studies on vaccinia virus assembly: localization of p15, p21,p14, and p39 viral proteins after reversal of morphogenesis blockage. XI European Congress on Microscopy (Dublin, Ireland, August, 26-30).

137. Risco, C., Rodriguez, D., Rodriguez, J.R., **Esteban M**. y Carrascosa J.L. (1999). Morfogenesis de poxvirus: aspectos estructurales. XIX Reunion Bienal de la Sociedad Espanola de Microscopia Electronica (Murcia, 28-30 de abril).

138. Risco C., Rodriguez D., Lechaire J.P., Rodriguez J.R., Gaill F., **Esteban M**. and Carrascosa J.L. (2000). New insights on the structure and morphogenesis of vaccinia virus. XII European Congress on Electron Microscopy (Brno, Czech Republic, July 9-14).

139. Navarro, J., Abad, M.L., Resino, S., Jimenez, J.L., Canto, C., Rodriguez, D., Lopez, F., **Esteban, M**., Muñoz-Fernandez, M.A, and Fernandez-Cruz, E (2000). Effect of a gp120-depleted inactivatyed HIV-1 immunogen (Remunetm) on the control of nuclear factor kappa-B activation, cytokine production and augmentation of HIV-specific cytotoxic T lymphocytes. V European Conference on Experimental Aids Research (ECEAR). Madrid, June 16-19.

140. Ramirez, J.C., Gherardi, M. M, and **Esteban, M** (2000). IL-2 actions on the specific anti-env cell mediated immune response when delivered from vaccinia virus and bimodal DNA prime/boost vaccination regimen. . V European Conference on Experimental Aids Research (ECEAR). Madrid, June 16-19.

141. Gomez, C. E., Rodriguez, D., Rodriguez, J.R., Abaitua, F., Duarte, C, and **Esteban, M** (2000). A V3 loop multiepitope polypeptide of HIV-1 Env (TAB13) expressed from DNA, vaccinia virus WR and modified virus Ankara vectors induces peptide specific CD8+ T cell response in mice. V European Conference on Experimental Aids Research (ECEAR). Madrid, June 16-19.

142. Yang, W.Y.,Chang, L-Y., Gil, J., **Esteban, M**, and Roth, D (2000). The effect of specific phosphorylation of plant eIF-2a on plant translational control. Translational Control. Cold Spring Harbor . New York. August

143. Risco, C., Rodriguez, D., Rodriguez, J.R., **Esteban, M** and Carrascosa, J.L (2000). New insights on the structure and morphogenesis of vaccinia virus. XIII International poxvirus and Iridovirus symposium. Montpellier, France, September 2-6, p79.

144. Abaitua, F., Rodriguez, J.R., Rodriguez, D, and **Esteban, M** (2000). Coadministration of two vaccinia

virus recombinants expressing HIV-env and interferon gamma results in a decreased in viral replication but favours a strong anti-env immune response. XIII International poxvirus and Iridovirus symposium. Montpellier, France, September 2-6, p138.

145. Gil, J, and **Esteban, M** (2000). Inhibition of vaccinia virus replication by the interferon-induced protein kinase PKR: mechanism of action. XIII International poxvirus and Iridovirus symposium. Montpellier, France, September 2-6, p154.

146. Ramirez, J.C., Gherardi, M, and **Esteban, M** (2000). IL-18 and IL-12 synergize in protection against vaccinia virus infection in mice and enhance the cellular immune response against the virus. XIII International poxvirus and Iridovirus symposium. Montpellier, France, September 2-6, p158.

147. Rodriguez, J.R., Gherardi, M., Rueda, G.G., Nussenzweig, R., Casal, I., **Esteban, M**, and Rodriguez, D (2000). Immunogenicity of parvovirus VLPs bearing a CD8+ T cell epitope of the CS protein of P. yoelii: enhanced CD8+ T cell response by boosting with vaccinia virus recombinant. XIII International poxvirus and Iridovirus symposium. Montpellier, France, September 2-6, p188.

148. Navarro, J., Abad, M.L., Resino, R., Jimenez, J.L., Cantó, C., Diaz, L., Rodriguez, D., **Esteban, M**, Muñoz-Fernandez, M.A and Fernandez-Cruz, E (2000). Effect of a Gp 120-depleted inactivated HIV-1 immunogen (Remune TM) on the control of nuclear factor Kappa-B activation, cytokine production and augmentation of HIV-1 specific cytotoxic T lymphocytes. Fifth. Eur. Conf. Exp. AIDS Res (ECEAR) 16-19 June, Madrid, Spain.

149. Ramirez, J.C., Gherardi, M.M., Rodriguez, D., Rodriguez, J.R and **Esteban, M** (2000). IL-12 actions on the specific anti-env cell mediated immune response when delivered from vaccinia virus in bimodal DNAprime /VV boost vaccination regimen. Fifth. Eur. Conf. Exp. AIDS Res (ECEAR) 16-19 June, Madrid, Spain.

150. García, M.A., Gil, J., Jimenez, V y **Esteban, M** (2001). La expresión de la proteina E3L del virus vaccinia en células 3T3 inhibe la apoptosis mediada por PKR. . VII Congreso Nacional de Virología. Valencia, 16-19 Sept. p94

151. Gil, J., García, M.A., Rullás, J., Alcamí, J y **Esteban, M** (2001). Inducción de la apoptosis y activación del factor de transcripción NF-kB por la enzima PKR. . VII Congreso Nacional de Virología. Valencia, 16-19 Sept. p79

152. Abaitua, F., Rodriguez, J.R., Rodriguez, D y **Esteban, M** (2001). La respuesta inmune frente a la proteina env del VIH se incrementa por la coexpresión de la proteina de choque térmico Hsp70. . VII Congreso Nacional de Virología. Valencia, 16-19 Sept. p74.

153. Gallego, J.C., Rodriguez, D., Risco, C., Cabezas, P., Carrascosa, J.L., Rodriguez, J.R y **Esteban, M** (2001). Morfogénesis de un mutante (M65) del virus vaccinia: caracterización estructural y funcional. VII Congreso Nacional de Virología. Valencia, 16-19 Sept. p162

154. Blanco, S., Rodriguez, J.R., Abaitua, F., Zavala, F., **Esteban, M** y Rodriguez, D (2001). Modulación por citoquinas de la respuesta inmune frente al antígeno CS de Plasmodium. . VII Congreso Nacional de Virología. Valencia, 16-19 Sept. p165

155. C.Gómez, C.E., Rodriguez, D., Rodriguez, J.R., Abaitua, F., Duarte, C y **Esteban, M** (2001). VII Congreso Nacional de Virología. Valencia, 16-19 Sept. p166.

156. López-Fuertes, L., Pérez-Jimenez, E., Moreno, S., Vila-Coro, A., Wittig, B., Junghans, C., Konig, S.A., Simon, M and **Esteban, M** (2001). DNA immunization of susceptible mice with minimalistic expression constructs expressing the LACK protein of Leishmania major. VII Congreso Nacional de Virología. Valencia, 16-19 Sept. p166

157. Tapia, E., Pérez-Jimenez, E., López-Fuertes, L., Gonzalo, R y **Esteban, M** (2001). Inducción de una respuesta inmune protectiva frente a la Leishmaniasis cutánea mediante la utilización de vectores de DNA y virus vaccinia recombinantes que expresan la proteina LACK de Leishmania infantum. . VII Congreso Nacional de Virología. Valencia, 16-19 Sept. p167.

158. Sánchez, A.B., Rodriguez, D., Garzón, A., Amorena, B., **Esteban, M** y Rodriguez, J.R (2001). La proteina env del virus Maedi-Visna expresada por un recombinante del virus vaccinia induce fusión en células de distintos orígenes. . VII Congreso Nacional de Virología. Valencia, 16-19 Sept. p169.

159. Gallego, J.C., Rodriguez, D., Cabezas, P., Risco, C., Rodriguez, J.C., Carrascosa, J.L and **Esteban, M** (2001). Vaccinia Virus Morphogenesis: Characterization of the Attenuated Mutant M65. EMBO Workshop "Cell Biology of Virus infection". Heidelberg. Sept. 22-25..

160. Gherardi, M.M., Ramírez, J.C, and **Esteban, M**. (2001). IL-18 and IL-12 induce a synergistic effect in the protection against Vaccinia virus infection in mice.10thEuropean Congress on Biotechnology, Madrid (Spain), July.

161. López-Fuertes, L, Pérez-Jiménez,E., Moreno, S., Vila-Coro, A., Wittig, B., Junghans, C., Konig, S.-A., Timon, M, and **Esteban, M** (2001). DNA immunization of susceptible mice with minimalistic expression constructs expressing the LACK protein of Leishmania major. 11TH International. Congress of Immunology, Stockholm, July 22-27.

162. Didierlaurent A**.**, Ramirez J. C., Finke D., **M. Esteban**, JC. Sirard and J. P. Kraehenbuhl. (2001). Portal of entry of HIV at mucosal sites and strategies to prevent infection. Proceedings of the 6th European Conference on Experimental AIDS Research - ECEAR 2001 (Edinburgh, UK, June 23-26, 2001).

163. Gherardi, M.M., Pérez-Jimenez, E., Nájera, J.L., D. Rodríguez., García-Sastre, A., Palese, P and **Esteban, M** (2002). Prime/Boost immunization schedules based on influenza and vaccinia virus (VV) vectors (MVA and WR) potentiate cellular immune responses agasinst HIV-env protein systemically and in the genito-rectal drainining lymph nodesXIV International AIDS conference, Barcelona (Spain), July 7-12.

164. Gallego-Gómez, J.C., Risco, C., Rodriguez, D., Cabezas, P., Carrascosa, J.L, and **Esteban,** M. (2002). Vaccinia virus and attenuated mutants induces epithelial to mesenchimal transitions. XIV International Poxvirus Symposium. Lake Placid, New York, July, p138.

165. **Esteban, M**. (2002). Recombinant poxviruses as efficient inducers of primed CD8+T cells: role of cytokines. Juan March Workshop on “Molecular Mechanisms of immune modulation: Lessons from viruses. Madrid, February 25-27.

166. **Esteban, M.** (2003). Cell signalling in apoptosis and role of PKR. International Symposium on “Triggering and modulation of natural and acquired immunity to pathogens”. Würzburg, Germany, April 3-5.

167. Gherardi, M., Perez-Jimenez, E., Nájera, J.L, and **Esteban, M** (2003). Modified vaccinia Ankara virus can be used as a mucosal vector for HIV antigens: its immunogenicity can be improved with a mucosal adjuvant or after applying a DNA/MVA scheme. Modern Vaccines Adjuvants and Delivery Systems. Dublin, 4-6 June.

168. Pérez**-**Jimenez, E., Gherardi, M., Kochan, G, and **Esteban, M**. (2003). Recombinant modified vaccinia virus Ankara expressing the leishmania infantum p36/Lack (MVAp36) antigen triggered a pronounced Th1 immune response against the antigen. Modern Vaccines Adjuvants and Delivery Systems. Dublin, 4-6 June.

169. A. Mörner, A. Aubertin, V. Erfle, **M. Esteban,** H. Fredlund, M-JFrachette, K. Karlén, P. Liljeström, C.

Nilsson, E. Olausson-Hansson, G.Sutter, R. Wagner, B. Wahren, M. Widfeldt, R. Thorstensson, G. Biberfeld. (2003). Comparison of different heterologous prime-boost HIV-1/SIV vaccine regimens including recombinant DNA, SFV, MVA and proteins; immune responsesand viral load in cynomolgus macaques after intrarectal challenge with SHIV-BX08". The 2nd IAS Conference on HIV Pathogenesis and Treatment. Paris, France,13-16 July.

170. Guerra, S., López, L., Conde, R., Pascual-Montano, A., **Esteban, M**, (2003). Alteración de la expresión génica de células humanas tras la infección con el virus Vaccinia empleando microchips de cDNA. VIII Congreso Nacional de Virología, Barcelona 2003, 12-15 Sept.: p. 178.

171. Muñoz-Fontela, C., Arroyo, J., Nombela, C., **Esteban, M.**, Rivas, C. (2003). Actividad transformante de la proteína latente LANA2 del virus del sarcoma de Kaposi (KSHV) en células B. VIII Congreso Nacional de Virología, Barcelona 2003, 12-15 Sept.: p. 29.

172. Guerra, S., Aracil, M., Conde, R., Bernard, A., **Esteban, M**. (2003). La proteína celular Wasp regula la salida del virus Vaccinia de la célula mediante la formación de colas de actina. VIII Congreso Nacional de Virología, Barcelona 2003, 12-15 Sept.: p. 33.

173. García, M. A., Gil, J., Gómez-Puertas, P., Guerra, S., Rullas, J., Alcamí, J., Moscat, M., **Esteban, M.** (2003). Los factores de asociación a receptores de la familia TNF (TRAF) median la activación del factor de transcripción NFKB mediante la proteína quinasa PKR, dependiente de RNA bicatenario. VIII Congreso Nacional de Virología, Barcelona 2003, 12-15 Sept.: p. 34.

174. Blanco, S., Abaitua, **Esteban, M.**, F., Rodríguez, J. R., Zavala, F., Rodríguez, D. (2003). Mantenimiento de la respuesta inmune celular frente al antígeno CS de *P. yoelii* mediante la administración de IL-15. VIII Congreso Nacional de Virología, Barcelona 2003, 12-15 Sept.: p. 147.

175. Pérez-Jiménez, E., Gherardi, M. M., Kochan, G**., Esteban, M.** (2003). La inmunización con un virus MVA recombinante que expresa la proteína LACK de *Leishmania infantum* induce una potente respuesta TH1. VIII Congreso Nacional de Virología, Barcelona 2003, 12-15 Sept.: p. 148.

176. Ventoso, I., Berlanga, J. J., De Haro, C., **Esteban, M**. (2003). Papel de las eIF2a proteína quinasas en la respuesta antiviral de la célula. VIII Congreso Nacional de Virología, Barcelona 2003, 12-15 Sept.: p. 103.

177. Garzón, A., Schleich, S., Rodríguez, J. R., **Esteban, M**., Griffiths, G., Krinjse-Locker, J., Rodríguez, D. (2003). Caracterización fenotípica de formas mutantes de la proteína A14L del virus Vaccinia. VIII Congreso Nacional de Virología, Barcelona 2003, 12-15 Sept.: p. 132.

178. **Esteban, M**. (2003). Análisis genómico de la respuesta celular a la infección con el virus Vaccinia. VIII Congreso Nacional de Virología, Barcelona 2003, 12-15 Sept.: p. 10.

179. Domingo-Gil, E., García, M. A., Rivas, C., **Esteban, M.** (2003). La apoptosis mediada por el sistema 2-5A/RNasaL inducida por los interferones no implica la actividad de las caspasas 3, 8 y 9. VIII Congreso Nacional de Virología, Barcelona 2003, 12-15 Sept. p. 173.

180. Vandermeeren, A. M., Gómez, C. E., Patiño, C., **Esteban, M.** (2003). Expresión regulada de la poliproteína de HCV por recombinante del virus Vaccinia: análisis de las alteraciones celulares mediante microscopía electrónica. VIII Congreso Nacional de Virología, Barcelona 2003, 12-15 Sept. p. 153.

181. Nájera, J. L., Gherardi, M. M., **Esteban, M.** (2003). Estudio comparativo de vectores atenuados del virus Vaccinia (MVA y NYVAC) que expresan antígenos del virus de la inmunodeficiencia humana (VIH-1). VIII Congreso Nacional de Virología, Barcelona 2003, 12-15 Sept. p. 204.

182. Gherardi, M. M., Pérez-Jiménez, E., Nájera, J. L., **Esteban, M**. (2003). El virus atenuado de Vaccinia

(MVA) puede ser utilizado como vector de antígenos de HIV para impactar mucosas: aumento de su inmunogenicidad mediante un adyuvante de mucosas y la aplicación de esquemas de inmunización ADN/MVA. VIII Congreso Nacional de Virología, Barcelona 2003, 12-15 Sept. p. 206.

183. **Esteban, M** (2004). Vaccinia virus: its usefulnees as a vector for a wide range of vaccination purposes. Spanish-Belgian Symposium on Perspectives and Applications of Biotechnology within the European Unión framework. Madrid. Feb 2-3.

184. **G**uerra, S., López-Fernández, L., Pascual-Montano, A and **Esteban, M** (2004). Identification of human genes during MVA infection. XVth International Poxvirus and Iridovirus meeting. Oxford, UK. September 3-8

185. Guerra, S., Aracil, M., Conde, R., Bernard, A and **Esteban, M** (2004). Involvement of Wiskott-Aldrich syndrome protein (WASP) in vaccinia virus pathogenesis. XVth International Poxvirus and Iridovirus meeting. Oxford, UK. September 3-8

186. Gherardi, M.M, Pérez-Jiménez, E., Nájera, J.L and **Esteban, M** (2004). Enhancement of HIV immunity in the genital tract after a DNA prime-MVA boost by the mucosal adjuvant cholera toxin. XVth International Poxvirus and Iridovirus meeting. Oxford, UK. September 3-8.

187. Risco, C., Fernández, J.J., **Esteban, M**., Carrascosa, J.L., Cyrklaff, M, and Baumeister, W (2004). Tomographic reconstruction of vaccinia virus. II European Virology Meeting (EuroVirology) (2004). Madrid, September 5-9.

188. Pérez-Jimenez, E., Kochan, G., Gherarrdi, M, and **Esteban, M** (2004). Patterns of immune response elicited by prime/boost vaccination with DNA and the attenuated modified vaccinia virus Ankara recombinants expressing LACK of Leishmania infantum. II European Virology Meeting (EuroVirology) (2004). Madrid, September 5-9.

189. Kochan, G., Pérez-Jimenez, E., Gómez, C.E., MacMahon-Pratt, D, and **Esteban, M** (2004). Comparison of protective efficacy of recombinant vaccinia virus expressing Leishmania p36/LACK, nuclease P-4 or methalloprotease gp63 in mice challenged with leishmania major. II European Virology Meeting (EuroVirology) (2004). Madrid, September 5-9.

190. Muñoz, C., García, M-A., García-Cao, I., Matheu, A., Arroyo, J., Collado, M**., Esteban, M**., Serrano, M, and Rivas, C (2004). Antiviral activity of tumor suppressors. II European Virology Meeting (EuroVirology) (2004). Madrid, September 5-9.

191. Ventoso, I., Sanz, M. A., Molina, S., Berlanga, J., Carrasco, L, and **Esteban, M** (2004). Translation control and antiviral response of the cell. II European Virology Meeting (EuroVirology) (2004). Madrid, September 5-9.

192. García, M-A., Muñoz, C., Matheu, A., Collado, M., Serrano, M., **Esteban, M**, and Rivas, C (2004). Antiviral activity of the tumor suppressor INK4a/ARF locus. II European Virology Meeting (EuroVirology) (2004). Madrid, September 5-9.

193. Muñoz, C., García, M-A., García-Cao, I., Arroyo, J., Collado, M., **Esteban, M**., Serrano, M, and Rivas, C (2004). Antiviral activity of the tumor suppressor p53. II European Virology Meeting (EuroVirology) (2004). Madrid, September 5-9.

194. Gherardi, M., Pérez-Jimenez, E., Nájera, J.L, and **Esteban, M** (2004). Induction of HIV specific immune responses in the genital tract after intranasal delivery of a MVA vector: enhanced immunogenicity after DNA prime-MVA boost immunization schedule together with a mucosal adjuvant. II European Virology Meeting (EuroVirology) (2004). Madrid, September 5-9.

195. Guerra, S., López-Fernandez, L., Pascual-Montano, A, and **Esteban, M** (2004). Gene expression

profiling of human cells infected with vaccinia virus wild type VV and MVA. II European Virology Meeting (EuroVirology) (2004). Madrid, September 5-9.

196. Guerra, S., Aracil, M., Conde, R., Bernad, A, and **Esteban, M** (2004). WASP protein is needed for vaccinia virus pathogenesis. II European Virology Meeting (EuroVirology) (2004). Madrid, September 5-9.

197. Vandermeeren, A., Gómez, C.E., Patiño, C, and **Esteban, M** (2004). Morphological and ultraestructural analysis of human cells infected with a vaccinia virus recombinant expressing HCV-core antigen. II European Virology Meeting (EuroVirology) (2004). Madrid, September 5-9.

198. Gómez, C.E., Vandermeeren, A., García, M-A, and **Esteban, M** (2004). Expression of hepatitis C polyprotein from a vaccinia virus recombinant triggers inhibition of translation and induction of apoptosis. II European Virology Meeting (EuroVirology) (2004). Madrid, September 5-9.

199. **Esteban, M** (2005). Cryo-electron tomography of vaccinia virus. 5th Annual NIAID Orthopoxvirus Research Group Meeting, Bethesda. April 19-21, 2005

200. Biescas, H., Gajardo, R., Vandermeeren, A., **Esteban, M**, and Jorquera, J. I (2005), FLEBOGAMMA intravenous immunoglobulin: evaluation of neutralizing antibodies to vaccinia virus. FOCIS 2005: Federation of Clinical Immunological Societies, May 12-16, Boston, USA.

201. Cristian I. Cañones, Ana M. Rodríguez, Eva Pérez-Jiménez, José Luis Nájera, **Mariano Esteban** , Horacio Salomón, and M. Magdalena Gherardi (2005). Mucosal immunization schemes based on attenuated Modified Vaccinia virus Ankara (MVA) vectors expressing HIV antigens. VII Congreso Latinoamericano de Inmunología., octubre 2-6, Córdoba, Argentina.

202. A. M. Rodríguez, C. I. Cañones, E. Pérez-Jiménez, J. L. Nájera**, M. Esteban**, H. Salomón, y M. M.Gherardi (2005). Regímenes de inmunización de mucosas basados en vectores del virus vaccinia Ankara modificado (MVA) que expresan antígenos del HIV. VII Congreso Argentino de SIDA, 24-26 de Noviembre. Teatro Argentino de La Plata, Buenos Aires, Argentina.

203. **Esteban, M** (2005). The prime/boost strategy with poxvirus vectors to control prevalent human diseases. Annual meeting of the Italian Society of Virology. Orvieto, September 26-29.

204. Guerra, S., López-Fernandez, L.A., García, M.A, and **Esteban, M** (2005). Microarray analysis reveals characteristic changes of host gene expression in response to the over expression of PKR infection of human HeLa cells. Annual meeting of International Society for Interferon and Cytokine Research (ISICR), Shangai, October 20-24, p231

205. García, M.A., Collado, M., Muñoz, C., Matheu, A., Arroyo, J**., Esteban, M**., Serrano, M, and Rivas, M (2005). PKR mediates the antiviral action of tumor suppressor Arf. Annual meeting of International Society for Interferon and Cytokine Research (ISICR), Shangai, October 20-24, p260

206. **Esteban, M** (2006). MVA and NYVAC as vaccines against prevalent human diseases. XVI International Poxvirus meeting. FASEB Summer Research Conferences. Indian Wells, California, USA. June 3-8.

207. Nájera, J.L., Gómez, C.E., Domingo-Gil, E., Gherardi, M.M and **Esteban, M** (2006). Cellular and Biochemical differences between two attenuated poxvirus vaccine candidates (MVA and NYVAC). XVI International Poxvirus meeting. FASEB Summer Research Conferences. Indian Wells, California, USA. June 3-8.

208. Esteban, M (2006). Engineering attenuated poxvirus vectors (MVA and NYVAC) as vaccines against prevalent human diseases. In "Viral engineering: vaccines and gene therapy". 2nd FEMS Congress of European Microbiologists. Madrid, July 4-8.

209. CE Gómez , JL Nájera , E Pérez-Jiménez , V Jiménez , R Wagner , M Graf , MJ Franchette , P Liljeström ; G Pantaleo, and **M Esteban** (2006). Head-to-head comparison on the immunogenicity in mice of two HIV/AIDS vaccine candidates based on the attenuated poxvirus strains MVA and NYVAC co-expressing in a single locus the HIV-1_{BX08} gp120 and HIV-1_{IIIB} Gag-Pol-Nef proteins of clade B. AIDS Vaccine-2006 Conference. Ámsterdam. August 29-September 2.

210. A M. Rodríguez, D. Mónaco, H.Salomón, **M.Esteban** and M.Gherardi (2006). Intranasal delivery of DNA IL-12 during mucosal DNA-prime/MVA-boost immunization schemes enhanced the cellular immune response against HIV-1 Env antigen AIDS Vaccine-2006 Conference. Ámsterdam. August 29-September 2.

211. P Mooij, S Balla-Jaghjoorsingh, N Beenhakker, P van Haaften, I Baak, I Nieuwenhuis, R Wagner, , C.E Gómez, J.L Nájera, , M.V Jiménez, , **M Esteban,** and JL. Heeney.(2006) Head-to-head comparison of immunogenicity and efficacy in macaques of MVA and NYVAC vectors expressing HIV-1 Env and SIV Gag/Pol/Nef. AIDS Vaccine-2006 Conference. Ámsterdam. August 29-September 2.

212. Domingo-Gil, E and **Esteban M** (2006). Apoptosis induced by 2-5 A system: mechanisms involved and role of mitochondria. CYTOKINES 2006. Viena. August 27-31.

213. **Esteban, M** (2006). Activación de una respuesta celular específica frente a patógenos con vectores atenuados de poxvirus. Sociedad Española de Bioquímica y Biología Molecular (SEBBM). Elche. Septiembre 7-10

214. **Esteban, M** (2006). Vacunas contra enfermedades prevalentes. BioSpain Biotec-2006. Madrid IFEMA. 18-20 Septiembre.

215. Nájera J.L, Gómez C.E, Domingo-Gil E, Guerra, S and **Esteban, M** (2007). Papel del gen C7L en el comportamiento diferencial entre dos cepas atenuadas del Virus Vaccinia, MVA y NYVAC. IX Congreso Nacional de Virología. Zaragoza . Abril 11- 14

216. Gómez, C.E., Nájera, J.L., Pérez-Jiménez, E., Jiménez, V., Wagner, R., Graf, M., Franchette, M.J., Liljeström, P., Pantaleo, G., and **Esteban, M** (2007). Generación y caracterización de un nuevo candidato vacunal frente al VIH/SIDA basado en la cepa atenuada de Poxvirus MVA. IX Congreso Nacional de Virología. Zaragoza . Abril 11- 14

217. Domingo-Gil, E., Pérez-Jiménez, E., Ventoso, I, and **Esteban, M**. La incorporación del gen E3L del Virus Vaccinia en células de cultivo y ratones confiere mayor sensibilidad a infecciones virales y parasitarias. IX Congreso Nacional de Virología. Zaragoza . Abril 11- 14

218. Guerra, S., Cáceres, A, and **Esteban, M** (2007). Papel del gen estimulado por interferón ISG15 en la infección del Virus Vaccinia. IX Congreso Nacional de Virología. Zaragoza . Abril 11- 14

219. Guerra, S., Najera., J.L., González, J.M., López, L., Climent, N., Gallart, T, and **Esteban, M** (2007). Diferencias en la expresión genética de células dendríticas humanas tras infección con los virus MVA y NYVAC. IX Congreso Nacional de Virología. Zaragoza . Abril 11- 14

220. **Esteban, M** (2007). Desarrollo de vacunas contra el VIH/SIDA. IX Congreso Nacional de Virología. Zaragoza . Abril 11- 14

221. N Climent, S Guerra, JL Nájera, CE Gómez, N Nomdedeu, F García, C Rovira, L Miralles, H Oliva, C Gil, JM Gatell, **M Esteban**, T Gallart (2007). *In vitro* response of T-cells from HIV+ patients to autologous dendritic cells infected with MVA and NYVAC expressing HIV-B genes. AIDS Vaccine07. Seattle, USA, August 20-23

222. CE Gómez, JL Nájera and **M Esteban** (2007). Multimeric soluble CD40L as immunomodulator for HIV vaccines. AIDS Vaccine07. Seattle, USA, August 20-23

223. Jose Luis Nájera, Carmen Elena Gómez, Elena Domingo-Gil, Laura Ochoa-Callejo, Gloria González-Aseguinolaza and **Mariano Esteban** (2007). Virus dissemination and pro-inflammatory responses triggered by the attenuated MVA and NYVAC poxvirus strains in mice. AIDS Vaccine07, Seattle, USA, August 20-23

224. P Mooij, S Balla-Jaghjoorsingh, N Beenhakker, P van Haaften, I Baak, I Nieuwenhuis, R Wagner, C.E Gómez, J.L Nájera, M.V Jiménez, **M Esteban**, G. Koopman and JL. Heeney (2007). MVA and NYVAC vectors expressing HIV-1 Env and SIV Gag/Pol/Nef induce preferential boosting of CD8+ versus CD4+ T-cell responses but give similar efficacy against $SHIV_{89.6p}$ challenge in rhesus macaques. AIDS Vaccine07. Seattle, USA, August 20-23.

225. **Esteban, M** (2007). The impact of protein kinase PKR in cell biology: from antiviral to antiproliferative action. "50th Anniversary of Interferon: from interferon discovery to clinical application". International meeting Paris, April 30.

226. AM.Rodríguez, G.Turk, F.Zanetti, F.Ferrer[2], JL Nájera, Mónaco, G.Schulman, MF.Pacutti, G.Calamante, **M. Esteban**, H.Salomón[1] y MM.Gherardi (2007). Desarrollo y caracterización de vectores vacunales que expresan la proteína Nef del intersubtipo de HIV-1. Congreso Nacional de Sida, Paraná Entre Ríos, Argentina, 5-8 de septiembre.

227. **Esteban, M** (2007). La proteína quinasa PKR como inhibidor de la replicación viral y regulador del crecimiento cellular. XXI Congreso Nacional de Microbiología. Sevilla 17-20 Septiembre.

228. Mooij, P; Balla-Jaghjoorsingh, S; Beenhakker, N; van Haaften, P; Baak, I; Nieuwenhuis, I; Gomez, CE; Najera, JL; Jimenez, MV; Wagner, R; **Esteban, M**; Heeney, JL. (2007). J. Med. Primatology

229. **Esteban, M.** (2007). "The problem of malaria in the world". Development of malaria vaccines. International Symposium. Foundation Areces. Madrid, December 13-14.

230. Domingo**-**Gil, E., Pérez-Jiménez, E., Ventoso, I., Nájera, J.L and **Esteban, M** (2008). Expresión of the E3L gene of vaccinia virus in transgenic mice decreases the host resistance to VACV and Leishmania infection. 17th International Poxvirus and Iridovirus conference. Grainau (Bavaria), Germany. June 7-12, p40

231. Esteban, M., Gómez, C.E., Nájera, J.L., Jiménez, V and the Eurovacc consortia (2008). Preclinical and clinical evaluation of the poxvirus vectors MVA and NYVAC as candidate vaccines against HIV/AIDS. 17th International Poxvirus and Iridovirus conference. Grainau (Bavaria), Germany. June 7-12, p71

232. Nájera, J.L., Domingo-Gil, E., Gómez, C.E and **Esteban, M** (2008). Involvement of the 2-5A/RNase L system in the apoptosis induced by NYVAC. 17th International Poxvirus and Iridovirus conference. Grainau (Bavaria), Germany. June 7-12, p139

233. Guerra, S., Cáceres A., Horak, I and **Esteban, M** (2008). Vaccinia virus prevents the antiviral action of ISG15. 17th International Poxvirus and Iridovirus conference. Grainau (Bavaria), Germany. June 7-12, p149

234. García, M.A., Krupa, M and **Esteban, M** (2008). Antitumoral activity of oncolytic vaccinia virus expressing the IFN-induced protein kinase PKR. 17th Internacional Poxvirus and Iridovirus conference. Grainau (Bavaria), Germany. June 7-12, p187

235. Gómez, C.E., Nájera, J.L., Domingo-Gil, E., Ochoa-Callejo, L., Goznzález-Aseguinolaza, and **Esteban, M** (2008). Distinct behaviour of MVA and NYVAC infections in mice. 17th Internacional

Poxvirus and Iridovirus conference. Grainau (Bavaria), Germany. June 7-12, p193

236. Delaloye, J., Steiner-Tardivel, Q.G., **Esteban, M**., Roger, T, and Calandra, T (2008). Role of Toll-like receptor (TLR), RIG-I-like receptor (RLR) and Nod-like receptor (NLR) pathways in innate immune responses elicited by poxvirus. Annual meeting Swiss Society for Infectious Diseases. Lausanne, August 28/29.

237. Delaloye, J., Roger, T., Le Roy, D., Knaup Reymond, **M., Esteban,** M, and Calandra, T (2008). Effects of viral vaccine vectors on macrophage migration inhibitory factor (MIF) expresión by myeloid cells. Toll2008 meeting, Lisbon, August.

238. Mónaco,D; Carobene,M; Rodríguez,AM; Najera, JL; Schulman,G; Pascutti,MF; Salomón,H; **Esteban, M** y Gherardi,MM (2008). Generación y caracterización de un vector viral que expresa la proteína gp160 de la forma recombinante circulante del HIV, CRF12_BF. Congreso Nacional de Sida, 5-8 de septiembre Paraná Entre Ríos, Argentina.

239. Mónaco,D; Pascutti,MF; Carobene,M; Najera,JL; Rodríguez,AM; Schulman,G; **Esteban,M**; Salomón,H and Gherardi,MM (2008). "Evaluation of the Immune Response Induced in Balb/c Mice by a Viral Vector expressing env Gene of the Circulating Recombinant Form of HIV-1 in Argentina, CRF12_BF". XVII International AIDS Conference, México 3-8 August.

240. AM.Rodríguez, G.Schulman, MF.Pacutti, F.Ferrer, G.Turk, JL.Nájera, D.Mónaco, G.Calamante, **M. Esteban**, H.Salomón and MM.Gherardi (2008**).** "Characterization of vaccine-vectors expressing Nef of the BF recombinant HIV-1 circulating form and evaluation of the immune response induced in mice". XVII International AIDS Conference que se realizará en la ciudad de México 3-8 August 2008.

241. **Esteban, M.**, Gómez, C.E., Nájera, J.L, Victoria Jiménez, V and the EuroVacc consortia (2008). The poxvirus vectors MVA and NYVAC as candidate vaccines against HIV/AIDS: preclinical and clinical evaluation. XIV International Congress of Virology. Istanbul, 10-15 August.

242. García, M., Gallego, P., Herranz, D., Marcos-Villar, L., Collado, M., **Esteban, M**., Serrano, M and Rivas, C. (2008). Antiviral activity of Sirt1. XIV International Congress of Virology. Istanbul 10-15 August.

243. **Esteban, M** (2008). Vacuna contra VIH/SIDA: un gran reto profiláctico y terapéutico**.** BIOTEC2008. Granada 17-19, Sept**.**

244. Esteban, **M** (2008). Improving NYVAC immunogenicity. Global HIV Vaccine Enterprise. Seattle, December 2-5.

245. Gonzalez-Santamaria, J., Campagna, M., Marcos-Villar, L., García, M.A., Lopitz-Otsoa, F., Rodriguez, M., **Esteban, M** and Rivas, C (2009). Covalent attachment of SUMO proteins to vaccinia virus E3L protein. Ubiquitin-proteasome system, dynamics and targeting. 4TH Intracellular Proteolysis Meeting. Barcelona, Spain, May 27-29.

246. Campagna, M., Herranz, D.-, García, M.A., Marcos-Villar, L., Gonzalez-Santamaria, J., Gallego, P., Gutieerez, S., Collado, M., Serrano, M., **Esteban, M** and Rivas, C (2009). SIRT1 stabilizes PML through sumoylation and protects against viral infection. Ubiquitin-proteasome system, dynamics and targeting. 4TH Intracellular Proteolysis Meeting. Barcelona, Spain, May 27-29.

247. **Esteban, M** (2009). The attenuated poxvirus vectors MVA and NYVAC as candidate vaccines agains HIV/AIDS: preclinical and clinical evaluation (inaugural conference). X Congreso Nacional de Virología. Salamanca, 21-24 Junio.

248. Iniesta, M., Nájera, J.L., **Esteban, M** and Blasco, R (2009). Anclaje de antígenos en la envuelta del virus vaccinia como diseño de vacunas para VIH. X Congreso Nacional de Virología. Salamanca, 21-

24 Junio.

249. García-Arriaza, J., Nájera, J.L, and **Esteban, M** (2009). Mejora de la inmunogenicidad de la vacuna de VIH-1, cepa MVA-B. X Congreso Nacional de Virología. Salamanca, 21-24 Junio.

250. Nájera, J.L., Gómez, C.E., García-Arriaza, J, and **Esteban, M** (2009). Caracterización de un nuevo candidato vacunal frente al VIH/SIDA basado en la cepa atenuada de vaccinia NYVAC. X Congreso Nacional de Virología. Salamanca, 21-24 Junio.

251. Perdiguero, B., Gómez, C.E., Nájera, J.L, and **Esteban, M (**2009). Efecto de la deleción del gen F1L sobre la inmunogenicidad frente a las proteínas Env/Gag-Pol-Nef del clade C de HIV-1 expresadas desde la cepa atenuada del virus vaccinia MVA. X Congreso Nacional de Virología. Salamanca, 21-24 Junio.

252. Gonzalez-Santamaría, J., Campagna, M., Marcos-Villar, L., Gallego, P., García, M.A., Lopitz, F., Rodríguez, M.S., **Esteban, M** and Rivas, C (2009). Interacción de la proteína E3L del virus vaccinia con SUMO. X Congreso Nacional de Virología. Salamanca, 21-24 Junio.

253. Najera, J.L., Gomez, C.E and **Esteban, M** (2009). Multimeric soluble CD40 ligand efficiently enhances HIV specific cellular immune responses during DNA prime and boost with attenuated poxvirus strains. AIDS VACCINE-2009. Paris, October 19-22.

254. Najera, J.L., Gomez, C.E., Garcia-Arriaza and **Esteban, M** (2009). Insertion of a vaccinia virus host range (hr) gene into NYVAC-B genome potentiates immune responses against HIV-1 antigens. AIDS VACCINE-2009. Paris, October 19-22.

255. Quakkelaar, E., Redeker, A., Loof, N., Perdiguero, B., Heinen, P., Gomez, C.E., **Esteban, M**., Jacobs, B., Pantaleo, G., and Melief, C (2009). Enhanced expresión of HIV antigens and improved antigen presentation alter infection with replication competent attenuated vaccinia virus in vitro. AIDS VACCINE-2009. Paris, October 19-22.

256. García-Arriaza, J., Nájera, J. L., Gómez, C. E., and **Esteban, M** (2010). High-magnitude, polyfunctional and memory HIV-1-specific immune responses elicited by a poxvirus vector MVA expressing HIV-1 subtype B genes and containing deletions in A41L and B16R viral genes. 4th European Congress of Virology, Cernobbio, Como Lake, Italy. April 7-11

257. Kibler, K.V., Wong, S., Huynh, T., Holechek, S.A., Denzler, K., Arndt, W., Koelle, D., Parrington, M., Tartaglia, J., **Esteban, M**., Pantaleo, G., Jacobs, B.L (2010). Construction and characterization of replication competent attenuated NYVAC-based vectors as potential HIV vaccines. XVIII International Poxvirus, Asfivirus, and Iridovirus Symposium. Sedona, Arizona, USA. June 5-10

258. Garcia-Arriaza, J., Najera, J.L., Gomez, C.E, and **Esteban, M** (2010). Immunogenic profiling of a candidate HIV/AIDS vaccine (MVA-B) expressing four HIV-1 antigens and potentiation by specific gene deletions. XVIII International Poxvirus, Asfivirus, and Iridovirus Symposium. Sedona, Arizona, USA. June 5-10

259. **Esteban, M** (2010). Viral vectors and vaccines. XVIII International Poxvirus, Asfivirus, and Iridovirus Symposium. Sedona, Arizona, USA. June 5-10

260. Gonzalez-Santamaria, J., Campagna, M., Marcos-Villar, L., Garcia, M.A., Gonzalez, D., **Esteban, M**, and Rivas, C. (2010). SUMO regulation of vaccinia virus E3L protein. XVIII International Poxvirus, Asfivirus, and Iridovirus Symposium. Sedona, Arizona, USA. June 5-10

261. Guerra, S., Abaitua, F., Martinez-Sobrido, L., **Esteban, M**., Garcia-Sastre, A, and Rodriguez, D. Host-range restriction of vaccinia virus E3L deletion mutant can be overcome by expression of the influenza virus NS1 protein. XVIII International Poxvirus, Asfivirus, and Iridovirus Symposium.

Sedona, Arizona, USA. June 5-10

262. Guerra, S., Gonzalez, J.M., Clment, N., Reyburn, H., Gallart, T, and **Esteban, M** (2010). Selective induction of host genes by MVA-B, a candidate vaccine against HIV/AIDS. XVIII International Poxvirus, Asfivirus, and Iridovirus Symposium. Sedona, Arizona, USA. June 5-10

263. Najera, J.L., Gomez, C.E., Garcia-Arriaza, J, and **Esteban, M** (2010). Insertion of vaccinia C7L gene into NYVAC-B genome potentiates immune responses against HIV-1 antigens. XVIII International Poxvirus, Asfivirus, and Iridovirus Symposium. Sedona, Arizona, USA. June 5-10.

264. P. Mooij, I. Nieuwenhuis, N. Beenhakker, S. Hofman, **M. Esteban**, B. Jacobs, K. Kibler, G. Koopman, W.M.J.M. Bogers, G. Pantaleo, and J.L. Heeney (2010). Improved immunogenicity against HIV-1 clade C antigens by using NYVAC-C with restored replication competence. AIDS Vaccine Conference 2010. Atlanta, USA, 28 Sept-1 Oct.

265. E.D. Quakkelaar, A. Redeker, N.M. Loof, B. Perdiguero, P. Heinen, **M. Esteban**, K. Kibler, B. Jacobs, S. Mayo McCaughey, E.K. Haddad, G. Pantaleo and C.J.M. Melief. (2010). Improved vaccinia virus vectors for vaccination against HIV. AIDS Vaccine Conference 2010. Atlanta, USA, 28 Sept-1 Oct

266. Kibler, K., Perdiguero, B., Gomez, C.E., Najera, J.L., Sanz, R., Jimenez, V., Quakkelaar, E.D., Melief, C.J.M., Haddad, E., Sekaly., Sallusto, F., Lanzavecchia, A., Harari, A., Tartaglia, J., Pantaleo, G., Jacobs, B, and **Esteban, M**. (2010). Improvement of the HIV/AIDS vaccine candidate NYVAC-C by deletion of the viral type I IFN inhibitor and/or acquisition of replication competence. AIDS Vaccine Conference 2010. Atlanta, USA, 28 Sept-1 Oct

267. Gomez, C.E., Perdiguero, B., Nájera, J.L., Jiménez, V., Gonzalez-Sanz, R, and **Esteban, M**. (2010) Removal of vaccinia virus genes that block type I and type II pathways improves the immunogenicity in mice of the HIV/AIDS vaccine candidate NYVAC-C. AIDS Vaccine Conference 2010. Atlanta, USA, 28 Sept-1 Oct.

268. Lopez JC1, Garcia F2, **Esteban M**3, Jimenez JL1, Perez I2, Muñoz MA1, Gatell JM2, Liljeström P4, Weber J5, Plana M2*. (2011) Safety and Immunogenicity of a Modified Pox Vector-Based Vaccine Candidate Expressing Env, Gag, Pol, and Nef Proteins of HIV-1 Subtype B (MVA-B) in HIV-1-Negative Healthy Volunteers: Results of the RISVAC02 Trial. 18th Conference on Retroviruses and Opportunistic Infections (CROI) Boston February 27-March 2.

269. Goodman, A.G., Guerra, S., Vijayan, A., Heinen, P.P., Sorzano, C.O.S**., Esteban, M**. (2011). A recombinant vaccinia virus-based T cell vaccine against influenza virus reduces viral load upon challenge. Poster at the American Society of Gene and Cell Therapy Annual Meeting. Seattle, WA. May 18-21, 2011.

270. Yanguez E.,Garcia-Culebras A., Llompart C., Eduardo-Correia B., Knobeloch K.P., Nieto A., **Esteban M** and Guerra S. (2011). Papel de la proteína de defensa ISG15 inducida por interferon en las infecciones virales. XI Congreso Nacional de Virología, Granada, Mayo 29-Junio 1.

271. Sanchez-sampedro L., Gomez C.E and **Esteban M**. (2011). Caracterización de nuevos mutantes replicativos del virus vaccinia como candidatos vacunales frente a leishmaniasis. XI Congreso Nacional de Virología, Granada, Mayo 29-Junio 1.

272. Cáceres A., Caelles C and **Esteban M.** (2011). Interacción del virus vaccinia con el hospedador: papel de la fosfatasa dual DUSP1. XI Congreso Nacional de Virología, Granada, Mayo 29-Junio 1.

273. Perdiguero B., Gomez C.E., Nájera J.L and **Esteban M**. (2011). Mejora de la inmunogenicidad frente a las proteinas ENV/GAG-POL-NEF del subtipo C de VIH-1 expresadas desde la cepa atenuada del virus vaccinia MVA mediante la deleción del gen viral anti-apoptótico F1L. XI Congreso Nacional de Virología, Granada, Mayo 29-Junio 1.

274. Guerra S., Abaitua F., Martínez-Sobrino L., **Esteban M**., Garcia-Sastre A and Rodriguez D. (2011). La proteina NS1 del virus de la gripe es capaz de sustituir a la proteina E3 del virus vaccinia in vitro pero no in vivo. XI Congreso Nacional de Virología, Granada, Mayo 29-Junio 1..

275. Chichon F.J., Rodríguez, M.J., Pereiro, E., Chiappi, M., Perdiguero, B., Guttmann, P., Werner, S., Rehbein, S., Schneider, G., **Esteban, M**. And Carrascosa, J.L. Cartography of vaccinica virus infection by cryo-x-ray nanotomography. 34º congreso de la SEBBM (Sociedad española de Bioquímica y Biología Molecular)**.** Barcelona, 5 – 8 September 2011

276. Perreau M., Welles H.C., Harari A., Hall O., Martin R., Maillart M., Dorta G., Bart P., Kremer E.J., Tartaglia J., Wagner R., **Esteban M**., Levy Y, and Pantaleo G (2011). DNA/NYVAC vaccine regimen induces HIV-specific CD4 and CD8 T-cell responses in intestinal mucosa. AIDS Vaccine 2011. Bangkok, Thailand, Sept. 12-15

277. Carmen E. Gómez, José L. Nájera, Beatriz Perdiguero**,** Juan García-Arriaza, Carlos Oscar S. Sorzano, Victoria Jiménez, Rubén González-Sanz, José Luis Jiménez, María Angeles Muñoz-Fernández, Juan Carlos López Bernaldo de Quirós, Alberto C. Guardo, Felipe García, José M. Gatell, Montserrat Plana and **Mariano Esteban** (2011). The HIV/AIDS vaccine candidate MVA-B triggers robust, polyfunctional and memory T cell responses to HIV-1 antigens in a phase I clinical trial in Spain. . AIDS Vaccine 2011. Bangkok, Thailand, Sept. 12-15

278. Mooij P., Nieuwenhuis I., Beenhakker N., Quakkelaar E.D., Heeney J. L., **Esteban M.**, Jacobs B., Pantaleo G., Bogers W., Melief C, and Koopman G (2011). Boosting of replication competent NYVAC primed HIV-1-specific T-cell responses by HIV synthetic long peptides (SLP). AIDS Vaccine 2011. Bangkok, Thailand, Sept. 12-15

279. Falivene J., Del Medico Zajac M.P., Rodriguez A.M., Pascutti M.F., Maeto, C.A., Perdiguero, B., Gomez C.E., **Esteban M**., Calamante G, and Guerardi M.M (2011). Optimization of the MVA vaccine potencial alter deletion of a viral gene coding for the IL-18 binding proteína. AIDS Vaccine 2011. Bangkok, Thailand, Sept. 12-15

280. García-Arriaza, J., Najera J.L., Gomez C.E., Tewabe N., Sorzano C.S., Calandra T., Roger T, and **Esteban M** (2011). A candidate HIV/AIDS vaccine (MVA-B) that enhances the magnitude and polyfunctionality of memory HIV-1-specific-T-cell responses. AIDS Vaccine 2011. Bangkok, Thailand, Sept. 12-15

281. McKay P.,Cope A., Swales J., Joseph S., **Esteban M.**, Tatoud R., Carter D., Weber J, and Shattock R.J (2011). HIV CN54gp140 + GLA significantly enhances vaccine antigen-specific T and B cell immune responses alter priming with DNA and MVA. AIDS Vaccine 2011. Bangkok, Thailand, Sept. 12-15

282. Perdiguero B., Gomez C.E., Najera J.L, and **Esteban M** (2011). Improving the immunogenicity against HIV-1 subtype C Env/Gag-Pol-Nef proteins expressed from MVA by the deletion of the viral anti-apoptotic gene F1L. AIDS Vaccine 2011. Bangkok, Thailand, Sept. 12-15.

283. Chichon, F.J., Rodríguez, M.J., Pereiro, E., Chiappi, M**.,** Perdiguero, B., Guttmann, P., Werner, S., Rehbein, S., Schneider, G., **Esteban, M**. And Carrascosa, J.L. Study of vaccinia virus assembly by x-ray cryo-tomographic reconstruction of whole cells. *2nd Joint Congress of the Portuguese and Spanish Microscopy Societies*. Aveiro (Portugal), 18 - 21 October 2011.

284. Caceres A., Caelles C, and **Esteban M** (2012). Dual-specificity phosphatase 1 (DUSP-1) is involved in vaccinia virus replication and host anti-viral immune response. XIX International Poxvirus, Asfarvirus and Iridovirus Conference. Salamanca, Spain. June 24-28, 2012.

285. Chichon F.J., Rodriguez M.J., Pereiro E., Chiappi M., Perdiguero B., Guttmann P., Werner S., Rehbein S., Schneider G., **Esteban M,** and Carrascosa J.L (2012). Cartography of vaccinia virus infection by cryo-X-ray nanotomography. XIX International Poxvirus, Asfarvirus and Iridovirus Conference. Salamanca, Spain. June 24-28, 2012.

286. Garcia-Arriaza J., Najera J.L., Gomez C.E., Tewabe N., Sorzano C.O.S., Calandra T., Roger T, and **Esteban M** (2012). A candidate HIV/AIDS vaccine (MVA-B) lacking vaccinia virus gene C6L enhances memory HIV-1 specific T-cell responses. XIX International Poxvirus, Asfarvirus and Iridovirus Conference. Salamanca, Spain. June 24-28, 2012.

287. Kibler K., Gomez C.E., Perdiguero B., Wong S., Huynh T., Holechek S., Arndt W., Jimenez V., Gonzalez-Sanz R., Denzler K., Haddad E.K., Wagner R., Sekaly R.P., Tartaglia J., Pantaleo G., Jacobs B.L, and **Esteban M** (2012). Replication-competent NYVAC demonstrates improved immune responses in animal studies. XIX International Poxvirus, Asfarvirus and Iridovirus Conference. Salamanca, Spain. June 24-28, 2012.

288. Lorenzo M.M., Caceres A., Sanchez-Puig J.M**., Esteban M.,** Fraile-Ramos A, and Blasco R (2012). Study on the involvement of the cellular ESCRT machinery in vaccinia virus infection. XIX International Poxvirus, Asfarvirus and Iridovirus Conference. Salamanca, Spain. June 24-28, 2012.

289. Gonzalez-Santamaria J., Campagna M., Garcia M.A., Marcos-Villar L., Gonzalez D., Gallego P., Cruz-Herrera C.F., Guerra S., Rodriguez M., **Esteban M**, and Rivas C (2012). Regulation of vaccinia virus E3 by SUMO. XIX International Poxvirus, Asfarvirus and Iridovirus Conference. Salamanca, Spain. June 24-28, 2012.

290. Eduardo-Correia B., Versteeg G., Ketscher L., Knobeloch K.P., Garcia-Sastre A., **Esteban M,** and Guerra S (2012). Role of ISG-15 and isogylation in poxvirus infection. XIX International Poxvirus, Asfarvirus and Iridovirus Conference. Salamanca, Spain. June 24-28, 2012.

291. Gomez C.E., Perdiguero B., Najera J.L., Sorzano C.O.S., Jimenez V., Gonzalez-Sanz R, and **Esteban M** (2012). Removal of vaccinia virus genes that block interferon type I and II pathways improves adaptive and memory responses of the HIV/AIDS vaccine candidate NYVAC-C in mice. XIX International Poxvirus, Asfarvirus and Iridovirus Conference. Salamanca, Spain. June 24-28, 2012.

292. Sanchez-Sampedro L., Gomez C.E., Mejias-Perez E, and **Esteban M** (2012). High quality long-term CD4+ and CD8+ effector memory populations stimulated by the vaccination protocol DNA-LACK/MVA-LACK in Leishmania major Balb/c model of infection. XIX International Poxvirus, Asfarvirus and Iridovirus Conference. Salamanca, Spain. June 24-28, 2012.

293. Chichon, F.J., Rodríguez, M.J., Pereiro, E.; Chiappi, M**.,** Perdiguero, B., Guttmann, P., Werner, S., Rehbein, S., Schneider, G., **Esteban, M**. And Carrascosa, J.L. Cryo-X-ray Tomography: an alternative microscopy for cellular approaches. International Congress of the Spanish Biophysical Society (SBE). Barcelona, 3 - 6 July, 2012.

294. Pereiro, E.; Chichon, F.J.; Ferrer S.; Rodríguez, M.J.; Chiappi M.; Guttmann, P.; S.; Schneider, G.; **Esteban, M**. and Carrascosa, J.L. Cryo-X-ray nanotomography. 18th User's Meeting & Workshops on X-ray Bio-imaging and Powder Diffraction. Hsinchu, Taiwán. 29 - 30 August 2012.

295. McKay, P.F., Cope A.V., Swales J., Joseph S., **Esteban M**., Tatoud R., Carter D., Weber J, and Shattock R.J (2012). Antigen-specific T lymphocyte responses elicited by a DNA_MVA HIV CN54gp140 immunization regime are significantly altered by the TLR4 adjuvant GLA. AIDS Vaccine 2012. Boston, USA. 9-12 Sept.

296. Hulot S.L., Korber B.T., Pantaleo, G., Tartaglia J., Jacobs, B., Perdiguero B., Gomez C.E., **Esteban M**., Letvin N., Seaman M.S., Haynes B, and Santra S (2012). Comparison of the depth of vaccine-icited HIV-1 Env epitope-specific CD8+ T lymphocyte responses. AIDS Vaccine 2012. Boston, USA.

9-12 Sept.

297. Garcia-Arriaza, J., Arnaez P., Gomez C.E, and **Esteban M** (2012). Immune responses triggered by HIV/AIDS vaccine candidates derived from MVA-B with deletions in several immune regulatory genes. AIDS Vaccine 2012. Boston, USA. 9-12 Sept.

298. Gomez C.E., Perdiguero B., Jimenez V., Filali-Mouhim., Ghneim K., Haddad E., Quakkerlaar E., Delaloye J., Harari A., Roger T., Durhem T., Sekaly R., Melief C., Calandra T., Sallusto F., Lanzavecchia A., Wagnner R., Pantaleo G, and **Esteban M** (2012). Systems análisis of MVA-C induced immune response reveals its significance as a vaccine candidate against HIV/AIDS of clade C. AIDS Vaccine 2012. Boston, USA. 9-12 Sept.

299. Chichon, F.J.; Rodríguez, M.J.; Pereiro, E.; Chiappi, M**.;** Perdiguero, B.; Guttmann, P.; Werner, S.; Rehbein, S.; Schneider, G.; **Esteban, M**. And Carrascosa, J.L. Analysis of Vaccinia virus infection by cryo-X-ray nanotomography. The 15th European Microscopy Congress. Manchester, 16 – 21 September 2012.

300. Caceres A., Perdiguero B., Gomez C.E., Cepeda V., Sorzano C.O., Caelles, C and Esteban M (2013). Role of the cellular phosphatase DUSP1 in vaccinia virus infection. XII Congreso Nacional de Virología, Burgos, Spain, June 2-12.

301. Herrera C.F., Campagna M., Marcos-Villar, L., Garcia M.A., Lang V., Vidal A., Rodriguez M.S., Esteban M, and Rivas C (2013). Regulation of PKR activity by SUMO. XII Congreso Nacional de Virología, Burgos, Spain, June 2-12.

302. Garcia-Arriaza J., Arnaez P., Gomez C.E., Sorzano C.O and Esteban M (2013). Improving adaptive and memory immune responses of an HIV/AIDS vaccine candidate MVA-B by deletion of vaccinia virus genes (C6L and K7R) blocking interferon signaling pathways. XII Congreso Nacional de Virología, Burgos, Spain, June 2-12.

303. Lorenzo M.M., Caceres A., Sanchez-Puig J.M., Esteban M., Fraile-Ramos A, and Blasco R (2013). Study of the involvement of the cellular ESCRT machinery in vaccinia virus infection. XII Congreso Nacional de Virología, Burgos, Spain, June 2-12.

304. Yángüez E., Frau A., Garcia-Culebras A., Esteban M., García-Sastre, A., Nieto A, and Guerra S (2013). ISG15 regulates peritoneal macrophages functionality against viral infection. XII Congreso Nacional de Virología, Burgos, Spain, June 2-12.

305. Chichón, F.J.; Rodríguez, M.J.; Pereiro, E.; Chiappi, M**.;** Perdiguero, B.; Guttmann, P.; Werner, S.; Henzler, E.K.; Schneider, G.; **Esteban, M**. and Carrascosa, J.L. Vaccinia virus (VACV) development inside infected cells by SOFT X-ray tomographic reconstruction. MICROSCOPY AT THE FRONTIERS OF SCIENCE 2013 , 3rd Joint Congress of the Portuguese and Spanish Microscopy Societies and Israel Society for Microscopy, Tarragona, 17 – 20 september 2013

306. J.L Heeney, B. Jacobs, **M. Esteban**, R. Wagner, K. Foulds, M. Roderer, S. Self, S. Barnet, J. Tartaglia, D. Montefioru, G. Tomaras, and G. Pantaleo (2013). Increased HIV-1 immunogenicity of replication competent NYVAC. AIDS Vaccine 2013. Barcelona, Spain, 7-9 October.

307. J.L Heeney, R. Wagner, **M. Esteban**, B. Jacobs, K. Foulds, M. Roderer, S. Self, S. Phogat, D. Montefiori, G. Tomaras and G. Pantaleo (2013). Rapid appearance of vaccine-induced protective anti-Env antibody responses with early co-administration of gp120 and NYVAC or DNA. AIDS Vaccine 2013. Barcelona, Spain, 7-9 October.

308. B. Mothe, S. Sánchez, S. Corral, N. Climent, A.C Guardo, L. Leal, B. Torres, J.L Jimenez, J. Pich, J.A Arnaiz, A. Leon, M. Muñoz-Fernandez, J.M Gatell, B. Clotet, **M. Esteban**, M. Plana, J. Lopez

Bernaldo de Quiros, C. Brander, and F. Garcia (2013). Dynamics of viral load (VL) rebound alter cART interruption in chronic HIV infected patients receiving MVA-B plus disulfiram. AIDS Vaccine 2013. Barcelona, Spain, 7-9 October.

309. C.E Gomez, B. Perdiguero, J. Garcia-Arriaza, V. Cepeda, C.O Sanchez-Sorcano, B. Mothe, J.L Jimenez, M.A Muñoz-Fernandez, J. Gatell, J.C Lopez Bernaldo de Quiros, C. Brander, F. Garcia, and **M. Esteban** (2013). Immunogenicity of MVA-B in HIV-infected volunteers. AIDS Vaccine 2013. Barcelona, Spain, 7-9 October.

310. B. Mothe, N. Climent, M. Plana, M. Rosas, J. Jimenez, M. Muñoz-Fernandez, J. Pich, J. Arnaiz, J. Gatell, B. Clotet, **M. Esteban**, J.L Bernaldo de Quiros, F. Garcia, and C. Brander (2013). Safety, immunogenicity and dynamics of viral load rebound alter cART interruption inb chronic HIV infected patients receiving MVA-B vaccination. AIDS Vaccine 2013. Barcelona, Spain, 7-9 October.

311. B. Perdiguero, C.E Gomez, C.O.S. Sorzano, J. Delaloye, T. Roger, T. Calandra, G. Pantaleo, and **M. Esteban** (2013). Deletion of the VACV A46R gene encoding for a TPR signalling inhibitor enhances the immunogenicity of the HIV/AIDS vaccine candidate NYVAC-C. AIDS Vaccine 2013. Barcelona, Spain, 7-9 October.

312. J. Delaloye, A. Filali-Mouhim, M. Cameron, E. Haddad, A. Harari, J. Goulet, C.E Gomez, B. Perdiguero, **M. Esteban**, G. Pantaleo, T. Roger, R. Sekaly, and T. Calandra (2013). Dual deletion of type I and type II interferon binding proteins in NYVAC-HIV Env-Gag-Pol-Nef poxvirus vectors markedly improves vector immunogenicity. AIDS Vaccine 2013. Barcelona, Spain, 7-9 October.

313. J. Garcia-Arriaza, and **M. Esteban (**2013). Modulation of immune responses to HIV Env and Gag-Pol-Nef antigens by selective deletion of a poxvirus gene. AIDS Vaccine 2013. Barcelona, Spain, 7-9 October.

314. C.E Gomez, B. Perdiguero, M.V Cepeda, L. Mingorance, J. Garcia-Arriaza, A. Vandermeeren, C.O. Sorzano, and **M. Esteban** (2013). High, broad, polyfunctional and durable T cell immune responses induced in mice by a novel hepatitis C virus (HCV) vaccine candidate base don MVA expressing the near full-lenght HCV genome. 7th VACCINE & ISV Congress. Sitges, Spain, 27-29 October.

315. M. Di Pilato, E. Mejias-Perez, C.E Gomez, B. Perdiguero, C.O Sorzano, and **M. Esteban** (2013). New vaccinia virus promoter as candidate for future bacines. 7th VACCINE & ISV Congress. Sitges, Spain, 27-29 October

316. L. Sanchez-Sampedro, C.E Gomez, E. Mejias-Perez, E. Perez-Jimenez, J.C Oliveros and **M. Esteban** (2013). M65 and M101 replication-competent vaccinia virases as vaccine candidates against leishmaniasis. 7th VACCINE & ISV Congress. Sitges, Spain, 27-29 October

317. A. Vijayan, C.E Gomez, E. Mejias-Perez, and **M. Esteban** (2013). A Vaccinia virus A27 protein fused with plasmodium circumsporozoite as a potencial malaria vaccine candidate. 7th VACCINE & ISV Congress. Sitges, Spain, 27-29 October.

318. Mauro Di Pilato*, Sánchez-Sampedro L, Mejias-Perez E, Sorzano C O and **Esteban M** (2014). Enhancement of antigen-specific CD4 T cell response through spacer modification in vaccinia virus promoters. 4th International Conference on Vaccines & Vaccination. Valencia, 24-26, September.

319. Di Pilato M*, Mejías-Pérez E*, Zonca M, Perdiguero B, Gómez CE, Trakala M, Nieto J, Nájera JL, Sorzano CO, Planelles L, **Esteban M**. (2014). Vaccinia Virus with Selective Deletions Enhances T Cell Response to HIV Antigens by Specific Neutrophil Recruitment. HIV Research for Prevention 2014. Cape Town, South Africa, 28-31, October.

320. Perdiguero B, Gómez CE, Cepeda MV, Sánchez-Sampedro L, García-Arriaza J, Mejías-Pérez E, Jiménez V, Sánchez C, Sorzano CO, Delaloye J, Roger T, Calandra T, Wagner R, Asbach B, Kibler

KV, Jacobs BL, Pantaleo G, **Esteban M** (2014). Bivalent NYVAC-based Vaccine Candidates against HIV/AIDS Expressing Clade C Trimeric Soluble gp140(ZM96) and Gag(ZM96)-Pol-Nef(CN54) as VLPs. HIV Research for Prevention 2014. Cape Town, South Africa, 28-31, October.

321. Yanguez E, Garcia-Culebras, A, Frau A, Garcia-Sastre A, **Esteban M**, Nieto A, and Guerra S (2014). ISG15 regulates peritoneal macrophages functionality against viral infection. XX International Poxvirus, Asfarvirus & Iridovirus Conference. Victoria BC, Canada, September 26-30.

322. Garcia-Arriaza J, Cepeda V, Hallengärd D, Sorzano C O, Kümmerer M K, Liljeström P, and **Esteban M** (2014). A novel poxvirus-based vaccine (MVA-CHIKV) is highly immunogenic and protects mice against chikungunya infection. XX International Poxvirus, Asfarvirus & Iridovirus Conference. Victoria BC, Canada, September 26-30.

323. Di Pilato M, Mejías-Pérez E, Zonca M, Perdiguero B, Gómez C, Trakala M, Nieto J, Nájera JL, Sorzano CO, Combadiere C, Pantaleo G, Planelles L and **Esteban M**. (2015).Neutrophil migration via NF_KB activation by modified Vaccinia virus as a novel mechanism to enhance HIV-specific T cell responses. XIII Congreso Nacional de Virología 2015. Madrid, 7-10, June.

324. Garcia-Arriaza J, Perdiguero B, Heeney J, Seaman M, Montefiori D, Labranche C, Yates N, Shen X, Tomaras G, Ferrari G, Foulds K.E, Mcdermott A, Kao S, Roederer M, Hawkins N, Self S, Yao J, Farrell P, Phogat S, Tartaglia J, Barnett S.W, Burke B, Cristillo A, Weiss D, Lee C, Kibler K, Jacobs B, Asbach B, Warner R, Ding S, Pantaleo G and **Esteban M** (2015). Head-to-head comparison of Poxvirus Nyvac and Alvac vectors expressing identical HIV-1 clade C inmunogens in prime/boost combination with env protein in non-human primates. XIII Congreso Nacional de Virología 2015. Madrid, 7-10, June.

325. Di Pilato M, Sánchez-Sampedro L, Mejías- Pérez E, Sorzano C.O.S and **Esteban M** (2015). Modification of promoter spacer length in Vaccinia Virus as astrategy to control the antigen expression. XIII Congreso Nacional de Virología 2015. Madrid, 7-10, June.

326. De la Cruz-Herrera C.F, Baz-Martinez, Lang V, El Motiam A, Barbazán J, Couceiro R, Abal M, Vidal A, **Esteban M**, Muñoz-Fontela C, Nieto A, Rodríguez MS, Collado M, Rivas C (2015). Modulation of P85β activity by sumo. XIII Congreso Nacional de Virología 2015. Madrid, 7-10, June.

327. Gómez C.E, Perdiguero B, García- Arriaza J, Cepeda V, Sánchez-Sorzano C.O, Mothe B, Jimenez J L, Muñoz-Fernández M.A, Gatell J.M, López Bernaldo de Quirós C, Brander C, García F and **Esteban M** (2015). Therapeutic MVA-B Vaccine improves the magnitude and quality of the T cell inmune responses in HIV-1 infected subjects on haart. XIII Congreso Nacional de Virología 2015. Madrid, 7-10, June.

328. Rodríguez M.J, Chichón S, Gutiérrez-Erlandsson S, Conesa J.J, **Esteban M**, Carrascosa José L (2015). Role of vimentin filaments in Vaccinia Virus assembly and maturation. XIII Congreso Nacional de Virología 2015. Madrid, 7-10, June.

329. Vijayan A, García- Arriaza J, Raman S.C, Conesa J.J, Chichón F.J, Santiago C, Sorzano O.S, Carrascosa J.L and **Esteban M** (2015). A chimeric HIV-1 GP120 fused with Vaccinia Virus 14K (A27) protein as an HIV inmunogen. XIII Congreso Nacional de Virología 2015. Madrid, 7-10, June.

330. Perdiguero B, Gómez C.E, Cepeda V, Sánchez-Sampedro L, García-Arriaza J, Mejías-Pérez E, Jimenez V, Sánchez C, Sorzano C.O.S, Oliveros J.C, Delaloye J, Roger T, Calandra T, Asbach B, Wagner R, Kibler V, Jacobs B.L, Pantaleo G and **Esteban M** (2015). Virological and immunological characterization of novel NYVAC-based HIV/AIDS Vaccine candidates expressing clade C trimeric soluble GP140 (ZM96) and GAG (ZM96)-POL-NEF(CN54) as virus- like particles. XIII Congreso Nacional de Virología 2015. Madrid, 7-10, June.

331. Mejías- Pérez E, Sánchez-Sampedro L, Sorzano C.O S, **Esteban M** (2015). Head-to-head

comparison of Vaccinia Virus-based vectors NYVAC and MVA expressing Leishmania activated C-kinase in mice. XIII Congreso Nacional de Virología 2015. Madrid, 7-10, June.

332. Quirós M, García-Arriaza J, Gómez C.E, Sorzano C.O.S and **Esteban M** (2015). Characterization of a novel Hepatitis C Virus (HCV) Vaccine candidate base on MVA expressing the nearly full-length HCV genome and lacking C6L Vaccine Virus immunomodulatory gene. XIII Congreso Nacional de Virología 2015. Madrid, 7-10, June.

333. De la Cruz-Herrera C.F, Baz-Martínez M, Vidal A, Lang V, Motiam A.E, Rodríguez M.S, **Esteban M**, Rivas C (2015). Non-covalent interaction with sumo is necessary for full activation of PKR. XIII Congreso Nacional de Virología 2015. Madrid, 7-10, June.

334. Liljeström P, Roques, P, Ljungberg K, Kümmerer B.M, Gosse L, Deureuddre-Bosquet N, Hallengärd D, Garcia-Arriaza J, **Esteban M**, Merits A, and Le Grant R (2015). The making of a Chikungunya vaccine: comparing attenuated and vectored vaccine platforms. 9th Vaccine and ISV Congress, October 18-20. Seoul, South Corea.

335. Kibler K, Gomez C, Denzler K, Perdiguero B, Huynh T, Sanchez L, Fukushima N, **Esteban M,** Pantaleo G, and Jacobs B (2016). Pre-clinical safety studies demonstrate attenuation of the replication-competent NYVAC-KC as a vaccine candidate vector. XXI International Poxvirus Asfarvirus and Iridovirus Conference. July 1-5, Strasbourg, France.

336. **Esteban M**, Garcia-Arriaza J, Perdiguero B, Heeney J, Seaman M, Montefiori D, Labranche C, Yates N, Shen X, Tomaras G, Ferrari, G, Foulds K, Mvdermott A, Kao S-F, Roederer M, Hawkins N, Self S, Yao J, Farrel P, Phogat S, Tartaglia J, Barnett S, Burke B, Cristillo A, Weis D, Lee C, Kibler K, Jacobs B, Wagner R, Ding S, and Pantaleo G (2016). A replication-competent NYVAC vector expressing HIV-1 clade C immunogens (NYVAC-C-KC) is more immunogenic than NYVAC-C in prime/boost combination with ENV protein in non-human primates. XXI International Poxvirus Asfarvirus and Iridovirus Conference. July 1-5, Strasbourg, France.

337. Alberto C. Guardo, Vicens Díaz-Brito, Judit Pich, Joan Albert Arnaiz, Beatriz Perdiguero, José M Gatell, **Mariano Esteban**, Juan Carlos López Bernaldo de Quirós, Felipe García, Montserrat Plana, for the RISVAC02boost study. Boosting MVA-B dose in healthy volunteers 4 years after a first immunization (2016) . HIV Research for Prevention 2016: AIDS Vaccine, Microbicide and ARV-based Prevention Science (HIVR4P). October 17-21, 2016. Chicago, USA.

338. Vicens Díaz-Brito, Alberto C. Guardo, Montserrat Plana, Judit Pich, Joan Albert Arnaiz, Beatriz Perdiguero, José M Gatell, **Mariano Esteban**, Juan Carlos López Bernaldo de Quirós, Felipe García, for the RISVAC02 and RISVAC03 study. Comparison of safety and immunogenicity of MVA-B in HIV-uninfected and HIV-infected volunteers (2016). HIV Research for Prevention 2016: AIDS Vaccine, Microbicide and ARV-based Prevention Science (HIVR4P). October 17-21, 2016. Chicago, USA.

339. Gomez CE, Perdiguero B, García-Arriaza J, Sanchez-Sorzano CO, Guardo A, Diaz-Brito V, Pich J, Arnaiz JA, Jimenez JL, Muñoz-Fernandez MA, Gatell JM, Bernaldo de Quiros JC, Garcia F, Plana M, and **Esteban M** (2017). Long-term immune responses induced by the prophylactic MVA-B HIV/AIDS vaccine. XIV Congreso Nacional de Virologia. Cadiz, 11-14 junio.

340. Perez P, Marin MQ, Gomez CE, Sanchez-Sorzano CO, **Esteban M**, and Garcia-Arriaza J (2017). Deletion of the vaccinia virus gene A40R improves adaptive and memory immune responses of the HIV/AIDS vaccine candidate MVA-B (2017). XIV Congreso Nacional de Virologia. Cadiz, 11-14 junio.

341. Marin MQ, Perez P, Gomez CE, Sanchez-Sorzano CO, **Esteban M**, and Garcia-Arriaza, J (2017). Characterization of novel hepatitis C virus vaccine candidate base don MVA expressing the nearly full-length HCV genome and lacking 6L vaccinia virus gene. XIV Congreso Nacional de Virologia. Cadiz, 11-14 junio.

342. Di Pilato M, Mejias-Perez E, Sanchez-Sorzano CO, and **Esteban M** (2017). Role of vaccinia virus NF-kB inhibitor protein A52, B15 and K7 in immunity. XIV Congreso Nacional de Virologia. Cadiz, 11-14 junio.

343. Garcia-Arriaza J, Perdiguero B, Heeney J, Seaman MS, Montefiori DC, Yates NL, Tomaras GD, Ferrari G, Foulds KE, Roederer M, Self SG, Borate B, Gottardo R, Phogat S, Tartaglia J, Barnet SW, Burke B, Cristillo AD, Weis DE, Lee C, Kibler KV, Jacobs BL, Wagner R, Ding S, Pantaleo G, and **Esteban M** (2017). Replication competent poxvirus NYVAC-KC as HIV/AIDS vaccine candidate and role of the virus B19R gene in non-human primates. XIV Congreso Nacional de Virologia. Cadiz, 11-14 junio.

344. **Esteban M** (2017). New trends in immunology: towards immunogenic and effective recombinant vaccines against HIV/AIDS and emerging viruses. XI Annual Congress of Biotechnology. León, 12-14 June.

345. Marin MQ, Perez P, Gomez CE, Sanchez-Sorzano CO, Sliepen K, Sanders RW, Ljungberg K, Liljeström, **Esteban M** and Garcia-Arriaza J (2018). Enhancing the Immunogenicity of an MVA-based Vaccine Candidate Against Hepatitis C. XXII International Poxvirus, Asfarvirus and Iridovirus Conference. Taiwan, May 26-31, 2018.

346. Perez P, Marin MQ, Di Pilato M, Gomez CE, Sanchez-Sorzano CO, **Esteban M**, and Garcia-Arriaza J (2018. An MVA vector expressing HIV-1 Env under control of a potent vaccinia virus promoter as promising strategy in HIV/AIDS vaccine design. XXII International Poxvirus, Asfarvirus and Iridovirus Conference. Taiwan, May 26-31, 2018.

347. Marin MQ, Perez P, Sanchez-Sorzano CO, Ljungberg, Liljeström P, Gomez CE, **Esteban M**, and Garcia-Arriaza J (2018). Immunization with DNA-launched RNA Replicon and Poxvirus Vaccine Candidates Expressing HCV Proteins Induce Potent Immune Responses. 25th International Symposium on Hepatitis C Virus and Related Viruses. Dublin, 8-11 October, 2018.

348. Garcia-Arriaza, J, Gomez CE, Perdiguero B, Sanchez-Corzo C, Sanchez-Sorzano CO, and **Esteban M** (2018). MVA vaccine candidates expressing trimeric HIV-1 clade C envelopes as immunogens against HIV (2018). HIV Research for Prevention HIVR4P-2018, Madrid, 21-25 October 2018.

349. Perdiguero B, Raman SC, Sanchez-Corzo C, Sanchez-Sorzano CO, Valverde JR, **Esteban M**, and Gomez CE (2018). Potent HIV-1-specific CD8 T cell responses induced in mice after immunization with a heterologous DNA-TMEP prime/MVA-B boost vaccine regimen. HIV Research for Prevention HIVR4P-2018, Madrid, 21-25 October 2018.

350. Perdiguero B, Gomez CE, Garcia-Arriaza J, Sanchez-Sorzano CO, Wilmschen S, von Laer D, Kimpel J, Pantaleo G and **Esteban M** (2018). Heterologous combination of VSV and NYVAC vectors expressing trimeric HIV Env elicits higher T and B cell responses compared with homologous regimen. HIV Research for Prevention HIVR4P-2018, Madrid, 21-25 October 2018.

351. Raman SC, Mejias-Perez E, Vijayan A, Perez MM, Cuervo A, Santiago C, Sanchez-Sorzano CO, Carrascosa JL, and **Esteban M** (2018). A new envelope based antigen forming soluble hexamers triggers potent humoral responses against HIV-1. HIV Research for Prevention HIVR4P-2018, Madrid, 21-25 October 2018.

352. Perez P, Marin MQ, Lazaro-Frias A, Jimenez de Oya N, Blazquez AB, Escribano-Romero E, Sanchez-Sorzano CO, Ortego J, Saiz JC, **Esteban M**, and Garcia-Arriaza J (2018) A Vaccine Based on a Modified Vaccinia Virus Ankara expressing Zika Virus Structural Proteins Controls Zika Virus Replication In Mice. European Academy for Biomedical Science-Scientific Symposium. Copenhagen, November 7-9, 2018.

353. Raman SC, Mejías-Pérez, E, Vijayan A, Perez MM, Cuervo A, Santiago C, Sorzano COS,

Carrascosa JL and **Esteban M** (2018). A New Envelope Based Antigen Forming Soluble Hexamers Triggers Potent Humoral Responses against HIV-1 2nd European PhD Symposium ENABLE: "The Promise of Future Medicine: from Research to Therapy" (Copenhagen, 6-9 November 2018)

354. Patricia Pérez, María Q. Marín, Adrián Lázaro-Frías, Nereida Jiménez de Oya, Ana-Belén Blázquez, Estela Escribano-Romero, Carlos Üscar S. Sorzano, Juan-Carlos Sáiz, **Mariano Esteban**, Miguel A. Martín-Acebes, Juan García-Arriaza (2018). A modified vaccinia virus Ankara vaccine candidate expressing Zika virus structural proteins controls Zika virus replication in mice. 2nd European PhD Symposium ENABLE: "The Promise of Future Medicine: from Research to Therapy" (Copenhagen, 6-9 November)

355. Perdiguero B, Sanchez-Corzo, C, Sanchez-Sorzano C.O, Sanz L, Mediavilla L, and **Esteban M** (2019). MVA-GP145-GPN as a vaccine candidate against HIV-1. XV Congreso Nacional Virología. Barcelona, Spain. June 9-12 .

356. Marin MQ, Sliepen K, Garcia-Arriaza J, Koekkoek S, Perez P, Gomez CE, Sanders RW and **Esteban M** (2019). Enhancing humoral responses against hepatitis C using MVA-HCV vector in combination with optimized E2 viral glycoproteins. XV Congreso Nacional Virología. Barcelona, Spain. June 9-12 .

357. Perez P, Marin MQ, Lazaro-Frias A, Jimenez de Oya N, Blazquez AB, Escribano-Romero E, Sanchez-Sorzano CO, Ortego J, Saiz JC, **Esteban M**, Martin-Acebes MA, and Garcia-Arriaza J (2019). A vaccine base don modified vaccinia virus Ankara vector expressing the Zika virus structural proteins and producing virus-like particles controls Zika virus replication in mice. XV Congreso Nacional Virología. Barcelona, Spain. June 9-12.

358. Lazaro-Frias A, Gomez-Medina S, Sanchez-Sampedro, Ljungberg K, Ustav M, Liljeström P, Muñoz-Fontela C, **Esteban M**, and Garcia-Arriaza J (2019). Distinct immunogenicity and efficacy against ebola virus of poxvirus-based vaccine candidates expressing GP and VP40 proteins. XV Congreso Nacional Virología. Barcelona, Spain. June 9-12.

359. Perdiguero B, Gomez CE, Garcia-Arriaza J, Sanchez-Sorzano CO, Wilmschen S, Von Laer D, Kimpel J, Wagner R. Asbach B, Ding S, Pantaleo G and **Esteban M** (2019). Improving the immunogenicity of HIV-1 vaccine candidates by the heterologous combination of VSV and NYVAC vectors. XV Congreso Nacional Virología. Barcelona, Spain. June 9-12

360. **Esteban M** (2021). El candidato vacunal MVA-CoV2-S protege completamente frente a la infección viral, morbilidad y mortalidad inducida por SARS-CoV-2/COVID-19. 42 Congreso virtual de la Sociedad Española de Inmunología (SEI). Online, 24-26 marzo, 2021.

361. García-Arriaza J., Garaigorta U., Pérez P., Lázaro-Frías A., Zamora C., Gastaminza P., Del Fresno C., Casasnovas J.M., Sorzano C.Ó.S., Sancho D. & **Esteban M**. (2021). COVID-19 vaccine candidates based on modified vaccinia virus Ankara expressing the SARS-CoV-2 spike protein induce robust T- and B-cell immune responses and full efficacy in mice. XXIII International Poxvirus, Asfarvirus & Iridovirus Conference. Philadelphia, E.E.U.U. (Virtual). 5-9 July

362. García-Arriaza J., Garaigorta U., Pérez P., Lázaro-Frías A., Zamora C., Gastaminza P., Del Fresno C., Casasnovas J.M., Sorzano C.Ó.S., Sancho D. & **Esteban M**. (2021). COVID-19 vaccine candidates based on modified vaccinia virus Ankara expressing the SARS-CoV-2 spike protein induce robust T- and B-cell immune responses and full efficacy in mice. VaccinesMeet. Niza, Francia. 4-5 November

363. Astorgano, D., Pérez, P., Lázaro-Frías, A., Zamora, C., **Esteban, M.** & García-Arriaza, J. (2021). Generation and characterization of an MVA-based vaccine candidate expressing the Receptor Binding Domain of SARS-CoV-2. 4th European PhD & Postdoc Symposiym ENABLE. Milan, Italia, 12-14 Mayo.

364. García-Arriaza, J., Pérez, P., Mooij, P., Boudewijns, R., Astorgano, D., Dallmeier, K., Koopman, G., & **Esteban, M**. (2022). Preclinical characterization of the SARS-CoV-2/COVID-19 vaccine candidate MVA-CoV2-S: Robust immunogenicity and full efficacy against SARS-CoV-2 in mice, hamsters and rhesus macaques. XVI Congreso Nacional de Virología. Málaga, España, 6-9 Septiembre (Comunicación oral).

365. Pérez, P., Lázaro-Frías, A., Zamora, C., Sánchez-Cordón, P.J., Astorgano, D., Luczkowiak, J., Delgado, R., Casasnovas, J.M., **Esteban, M**., & García-Arriaza, J., (2022). A single dose of an MVA vaccine expressing a prefusion-stabilized SARS-CoV-2 spike protein neutralizes variants of concern and protects mice from a lethal SARS-CoV-2 infection. XVI Congreso Nacional de Virología. Málaga, España, 6-9 Septiembre (Póster).

366. Lázaro-Frías, A., Gómez-Medina, S., Nelson, E.V., Pérez, P., Marín, M.Q., Muñoz-Fontela, C., **Esteban, M.**, & García-Arriaza, J. (2021). Distinct immunogenicity and efficacy of poxvirus-based vaccine candidates against Ebola virus expressing GP and VP40 proteins. XVI Congreso Nacional de Virología. Málaga, España, 6-9 Septiembre (Póster).

367. Pérez, P., Martín-Acebes, M.A., Poderoso, T., Lázaro-Frías, A., Saiz, J.C., S. Sorzano, C.Ó., **Esteban, M.**, & García-Arriaza, J. (2021). The combined vaccination protocol of DNA/MVA expressing Zika virus structural proteins as efficient inducer of T and B cell immune responses. XVI Congreso Nacional de Virología. Málaga, España, 6-9 Septiembre (Póster).

368. Astorgano, D., Pérez, P., Albericio, G., Sánchez-Cordón, P.J., Luczkowiak, J., Delgado, R., Casasnovas, J.M., **Esteban, M**., & García-Arriaza, J., (2022). Intranasal administration of a single dose of MVA-based vaccine candidates against COVID-19 induced local and systemic immune responses and fully protects mice from a lethal SARS-CoV-2 infection. XVI Congreso Nacional de Virología. Málaga, España, 6-9 Septiembre (Póster).

369. Escribano-Romero, E., Pérez, P., Blázquez, A.B., Jiménez de Oya, N., **Esteban, M.**, Saiz, J.C., García-Arriaza, J. & Martín-Acebes, M.A. (2022). Evaluation of the Immune Crosstalk between West Nile Virus and a Live-Attenuated Zika Virus Vaccine Based on Modified Vaccinia Virus Ankara. XVI Congreso Nacional de Virología. Málaga, España, 6-9 Septiembre (Póster).

370. García-Arriaza, J., Pérez, P., Mooij, P., Boudewijns, R., Astorgano, D., Dallmeier, K., Koopman, G., & **Esteban, M**. (2022). Robust immunogenicity and full efficacy against SARS-CoV-2 in mice, hamsters and rhesus macaques of a COVID-19 vaccine candidate based on an MVA vector expressing the SARS-CoV-2 S protein. 2022 International Society for Vaccines (ISV) Annual Congress. Québec, Canadá, 18-20 September (Comunicación oral).

371. Beatriz Perdiguero, Benedikt Asbach, Carmen E Gómez, Josef Köstler, Susan Barnett, Marguerite Koutsoukos, Deborah E Weiss, Anthony D Cristillo, Kathryn E Foulds, Mario Roederer, David C Montefiori, Nicole L Yates, Guido Ferrari, Xiaoying Shen, Sheetal Sawant, Georgia D Tomaras, Alicia Sato, William J. Fulp, Raphael Gottardo, Song Ding, Jonathan L Heeney, Giuseppe Pantaleo, **Mariano Esteban** and Ralf Wagner. (2022). Early and long-term HIV-1 immunogenicity induced in macaques by the combined administration of DNA, NYVAC and Env protein-based vaccine candidates: The AUP512 Study. XVI Congreso Nacional de Virología. Málaga, España, 6-9 Septiembre.

372. Michela Falqui, Carmen Elena Gómez, Beatriz Perdiguero, Manuel Albert, Laura Marcos, Carlos Oscar Solorzano, **Mariano Esteban** and Susana Guerra. Generation of the MVA-ISG15 vector as a potential adjuvant in HIV immunization protocols (2022). XVI Congreso Nacional de Virología. Málaga, España, 6-9 Septiembre.

373. Beatriz Perdiguero, Carmen Elena Gómez, Alexandra Hauser, David Peterhoff, Elefthéria Sideris, Carlos Óscar S. Sorzano, Sarah Wilmschen, Marion Schaber, Dorothee von Laer, Christina Schmalzl, Song Ding, Janine Kimpel, Yves Levy, Giuseppe Pantaleo, **Mariano Esteban** and Ralf Wagner. (2022). Potency and durability of T and B cell immune responses with high broadly neutralizing antibody recognition after prime/boost combinations with recombinant VSV-GP, DNA or NYVAC vectors

expressing the novel HIV-1 Env clade C membrane-bound trimeric gp140:GΔ6 ConCv5 KIKO protein. XVI Congreso Nacional de Virología. Málaga, España, 6-9 Septiembre.

374. Carmen Elena Gómez, Beatriz Perdiguero, Lorena Usero, Laura Marcos-Villar, Laia Miralles, Lorna Leal, Carlos Óscar S. Sorzano, Cristina Sánchez-Corzo, Montserrat Plana, Felipe García, and **Mariano Esteban**. (2022). Enhancement of the HIV-1-Specific Immune Response Induced by an mRNA Vaccine through Boosting with a Poxvirus MVA Vector Expressing the Same Antigen. XVI Congreso Nacional de Virología. Málaga, Spain, 6-9 September.

375. Juan García-Arriaza, Patricia Pérez, Petra Mooij, Robbert Boudewijns, David Astorgano, Guillermo Albericio, Rana Abdelnabi, Kai Dallmeier, Gerrit Koopman, **Mariano Esteba**n (2023). Poxvirus MVA-based vaccine candidates expressing the SARS-CoV-2 S protein induce potent humoral and T cellular immune responses and full efficacy against SARS-CoV-2 infection in several animal models. XVIth International Nidovirus Symposium, Montreux, Switzerland, May14th - 18th.

376. Garcia-Arriaza J, Perez P, Mooij P, Boudwijns R, Astorgano D, Albericio, G, Abdelnabi mR, Dallmeier, Koopman G and **Esteban M** (2023). MVA-based vaccine candidates against COVID-19 expressing SARS-CoV-2 S protein trigger robust immunogenicity and complete efficacy against SARS-CoV-2 infection in various animal models. XXIV International Poxvirus, Asfarvirus and Iridovirus Conference. Dusseldorf (Germany), September 2-6, 2023.

377. Jacobs, B, Kibler K, Szcerba M, Williams, J and **Esteban M** (2023). Replication-competent NYVAC-KC vector expressing modified spike protein and administered by intranasal route or by scarification protects against mouse-adapted SARS-CoV-2 in mice. XXIV International Poxvirus, Asfarvirus and Iridovirus Conference. Dusseldorf (Germany), September 2-6, 2023.

378. Gomez C.E, Marcos-Villar L, Perdiguero B, Lopez-Bravo M, Zamora C, Sin L, Alvarez E, Oscar S. Sorzano C, Sanchez-Cordon P, Garcia F, Plana M, Alonso M.J, **Esteban M** (2023). Immunogenicity and protective efficacy of trimeric SARS-CoV-2 receptor binding domain after heterologous mRNA/MVA regimen. XXIV International Poxvirus, Asfarvirus and Iridovirus Conference. Dusseldorf (Germany), September 2-6, 2023.

379. Perdiguero B, Marcos-Villar L, Lopez-Bravo M, Sanchez-Cordon P, Zamora C, Valverde J.R, Oscar S. Sorzano C, Sin L, Alvarez E, **Esteban M**, and Gomez C.E (2023). Immunogenicity and efficacy of a novel multi-patch SARS-CoV-2/COVID-19 vaccine candidate. XXIV International Poxvirus, Asfarvirus and Iridovirus Conference. Dusseldorf (Germany), September 2-6, 2023.

380. Guerra S, Falqui M, Perdiguero B, Coloma R, Albert M, Marcos L, McGrail J.P, Oscar S. Sorzano C, **Esteban M** and Gomez C.E (2023). An MVA vector expressing cell-free ISG15 increases IFN-I production and improves HIV-1-specific CD8 T cell immune responses. XXIV International Poxvirus, Asfarvirus and Iridovirus Conference. Dusseldorf (Germany), September 2-6, 2023.

381. Perez P, Astorgano D, Albericio G, Flores S, Sanchez-Cordon P, Luczkowiak J, Delgado R, Casasnovas J.M, **Esteban M** and Garcia-Arriaza J (2023). MVA-based vaccine candidates expressing prefusion-stabilized spike proteins from SARS-CoV-2 Wuhan and beta variant of concern are highly immunogenic and protects mice from a lethal challenge with SARS-CoV-2 beta variant. XXIV International Poxvirus, Asfarvirus and Iridovirus Conference. Dusseldorf (Germany), September 2-6, 2023.

382. Albericio G, Gomez-Carballa A, Montoto-Louzao J, Perez P, Astorgano D, Rivero-Calle I, Martinon-Torres F, **Esteban M,** Salas A and Garcia-Arriaza J (2023). Impact of the COVID-19 vaccine candidate MVA-CoV2-S on lung transcriptomes of K18-hACE2 mice challenge with SARS-CoV-2. XXIV International Poxvirus, Asfarvirus and Iridovirus Conference. Dusseldorf (Germany), September 2-6, 2023.

383. Garcia-Arriaza J, Villadiego J, Ramirez-Lorca R, Garcia-Swinburn R, Cabello-Rivera D, Rosales A.E, Alvarez-Vergara M.I, Cala-Fernandez F, Garcia-Roldan E, Lopez-Ogayar J.L, Zamora C, Astorgano D,

Albericio G, Perez P, Muñoz-Cabello A.M, Pascual A, **Esteban M**, Lopez-Barneo J, and Toledo-Aral J.J (2023). Full protection from SARS-CoV-2 brain infection and damage in susceptible transgenic mice conferred by MVA-CoV2-S vaccine candidate. XXIV International Poxvirus, Asfarvirus and Iridovirus Conference. Dusseldorf (Germany), September 2-6, 2023.

384. Garcia-Arriaza J, Lennol M.P, Garcia-Ayllon M.S, **Esteban M** and Saez-Valero J (2023). Serum angiotensin-converting enzymne 2 as a potent biomarker for SARS-CoV-2 infection and vaccine efficacy. XXIV International Poxvirus, Asfarvirus and Iridovirus Conference. Dusseldorf (Germany), September 2-6, 2023.

385. Patricia Pérez, Daniel Rodríguez-Martín, Sara Flores, María A. Noriega, Pedro J. Sánchez-Cordón, Kaijun Jiang, Irene González-Domínguez, Anastasija Cupic, Stefan Slamanig Adam Abdeljawad, Nicholas Lemus, Tsoi Ying Lai, Weina Sun, Adolfo García-Sastre, **Mariano Esteban** and Juan García-Arriaza. (2024). Heterologous prime/boost regimens combining Newcastle disease virus and modified vaccinia virus Ankara vectors expressing the SARS-CoV-2 spike protein stimulate robust SARS-CoV-2-specific immune responses and full protection against lethal SARS-CoV-2 infection in mice. XVII Congreso Nacional de Virología, Santiago de Compostela, 2-5 Septiembre, 2024

386. Guillermo Albericio, Alberto Gómez-Carballa, Julián Montoto-Louzao, Patricia Pérez, David Astorgano, Irene Rivero-Calle, Federico Martinón-Torres, **Mariano Esteban**, Antonio Salas and Juan García-Arriaza (2024). Lung transcriptomics of K18-hACE2 mice highlights mechanisms and genes involved in the MVA-S vaccine-mediated immune response and protection against SARS-CoV-2 infection. XVII Congreso Nacional de Virología, Santiago de Compostela, 2-5 Septiembre, 2024

387. Guillermo Albericio, Patricia Pérez, Daniel Rodríguez-Martín, David Astorgano, Sara Flores, Cristina Sánchez-Corzo, María A. Noriega, **Mariano Esteban** and Juan García-Arriaza. (2024). Development of next-generation modified vaccinia virus Ankara-based vaccine candidates against Monkeypoxvirus by directed deletion of multiple immunomodulatory genes. XVII Congreso Nacional de Virología, Santiago de Compostela, 2-5 Septiembre, 2024

388. David Astorgano, Patricia Pérez, Guillermo Albericio, Sara Flores, Cristina Sánchez-Corzo, María A. Noriega, Pedro J. Sánchez-Cordón, Nuria Labiod, Rafael Delgado, José M. Casasnovas, **Mariano Esteban** and Juan García-Arriaza. (2024). MVA-based vaccine candidates expressing prefusion-stabilized spike proteins of the SARS-CoV-2 Wuhan, Beta and Omicron BA.1 variants protect transgenic K18-hACE2 mice against Omicron infection and elicit robust and broad specific humoral and cellular immune responses. XVII Congreso Nacional de Virología, Santiago de Compostela, 2-5 Septiembre, 2024

389. Rocío Coloma, Michela Falqui, Beatriz Perdiguero, Laura Marcos-Villar, **Mariano Esteban**, Carmen Elena Gómez and Susana Guerra. (2024). New MVA-based vector expressing ISG15. XVII Congreso Nacional de Virología, Santiago de Compostela, 2-5 Septiembre, 2024

390. Juan García-Arriaza, Javier Villadiego, Reposo Ramírez-Lorca, Roberto García-Swinburn, Daniel Cabello-Rivera, Alicia E. Rosales-Nieves, María I. Álvarez-Vergara, Fernando Cala-Fernández, Ernesto García-Roldán, Juan L. López-Ogáyar, Carmen Zamora, David Astorgano, Guillermo Albericio, Patricia Pérez, Ana M. Muñoz-Cabello, Alberto Pascual, **Mariano Esteban**, José López-Barneo and Juan José Toledo-Aral. (2024). MVA-S vaccine candidate confers complete protection from SARS-CoV-2 brain infection and damagein susceptible transgenic K18-hACE2 mice. XVII Congreso Nacional de Virología, Santiago de Compostela, 2-5 Septiembre, 2024

391. Laura Marcos-Villar, Beatriz Perdiguero, Shubaash Anthiya, Mireya Borrajo, Gustavo Lou, Lorenzo Franceschini ,Ignasi Esteban, Pedro J.Sánchez-Cordón, Carmen Zamora, Carlos Óscar S. Sorzano, Luis Jordá, Laia Codó, Josep L. Gelpí, Marta Sisteré-Oró, Andreas Meyerhans, Kris Thielemans, Francisco Martínez-Jiménez,Nuria López-Vigas, Felipe García, María J. Alonso, Montserrat Plana, **Mariano Esteban** and Carmen Elena Gómez. (2024). Enhancing Immune Response toSARS-CoV-2 Using

Diverse Nanocarriers Delivering mRNA for Spike Protein's Trimeric RBD Expression: COVARNA Consortium. XVII Congreso Nacional de Virología, Santiago de Compostela, 2-5 Septiembre, 2024

392. Beatriz Perdiguero, Enrique Álvarez, Laura Marcos-Villar, María López-Bravo, José Ramón Valverde, Laura Sin, Carlos Óscar S. Sorzano, Michela Falqui, Rocío Coloma, **Mariano Esteban**, Susana Guerra and Carmen Elena Gómez. (2024). B and T cell bi-cistronic multiepitopic vaccine induces broad immunogenicity against SARS-CoV-2. XVII Congreso Nacional de Virología, Santiago de Compostela, 2-5 Septiembre, 2024

393. Enrique Álvarez, Beatriz Perdiguero de la Torre, Laura Marcos-Villar, Laura Sin, Ralf Wagner, **Mariano Esteban**, Carmen Elena Gómez. (2024). MVA-ConCv5 KIKO and MVA-TMEP: A Combined Approach to Enhance HIV-1 Immunity. XVII Congreso Nacional de Virología, Santiago de Compostela, 2-5 Septiembre, 2024

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TESIS DOCTORALES DIRIGIDAS / PhD THESIS

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1. Cabrera, Carlos V. (1978). Studies on the structure and genetic expression of poxvirus. Departments of Microbiology, Rutgers Medical School, CMDNJ, Piscataway, New Jersey and School of Pharmacy, Universidad de Santiago de Compostela, España.

2. Dallo, Shatha (1986). Isolation and characterization of spontaneous deletion mutants of vaccinia virus. Department of Microbiology and Immunology, SUNY Health Science Center at Brooklyn, NY. Premio extraordinario.

3. Maa, Juehn-Shin (1988). Biochemical and genetic characterization of immunodominant proteins of vaccinia virus. Department of Biochemistry, SUNY Health Science Center at Brooklyn, NY.

4. Kahn, Jeffrey S. (1990). Structural and functional studies of the vaccinia virus nucleic acid-dependent ATPase. Department of Microbiology and Immunology, SUNY Health Science Center at Brooklyn, NY.

5. Gong, Shiaoching (1990). Genetic variability of the 14 KDa envelope protein of vaccinia virus and involvement of this protein in virus-induced cell fusion. Department of Biochemistry, SUNY Health Science Center at Brooklyn, NY.

6. Chingfeng Lai (1990). Structural and functional characterization of the vaccinia virus 14 KDa envelope protein synthesized in Escherichia coli. Department of Biochemistry, SUNY Health Science Center at Brooklyn, NY.

7. Walter E. Demkowicz (1991). Identification and immunologic characterization of two antigenic core proteins of vaccinia virus. Department of Microbiology and Immunology, SUNY Health Science Center at Brooklyn, NY.

8. Rodriguez, J-R (1992). Characterization of attenuated variants of vaccinia virus as safe recombinant vaccines: application as a vaccine against AIDS. Department of Biochemistry, SUNY Health Science Center at Brooklyn, NY. Universidad Autónoma de Madrid. Premio extraordinario.

9. Irvine, Martin (1993). Identification and characterization of mutants of vaccinia virus with increased sensitivity to interferon. Department of Microbiology and Immunology. SUNY, Health Science Center

at Brooklyn, N.Y.

10. Lee, S.B (1994). Structure and function of the interferon-induced double-stranded RNA-dependent protein kinase. Department of Microbiology, SUNY Health Science Center at Brooklyn, N.Y. Premio extraordinario.

11. Melková, Zora (1995). Macrophage antiviral activity: Role of Interferon-gamma and nitric oxide in the inhibition of vaccinia virus growth in macrophages. State University of New York, Health Science Center at Brooklyn, N.Y. USA.

12. Pavón, Miguel (1997). La proteina kinasa humana inducida por interferón y sensible a dsRNA (PKR): caracterización preliminar, proteinas de unión y algunas propiedades nuevas. Centro Nacional de Biotecnologia. Universidad Autónoma de Madrid.

13. Collado, Manuel (1997). Modulación de la respuesta inmunitaria frente a la proteina env del VIH-1, mediante su fusión a antígenos del virus vaccinia. Centro Nacional de Biotecnologia. Universidad Autónoma de Madrid.

14. Vazquez, Isabel (1998). Caracterización de los dominios funcionales de la proteina de 14 kDa del virus vaccinia que juega un papél importante en la interacción virus-célula. Centro Nacional de Biotecnologia y Facultad de Farmacia de la Universidad de Santiago de Compostela.

15. Gonzalo, Rosa (1999). Desarrollo de estrategias de inmunización frente a Leishmania basadas en virus vaccinia recombinantes en el modelo murino. Centro Nacional de Biotecnologia, Universidad Autónoma de Madrid.

16. Moratilla, Marta (1999). Análisis estructurales y funcionales del genoma del virus Molluscum contagiosum. Centro Nacional de Biotecnología. Universidad Autónoma de Madrid.

17. Gil, Jesús (2000). Mecanismo de inducción de apoptosis y activación de NF-kB por la proteina quinasa dependiente de dsRNA, PKR. Centro Nacional de Biotecnología, Universidad Autónoma de Madrid. Premio extraordinario

18. Abaitúa, Fernando (2001). Potenciación de la respuesta inmune frente al antígeno de la envuelta del virus de la inmunodeficiencia humana (VIH-1) por recombinantes atenuados del virus vaccinia que expressan citoquinas I tipo Th1 (FN-gamma e IL-12). Universidad Autónoma de Madrid. Sobresaliente cum laude.

---

19. Juan Carlos Gallego Gómez (2003). Biología celular de la infección y morfogénesis de mutantes atenuados del virus vaccinia. Universidad Autónoma de Madrid. 11 marzo. Sobresaliente cum laude.

20. Carmen E. Gómez (2003). Respuesta inmune generada por sistemas combinados de vacunación frente a péptidos de la envuelta del VIH-1 incluidos en la proteína multiepitópica TAB-13. Universidad Autónoma de Madrid. 17 diciembre. Sobresaliente cum laude

21. Maria Angel García Chaves (2004). Mecanismo de acción y regulación de la proteína quinasa inducida por interferon, PKR. Universidad Autónoma de Madrid. 30 abril de 2004. Sobresaliente cum laude. Premio Extraordinario de la UAM.

22. Soledad Blanco Chapinal (2005). Estrategias de modulación de la respuesta inmune frente a malaria en el modelo murino de Plasmodium yoelii. Universidad Autónoma de Madrid. 16 diciembre de 2005. Sobresaliente Cum Laude.

23. Andrea Vandermeeren (2006). Study of the HCV polyprotein expresión from an inducible vaccinia virus recombinant and its implication in the host-cell responses. Universidad Autónoma de Madrid. 30 de marzo de 2006. Sobresaliente cum laude.

24. Eva Pérez Jiménez (2006). Desarrollo de una vacuna frente a leishmaniasis. Universidad Autónoma de Madrid. 29 mayo. Sobresaliente cum laude.

25. José Luis Nájera (2007). Caracterización "in vitro" e "in vivo" de los vectores atenuados de poxvirus MVA y NYVAC como candidatos vacunales frente al VIH/SIDA. Universidad Autónoma de Madrid. 23 de noviembre. Sobresaliente "cum laude".

26. Elena Domingo Gil (2008). Caracterización de la apoptosis inducida por el sistema 2-5A/RNasa L. Universidad Autónoma de Madrid. 15 febrero. Sobresaliente "cum laude".

27. Lucas Sanchez Sampedro (2012). Mutantes replicativos y atenuados del virus vaccinia como candidatos vacunales frente a leishmaniasis. Universidad Autónoma de Madrid. 19 octubre. Apto "cum laude".

28. Ana Cáceres Núñez (2013). Papel de la fosfatasa celular DUSP-1 en la infección por el virus vaccinia. Universidad Autónoma de Madrid. 19 abril. Apto "cum laude".

29. Aneesh Vijayan (2013). Adjuvant-like effect of vaccinia virus 14K protein: a case study with malaria vaccine based on circumsporozoite protein. Universidad Autónoma de Madrid. 13 junio. Apto

30. Mauro di Pilato (2015). Poxvirus vaccine strategies to improve T cell responses: neutrophil immunomodulation and promoter modification. Universidad Autónoma de Madrid. 3 mayo. Sobresaliente "cum laude".

31. Ernesto Mejías (2017). Vectores virales basados en poxvirus como agentes oncolíticos. Universidad Autónoma de Madrid. 27 enero. Sobresaliente "cum laude"

32. Suresh Chithathur Raman (2018). Enhancing B and T cell immune responses against the HIV-1 envelope using protein and poxvirus-based vaccines. Universidad Autónoma de Madrid. 19 October. Sobresaliente "cum laude"

33. María Quirós Marín (2019). Aumento de la inmunogenicidad de una vacuna contra la hepatitis C (MVA-HCV) basada en el virus vaccinia modificado de Ankara (MVA). Universidad Autónoma de Madrid. 17 mayo. Sobresaliente "cum laude".

34. Patricia Pérez Ramírez (2019). Novel vaccines based on poxvirus vector MVA against human viral diseases HIV/AIDS and Zika. Universidad Autónoma Madrid. June 14. Sobresaliente "cum laude".

35. Adrián Lázaro Frias (2020). Generación de candidatos vacunales basados en el MVA frente a los ebolavirus Zaire y Sudan. Universidad Autónoma de Madrid. 2 octubre. Sobresaliente "cum laude"

EXPERIENCIA DE GESTIÓN DE I+D/ R&D

Título: Centro Nacional de Biotecnología del CSIC.

Tipo de actividad: Director

Fecha: 1992- 2003

Título: Presidente de la Real Academia Nacional de Farmacia (RANF)
Fecha: 2012-2018

Título: Presidente del Instituto de España
Fecha 2017-2018

Título: Presidente de Honor de la Real Academia Nacional de Farmacia (RANF)
Fecha 2020-indefinido

EXPERIENCIA EN ORGANIZACIÓN DE ACTIVIDADES DE I+D/R&D

Título: Fith European Conference on Experimental Aids Research (ECEAR), Presidente.
Tipo de actividad: Congreso, Madrid.
Fecha: 16-19 de Junio, 2000.

Título: XI International Poxvirus and Iridovirus Meeting, Presidente.
Tipo de actividad: Congreso, Toledo.
Fecha: 4-9 de mayo, 1996.

Título: II European Congress in Virology (EUROVIROLOGY-2004), Co-Presidente.
Tipo de actividad: Congreso, Madrid.
Fecha: Septiembre, 2004.

Título: 7the Vaccine Congres and ISV, Co-Chair
Tipo de actividad: Congreso, Sitges, Spain
Fecha: 27-29 October, 2013

EXPERIENCIA ACADÉMICA/ACADEMIC

En España, Facultad de Farmacia, Universidad de Santiago de Compostela. Profesor Ayudante de Prácticas en Microbiología, 1968-1970.

En EE.UU, Rutgers Medical School, Piscataway, New Jersey. Instructor, Department of Microbiology, 1974-1977

En EE.UU (Health Science Center, Brooklyn, New York). Professor, Departments of Biochemistry and of Microbiology and Immunology. 1979-1992

I. Medical School Courses:
   (a) General Biochemistry
   (b) Nine-week selective course in General Biochemistry
   (c) Microbiology and Immunology

2. School of Graduate Studies
   (a) Molecular Genetics, GI l02, 4 credits
   (b) Animal Virology, G l03, 6 credits
   (c) Biochemistry, G l03, 8 credits
   (d) Microbial Genetics, G l02, 6 credits
   (e) Techniques in Molecular Cloning, G-507, 4 credits

Member of President's Advisory Committee on Research Allocation,

1984-1987.
Member of Search Committee for Chairman of Microbiology and Immunology, 1981
Member of Search Committee for Chairman of Anatomy and Cell Biology, 1982-1984
Committee of the Graduate School Faculty, 1980
Co-Director of Molecular Genetics Course 1980-1986
Chairman, Recombinant Biohazards Committee, 1990-1992
Group Leader, AIDS Research, 1990-1993

En España, Universidad Autónoma de Madrid. Profesor Honorario, Departamento de Biología Molecular. Curso Sistema Inmune y Agentes infecciosos. 4 créditos. 1998-2008.
Participación en Masteres de Virología, Universidades Autónoma y Complutense de Madrid (2009-presente)

MIEMBRO DE SOCIEDADES CIENTIFICAS / MEMBERSHIP

- Miembro Honorario de las siguientes Sociedades:
- American Society of Microbiology
- American Society of Virology
- British Society of Microbiology
- Spanish Society of Microbiology
- Harvey Society
- The Society of Sigma Xi
- New York Academy of Sciences
- American Association for the Advancement of Science

PARTICIPACIÓN EN COMITÉS EUROPEOS / EU COMMITTEES

- Member of the European Action Progamme Against AIDS. 1994-present

- Member of the COST /STD Initiative for a European Vaccine Program.
1994-97.

- Member of the European Concerted Action Against Malaria, 1996-98

- Member of External Advisory Group (EAG) of the European Commission, key action 2, Control of Infectious Diseases, Fifth Framework Programme.1998-2002

- Member of WHO Advisory Committee on Variola Virus Reseach, 1998-present

- Member of Strategic Advisory Group of Experts (SAGE) for Immunization, Vaccines and Biologicals, WHO, 2002-2007

- Member of Advisory Group for the Sciende Foundation of Ireland, 2000-2004

- Member of European Science Foundation (ESF) Group for Research Infraestructures on Biomedical Sciences, 2003-2008

- Member of Scientific Advisory Group, Novartis, Spain. 2002-2008

-Founder and Board Member of the European Foundation Against AIDS (EuroVacc) 2002-present

-Member of Scientific Advisory Group, CSIC, 2012-2017

EVALUACION DE TRABAJOS CIENTIFICOS / SCIENTIFIC EVALUATION

1) Revistas científicas: Science; EMBO J.; J. Virol; Virology; J. Gen. Virol.; Arch. Virology; Virus Research; J. Biol. Chem.; J. Interferon and Cytokine Research; ONCOGENE; Molecular Therapy; Vaccine. FEBS Lett. Apoptosis, Front. Immunol, Vaccines, Nature Commun.

2) Proyectos: National Science Foundation (NSF), USA; American Cancer Society, USA; Natural Sciences and Engineering Research Council of Canada (NSERC); Human Frontiers, EU; Austrian Science Fund; National Science Foundation of Ireland; Research Grants Council, Hong Kong; Medical Research Council of South Africa; Israel Science Foundation; Agencia Nacional de Evaluación y Prospectiva (ANEP); Fondo de Investigaciones Sanitarias (FIS); Comunidad Autónoma de Madrid (UAM); Fundación para la Investigación sobre el Sida (FIPSE). Fundación Marcelino Botín; Foundation Bill and Melinda Gates

3) Centros de investigación: Miembro del Comité Externo de Evaluacion de los centros: Centro Nacional de Ingeniería y de Industria Tecnológica (INETI) del Ministerio de Ciencia y Tecnología de Portugal; Instituto de Investigaciones Bioquímicas, Fundación Campomar, Buenos Aires, Argentina (Abril, 2001), Molecular Virology Institut, Munich (2002).

LOGROS CIENTIFICOS / SCIENTIFIC ACHIEVEMENTS:

El objetivo de mi investigación es entender la biología molecular de agentes infecciosos para desarrollar estrategias que permitan su control. Los resultados mas significativos obtenidos en las líneas de investigación del laboratorio con su número de referencia (ref) de publicación en el CV han sido los siguientes:

LINEA: BIOLOGÍA DE LA INFECCIÓN VIRAL. *Estos estudios nos han permitido identificar procesos de entrada del virus en la célula, su transcripción en RNA mensajeros, control de la síntesis de proteínas, procesos de replicación del DNA, y ensamblaje viral.*

-Establecimiento de la entrada del virus vaccinia en células por fusion de membranes (ref. 31, 61, 80)

-Descubrimiento de que la cara basolateral de la célula está implicada en la entrada del virus vaccinia (ref. 85)

-Descubrimiento de la proteína p14 (A27L) del virus vaccinia como mediador de la entrada del virus en la célula por fusión e identificación de los dominios de union y de neutralización (ref. 54, 62, 66, 74, 78, 80, 95, 136, 140)

-Descubrimiento de la proteína p32 (D8L) como mediador de la union del virus vaccinia a la membrana cellular (ref. 79, 84, 91)

-Establecimiento de un sistema libre de células para la traducción de los RNA mensajeros virales (ref. 3,4,7)

-Demostración *in vitro* de la traducción completa del genoma del virus de la encefalomiocarditis (ref. 9)

-Demostración de la regulación diferencial de la síntesis de proteínas por el virus vaccinia y de la existencia de una rápida inhibición traduccional (ref. 2,5, 6)

-Descubrimiento de los mecanismos de replicación (iniciación, elongación y terminación) del DNA del virus vaccinia (ref. 13 a 21, 26, 27, 28)

-Establecimiento de un sistema de purificación del DNA intacto del virus vaccinia (ref. 20)

-Identificación de proteínas de union al DNA del virus vaccinia (ref. 21, 27)

-Primer mapa transcripcional del virus vaccinia (ref. 22, 23)

-Descubrimiento de RNAs virales de bajo peso molecular que actúan como reguladores de la traducción de los RNA mensajeros celulares (ref. 30, 71, 87, 99)

-Identificación de las proteínas del virus vaccinia que inducen protección frente a la infección y son inmunodominantes en individuos vacunados contra viruela (67, 79, 81, 84)

-Primera generación de una vacuna contra viruela basada en proteínas purificadas (88, 90, 172)

-Caracterización de las proteínas que son necesarias para el correcto ensamblaje del virus vaccinia y del reclutamiento de membranes en distintos compartimentos celulares (ref. 107, 113, 120, 124, 129, 130, 143, 161, 166)

-Primera definición por microscopía electrónica y por tomografía de la estructura del virus vaccinia a una resolución de 4-6 nm (199), del proceso de ensamblaje de membranas (240) y del proceso de morfogénesis por crio-Rayos X (244).

-Secuenciación parcial del genoma del poxvirus Molluscum contagiosum, su mapeo e identificación de genes con organización única (115, 118, 123, 174)

-Demostración de que las proteínas A27-A17 de vaccinia participan en el proceso de fusión del virus con la membrana celular y mapeo del dominio de fusión (ref. 229).

LINEA: MECANISMO DE ACCION DE LOS INTERFERONES (IFN). *Estos estudios pioneros nos han permitido demostrar el papel de los interferones como inhibidores de la replicación viral y como reguladores del crecimiento celular*.

.-Descubrimiento de que los interferones (IFN) inhiben la replicación viral a nivél traduccional. Este trabajo (ref. 2) publicado en Nature mereció la distinción en la sección News and Views y fue pionero en el desciframiento de los mecanismos de acción de IFN por inhibición de la síntesis de proteínas (ref. 1-12; 43,47) e interés por el uso del IFN como droga en tratamiento de enfermedades infecciosas y cáncer.

- Descubrimiento de que los virus animales contienen genes que interfieren con la acción de los interferones (ref.44,45,56, 98)

-Descubrimiento de que los interferones inhiben la transformaión genética y oncogénica por genes virales y celulares, así como procesos de recombinación viral (ref.48-52)

-Descubrimiento del modo de acción antiviral de la prostaglandina PGA1 y su relación con los interferones (ref.33,37,39,40,60,73)

-Descubrimiento de la proteina quinasa PKR dependiente de RNA bicatenario e inducida por los interferones como activador del proceso de muerte celular por apoptosis (ref.101), lo que explica la acción antitumoral de IFN. En una serie extensa de trabajos se caracterizó el modo de acción antiviral y anticelular de la PKR y su señalización molecular (ref. 92,93,102,117,122, 125,138,139,144,148-151,160,178,192).

-Identificación de genes virales (en poxvirus, herpesvirus, reovirus) y celulares cuyos productos víricos controlan la acción de la proteína quinasa PKR (ref. 116,156, 169,185,187)

-Descubrimiento de la proteína RNasaL inducida por IFN como inductor de apoptosis (ref.128)

-Identificación de la proteína E3L del virus vaccinia como inhibidor de la apoptosis inducida por el sistema de defensa celular 2-5A sintetasa/RNasa L (ref. 132, 176)

-Demostración del efecto antiviral y apoptótico de la proteína óxido nítrico sintetasa inducida por IFN (ref. 109, 126,154)

-Demostración de un nuevo mecanismo de acción de evasión viral (familia de flavivirus) que eluden a la acción de la proteína quinasa PKR por mediación de una estructura *(hairpin-loop*) en el extremo 5´de la forma subgenómica viral que codifica para las proteínas estructurales (ref. 207)

-Demostración de que la expresión del genoma del virus de la hepatitis C induce apoptosis por activación de las rutas de muerte, proteína quinasa PKR y sistema 2-5 A sintetasa/RNasa L (ref. 202).

-Demostración del papel de la mitocondria en la apoptosis mediada por el el sistema 2-5A sintetasa/RNasa L inducido por los interferones (ref. 211)

-Primera generación de un ratón transgénico que al expresar la proteína E3 del virus vaccinia confiere mayor sensibilidad de los animales a la infección con virus y parásitos, ejerciendo estos efectos por interferencia con el sistema de los interferones y respuesta inmune (ref. 230)

-Demostración de que hay genes supresores de tumores que también actúan como inhibidores de la replicación de los virus (ref. 217, 220, 227,243,262)

-Hemos escrito revisiones extensas sobre el modo de acción de la proteína PKR inducida por los interferones ampliamente citadas (ref. 216, 221)

LINEA: INTERACCION VIRUS-CELULA. *Estos estudios tienen como objetivo definir el impacto que la infección tiene sobre el hospedador, así como identificar los genes celulares y sus productos que se inducen o reprimen durante el proceso de infección viral y que juegan un papél importante en la patogénesis vírica.*

-Demostración del reclutamiento de ribosomas por los RNA mensajeros virales producidos por el virus vaccinia y formación del complejo de iniciación en la traducción (ref. 11)

-Identificación y demostración de la enzima ATPasa-dependiente de DNA en la regulación de la expresión génica viral (ref. 57, 83)

-Establecimiento de un sistema de expresión regulada de genes celulares por la polimerasa del bacteriófago T3 (ref. 82).

-Identificación por microarrays de los genes celulares que se inducen y reprimen durante la infección de células HeLa con el virus vaccinia, estirpes salvajes WR y atenuadas MVA y NYVAC (ref. 183, 192, 208), así como en células dendríticas humanas (ref. 223).

-Identificación de los genes celulares inducidos por la activación del sistema de interferon, 2-5A synthetasa/RNasaL (253)

-Identificación de los genes celulares inducidos en células dendríticas humanas por los candidatos vacunales frente al VIH, los vectores MVA-B (255) y MVA-C (281).

-Descubrimiento del gen humano ATF-3 como necesario para la inducción de apoptosis por activación de la proteína quinasa PKR (ref. 215).

-Demostración de que genes supresores de tumores tienen capacidad antiviral y que este efecto es ejercido, en el caso de ARF, por supresión de la acción de la proteina quinasa PKR (216, 217,220,221,227)

-Identificación del gen celular ISG15 como inhibidor de la replicación del virus vaccinia y demostración del gen viral E3L que al interaccionar con ISG15 modula su capacidad antiviral (237, 298)

-Revisión de las múltiples funciones inmunomoduladoras de ISG-15 (407).

LINEA: PATOGENESIS DE LA INFECCION VIRAL. *Estos estudios tienen como objetivo definir los mecanismos que utilizan los virus animales para provocar la muerte del hospedador*

-Demostración de que el efecto citopático inducido por el virus vaccinia es dependiente de la expresión génica viral (ref. 24,25, 29)

-Demostración de que las drogas antiinflamatorias aumentan la patogenicidad vírica (ref. 60)

-Establecimiento del primer sistema de seguimiento de la infección viral en tejidos animales con el marcador fluorescente luciferasa (ref. 69)

-Establecimiento de una infección vírica persistente, demostración de generación de mutaciones y de su papel en patogénesis (51,63-65,70,77,78)

-Descubrimiento del gen humano Wiskott-Aldrich (WASP) como necesario para la patogénesis del virus vaccinia (ref. 198)

-Identificación del gen de vaccinia C7L como regulador traduccional y de apoptosis (ref. 212)

-Establecimiento de un sistema de imagen *in vivo* para el seguimiento de la infección en tejidos de ratones inoculados con poxvirus virulentos y atenuados (ref. 222)

--Demostración de un gen viral E3L capaz de revertir las defensas del hospedador y producir mayor sensibilidad a infecciones virales y parasitarias en modelo de ratón transgénico (230)

-Demostración de una nueva estrategia por el virus vaccinia para aumentar la migración de neutrófilos por la activación del factor NFkB (317)

LINEA: DESARROLLO DE VACUNAS CONTRA ENFERMEDADES PREVALENTES. *Estos estudios, pioneros en el campo de las vacunas, han permitido desarrollar candidatos vacunales frente a distintos patógenos y a establecer protocolos de inmunización combinada de vectores que inducen una fuerte respuesta inmune celular y protección frente a distintas enfermedades. Estos protocolos se estan aplicando en ensayos clínicos. El objetivo es modular el sistema inmune para provocar un mayor control de patógenos y tumores.*

-Descubrimiento de que la **inmunización combinada** con dos vectores distintos (***prime/boost***) aumenta consideráblemente la respuesta inmune celular de **linfocitos T CD8+** frente a un antígeno, dando lugar a una **alta protección** contra **malaria** que expresa dicho antígeno (ref. 103)

-Establecimiento del **ensayo ELISPOT** para cuantificar a los linfocitos CD8+ que son específicamente activados en procesos de vacunación (ref. 105).

-Establecimiento de **protocolos de inmunización combinada** que inducen protección **frente a malaria** y caracterización de la respuesta inmune humoral y celular (ref. 103, 112,131,147,158,189)

-Establecimiento de protocolos de inmunización combinada que inducen protección frente a leishmaniasis y caracterización de la respuesta inmune (ref. 94, 159, 176, 180, 183, 286)

-Desarrollo de una **vacuna contra leishmania infantum** (ref. 203, 209, 234; **Patente** solicitud de invención **Nº 200501886**)

-Demostración del incremento de células memoria y protección frente a leishmaniasis por activación intradermal de células NFKTi en inmunización conjunta de vectores virales y adyuvantes (234)

-Establecimiento de protocolos de inmunización combinada que inducen una fuerte respuesta celular sistémica y de mucosas específica frente a antígenos del VIH-1 con valor prognóstico en protección contra el Sida (ref. 133,142,182,194)

-Demostración del papel de las citoquinas IL-12, IL-18, GM-CSF e IFN-γ en la respuesta inmune frente a distintos antígenos y su efecto en protección contra patógenos (ref. 135,141,154,180, 186,191)

-Generación de **candidatos vacunales** con potencial clínico frente al **sida, malaria y leishmania** (ref 51,75,86,146,151,171,183,189)

-Desarrollo de dos **vacunas contra el VIH/SIDA** basadas en MVA frente a los **subtipos B y C** (MVA-B y MVA-C), que representan el 80% de los casos de SIDA en el mundo (**Patent US 8,871,219 B2**, 28/10/2014; ref. 218, 219**)**

-Demostración en ensayos preclínicos en monos, que los vectores MVA y NYVAC inducen distinto tipo de respuestas celulares frente a antígenos del VIH/SIV y confieren una alta protección frente al virus patógeno SHIV89.6p (ref. 232).

-Demostración en monos de que se pueden administrar los vectores MVA y NYVAC por via respiratoria y conseguir niveles semejantes de activación de la respuesta inmune que por inyección intramuscular de los mismos vectores. Esta aplicación respiratoria facilita vacunar frente al VIH a una gran población en paises pobres (ref. 231).

-Demostración en **ensayo clínico profiláctico de fase I** que el protocolo con los candidatos vacunales DNA/NYVAC induce una alta inmunogenicidad (mas del 90% de los vacunados) frente a los antígenos del VIH, manteniéndose esta respuesta inmune durante más de un año con activación polifuncional de la población de células T CD4 y CD8+ (ref. 233, 236).

-Demostración que el candidato vacunal MVA-B frente al VIH en células dendríticas humanas activa la expresión de genes inmunomoduladores con actividad polifuncional (255, 268).

-Demostración en ensayo clínico en fase I con el candidato vacunal MVA-B administrado en tres dosis a individuos sanos, que esta vacuna induce una potente respuesta inmune frente al VIH en la mayor parte de los voluntarios, siendo polifuncional y duradera (269, 270).

-Optimización de **candidatos vacunales frente al VIH basados en NYVAC** (266, 276, 283) y **MVA** (256, 259, 271, 280, 281) con mayor capacidad para activar respuestas inmunes de amplio rango y duraderas contra el VIH.

-Desarrollo de protocolos de inmunización con mayor capacidad para activar células dendríticas (241, 260, 264).

-Desarrollo de un **candidato vacuna**l frente a **cáncer de próstata** (263) y uso de **vectores** de deleción del virus vaccinia (WR-delta4) como agentes **oncolíticos** (345).

-Desarrollo de un **candidato vacunal (MVA-Flu)** frente al virus de la **gripe** (275).

-Desarrollo de un **candidato vacunal (MVA-CS) frente a malaria** con inducción de esterilidad (284; **patente** solicitud **P201131854**).

-Identificación del gen C6L del virus vaccinia como inhibidor del interferon beta y su aplicación en vacunas (271; solicitud de **patente P201131230).**

-Desarrollo de un **candidato vacunal (MVA-HCV)** frente al **virus de la hepatitis C** (295, 357, 370): patente solicitud **P201330467**

-Desarrollo de un **candidato vacunal (MVA-CHIKV)** efectivo frente al **virus Chikungunya**: **patente** solicitud **PCT/EP2014/076310**, 2 Dic 2014 (303, 309, 310, 320, 333, 337).

-Demostración de que la combinación en ***prime/boost*** **de vectores basados en replicones de alfavirus** y en el vector de **poxvirus MVA** induce una mayor respuesta inmune y protección frente a patógenos que cuando dichos vectores se administran de forma homóloga (333, 337, 350, 357).

-Demostración de que la **combinación heteróloga de vacunas basadas en mRNA y MVA** inducen una mayor respuesta inmune que la combinación homóloga (382)

-Identificado un nuevo mecanismo de activación celular de la respuesta immune por poxvirus (317, 321).

-Modificación de promotores del virus vaccinia con mayor capacidad para expresar antígenos heterólogos e incrementar su respuesta inmune (299, 322)

-Generado un **prototipo vacunal frente al VIH basado en el vector NYVAC** que expresa la protein Gp140 en forma trimérica y Gag como VLPs junto con Pol-Nef del subtipo C del VIH y demonstración de su capacidad inmunogénica en modelos de ratón y de monos (314, 324, 368).

-Demostración en **ensayo clínico terapéutico en fase I** con el candidato vacunal MVA-B administrado en tres dosis a individuos infectados por **VIH** y en terapia antirretroviral (cART), de que la vacunación induce activación de células T CD4+ específicas y reduce de forma transitoria la viremia después de la retirada de cART (315, 326).

–Demonstración de **marcadores inmunes**, celulares y humorales, que se **correlacionan con protección frente al VIH en modelo de macacos** tratados con la vacuna basada en vector NYVAC-KC replicativo (336, 353, 354).

-Demostración en un **ensayo clínico fase 1b** multivalente de que la administración de **candidatos vacunales basados en proteína, DNA y NYVAC** inducen respuestas inmunes amplias **frente al VIH** (363).

-Desarrollo de **candidatos vacunales frente al virus de ebola (MVA-EBOV)** que inducen con una sola dosis 80% de protección (348).

-Desarrollo de **un candidato vacunal (MVA-Zika)** con alta protección (100%) frente al **virus Zika** (355).

-Desarrollo de un **candidato vacunal (MVA-CoV2-S)** frente a **SARS-CoV-2/COVID-19** que en modelo de ratón protege completamente (100%) frente a la morbilidad y mortalidad provocada por la infección del coronavirus SARS-CoV-2 y que esta protección se corrrelaciona con inducción de altos niveles de anticuerpos neutralizantes y de activación de linfocitos T CD4+ y CD8**+. Patente** solicitud **EP20382558.3**. 23-06-2020 (375, 384, 385).

-Demostración de que **la vacuna MVA-CoV2-S** produce una alta producción de anticuerpos neutralizantes y protección frente al SARS-CoV-2 en modelos animales de **hamsteres y macacos** (387, 388).

-Demostración de la eficacia de la **vacuna optimizada** MVA-S(3P) frente a las distintas **variantes del SARS-CoV-2. Patente** solicitud (23/06/2022**). EP 4108257** (385, 400, 405).

-Demostración de que una sóla dosis de la vacuna MVA-CoV2-S administrada por ruta intranasal previene complétamente frente a la infección por SARS-CoV2 (391).

-Demostración de que la **vacuna MVA-CoV2-S protege completamente frente al daño cerebral** del coronavirus (349).

-Demostración de la capacidad de **anticuerpos biespecíficos** para el control de la infección por SARS-CoV-2 (401).

-Demostración de la **durabilidad de las respuestas inmunes B y T** mediante la inmunización de la proteína Env estabilizada del VIH dirigida a la membrana celular (403).

Demostración de la **modulación de las respuestas inmunes B y T** por distintas nanopartículas de mRNA frente al SARS-CoV-2 y **combinación eficaz de mRNA/MVA como proceso vacunal contra el coronavirus** (408, 410).

-Publicado extensos artículos de revisión sobre la evolución de las vacunas de poxvirus y de vectores atenuados frente a distintos patógenos (318, 399)

Resumen de Investigación del grupo POXVIRUS Y VACUNAS

Los objetivos fundamentales de nuestro laboratorio van dirigidos a comprender las bases moleculares en la patogenia de agentes infecciosos y su relación con el huesped, así como utilizar estos conocimientos para desarrollar vacunas que puedan ser efectivas en el control de enfermedades prevalentes con gran impacto en la población y con potencial epidémico/pandémico. Como sistema modelo de agente infeccioso y como vector de expresión, utilizamos el virus vaccinia que pertenece a la familia de los poxvirus. Las líneas de investigación son:

1. *Mecanismo de ensamblaje del virus vaccinia.*

El ensamblaje del virus vaccinia, y en general de los poxvirus, es un proceso complejo en el que intervienen mas de 100 proteínas y cuyo estudio puede aportar conocimientos relevantes en biología. Nuestros trabajos van dirigidos a conocer a nivel molecular y celular cómo se forman las membranas y los cores virales para dar lugar a partículas infectivas. Utilizando mutantes condicionales para determinados genes virales y su estudio ultraestructural por microscopia electrónica de células infectadas, llevado a cabo en colaboración con los Drs C. Risco y J.L Carrascosa (CNB), hemos demostrado el papél que distintas proteínas del core (A4L, A10L) y de la membrana (A14L, A17L, A27L) viral ejercen en los procesos morfogenéticos. El objetivo a largo plazo es identificar todos los estadíos de morfogénesis, el papél de las proteínas de membrana en ensamblaje, su modo de interacción y definir por técnicas de alta resolución por Crio-tomografía de rayos X la organización estructural del virion y proteínas asociadas.

2. *Mecanismos de acción antiviral y antitumoral de los interferones*

Durante años, nuestro grupo viene trabajando sobre el mecanismo de acción de los interferones (IFN), debido al papel tan importante que este tipo de moléculas biológicas juegan como primera línea de defensa del organismo frente a infecciones, como inhibidores del crecimiento celular con efecto antitumoral y como reguladores del sistema inmune. Hemos estudiado, en sistemas inducibles, el papel que enzimas inducidas por IFN pueden tener como antivirales y antitumorales: proteinas 2-5A sintetasa/RNasa L, óxido nítrico sintetasa (iNOS) y proteina quinasa p68 (PKR). Nuestros estudios futuros van dirigidos a conocer en profundidad la señalización de PKR, las proteínas con las que interacciona formando un complejo, su papel en la regulación de la síntesis de proteínas, así como los genes celulares que son activados, aplicando las tecnologías de genómica, proteómica y modelos celulares y animales. También estamos estudiando el papel de varios genes virales (E3L de VV, MC159L de molluscum contagiosum, sigma 2 de reovirus aviar, LANA3 de herpesvirus 8 y E2-NS5A de HCV), así como celulares (PACT, p67, NF90, ISG15) como reguladores del proceso antiviral y de apoptosis inducido por IFN. Esta investigación puede beneficiar la aplicación clínica del IFN en terapia antiviral y antitumoral

3. *Interacción virus-célula*

Por microarrays de DNA hemos identificando genes celulares inducidos en respuesta a la infección por el virus vaccinia (estirpe salvaje y mutantes) y por acción de estímulos apoptóticos. Nuestro objetivo es identificar por tecnología RNA-seq, exoma completo, genes celulares importantes en el proceso infectivo y apoptótico y desarrollar modelos celulares y animales para su estudio funcional. Estos estudios ayudarán a entender los mecanismos de patogénesis viral y cómo el huésped responde a la infección. Hemos descubierto la proteína celular WASP como responsable de la transmisión del virus en animales y la proteina ISG15 como inhibidor de la replicación viral e immunoregulador.

4. *Desarrollo de vacunas contra enfermedades prevalentes*.

Nuestro laboratorio está desarrollando estrategias de inmunización contra VIH, hepatitis C, chikungunya, malaria, leishmania, ebola, zika, SARS-CoV-2 y cáncer de próstata basadas en la utilización de recombinantes del virus vaccinia, estirpes MVA y NYVAC, sólos o en combinación con otros inmunógenos como proteínas+adyuvante, mRNA, replicones, DNA y vectores virales heterólogos. Nuestro grupo ha sido pionero en el establecimiento de protocolos de inmunización combinada de vectores que inducen una fuerte respuesta inmune y protección frente a patógenos en modelo murino de malaria *(Plasmodium yoelii*) y leishmania (*L. major y L. infantum*). Estos estudios han permitido definir parámetros básicos para conseguir la inducción primaria de linfocitos T CD8+ y las condiciones para generar una fuerte respuesta secundaria, lo que puede tener interés para el desarrollo de estrategias profilácticas y terapéuticas para prevenir enfermedades infecciosas y tumorales. Con el fin de modular la respuesta inmune frente a antígenos de interés, estamos evaluando el efecto sobre dicha respuesta (sistémica y de mucosas) de la coexpresión de diversas citoquinas (IL-12, IFN-γ, GM-CSF, IL-18, IL-15), de adyuvantes como mega CD40L y ligandos de muerte celular como PD-L1. Hemos llevado a cabo ensayos de inmunogenicidad y protecciónen en distintos modelos animales, que han demostrado su eficacia. El objetivo final es conseguir candidatos vacunales eficaces frente a patógenos emergentes y re-emergentes con potencial epidémico/pandémico y antitumoral.

a) **Desarrollo de una vacuna frente al VIH/SIDA**

Llevamos muchos años trabajando en el desarrollo de una vacuna frente al VIH utilizando distintas aproximaciones, que incluyen vectores de poxvirus MVA y NYVAC, ácido nucleico DNA, proteína Env recombinante y mas recientemente nanopartículas con mRNA. Hemos demostrado que la combinación de vectores de DNA y de poxvirus (NYVAC) inducen una alta respuesta inmune frente al VIH con activación de células T CD4+ y CD8+ en ratones, macacos y humanos. En 2009 iniciamos en España el primer ensayo clínico en fase I con la vacuna MVA-B expresando cuatro antígenos Env-Gag-Pol-Nef generada por el grupo en el CNB con resultados muy positivos de inmunogenicidad y en 2012 iniciamos otro ensayo clínico fase I con individuos VIH positivos, con resultados prometedores. Se ha completado tambien en el Reino Unido otro ensayo clínico profiláctico fase I con la combinación de DNA/MVA-C y proteína Env con resultados de incremento de la inmunogenicidad. El vector MVA-C para el subtipo C del VIH también expresando cuatro antígenos del VIH fue desarrollado en el CNB. Como parte de proyectos de colaboración con la Fundación Bill y Melinda Gates, así como junto con consorcios europeos financiados en el programa H2020, llevaremos a cabo varios ensayos en ratones, macacos para determinar el protocolo óptimo de inmunización con capacidad para producir anticuerpos neutralizantes de amplio espectro de acción y su eficacia frente al VIH, así como un análisis profundo de los mecanismos moleculares, celulares e inmunes importantes en el control de la infección. En un ensayo clínico fase Ib hemos demostrado la importancia de la administración simultánea de inmunógenos de NYVAC, DNA y proteína Env en el grado de inmunogenicidad y durabilidad. Estamos mejorando la capacidad inmune de los vectores de poxvirus por modificación genética mediante deleciones específicas en genes que bloquean la respuesta inmune del hospedador para futuros ensayos clínicos, así como la combinación de inmunógenos con el objetivo de poder controlar la infección y eliminar los reservorios del VIH en el organismo.

b). *Desarrollo de vacunas contra hepatitis C, chikungunya, Ebola, SARS-CoV-2, mpox y cáncer de próstata.*

En el caso de **hepatitis C** (HCV), nuestro objetivo es desarrollar una vacuna basada en un procedimiento de inmunización combinada de vectores ("prime/boost"), que expresan la poliproteina del virus de la hepatitis C (VHC). Hemos conseguido un virus recombinante de vaccinia, estirpe MVA, que expresa todas las proteínas del VHC-1a de forma estable y que induce respuestas inmunes amplias frente a HCV en modelos animales. Estamos optimizando el vector MVA por deleción de genes inmunomoduladores y en combinanción con otros vectores de DNA y mRNA para conseguir una mayor potenciación de la respuesta inmune humoral y celular. El objetivo es trasladar esta investigación a la clínica.

En relación a **chikungunya**, hemos generado un vector de MVA-CHIKV que expresa todas las proteínas estructurales del virus chikungunya y demostrado su capacidad protectiva esterilizante en modelo murino. Estos estudios se han extendido al modelo de macaco con resultados semejantes al modelo murino y queremos entender los mecanismos moleculares e inmunes de protección, y llevar esta vacuna a fases clínicas. Colaboramos con el grupo de Peter Liljeström en el Instituto Karolinska de Suecia en la combinación de replicones y MVA.

En relación al virus **Ebola,** hemos generado un vector de MVA-EBOV que expresa los antígenos GP y VP40 del virus Ebola, que en modelo de ratón protege con una sola dosis en un 80% frente a la infección por la estirpe Zaire. Estamos caracterizando la naturaleza de las respuestas inmunes que se activan y son esenciales para el control de la infección por el virus ébola. Colaboramos con el grupo de Cesar Muñoz-Fontela en Hamburgo que dispone de un animalario BSL-4. El objetivo es establecer un proceso óptimo de vacunación que confiera inmunidad duradera.

En relación al virus de la **viruela símica (mpox)** causante de la epidemia vírica por el clado IIb que afectó a España en el año 2022 y se extendió a muchos países, así como mpox del clado Ib en 2024 surgido en África, lo que produjo la consideración de la Organización Mundial de la Salud (OMS) a declarar la Emergencia de Salud Pública de Importancia Internacional (ESPII) en agosto de 2024, estamos trabajando como parte del proyecto europeo H2020-RESILIENCE en la optimización de vacunas con vectores de MVA y NYVAC, mRNA y proteínas con mayor capacidad inmunogénica y durabilidad que las vacunas actuales frente a viruela humana y símica.

En relación al **SARS-CoV-2**, con la reciente pandemia del coronavirus, hemos desarrollado un candidato vacunal MVA-CoV2-S que expresa la proteína S completa y demostrando en modelo de ratón transgénico permisible a la infección, que la vacunación protege al 100% de la infección por el coronavirus y que esta protección se correlaciona con la producción de altos niveles de anticuerpos neutralizantes y de activación de linfocitos T CD4+ y CD8+. Estos ensayos se han extendido a hamsteres y macacos para establecer los criterios de inmunogenicidad y eficacia de la vacuna. También hemos demostrado que la vacuna MVA-CoV2-S es eficaz frente a las distintas variantes del SARS-CoV-2 y que una sóla dosis administrada por ruta intranasal protege complétamente frente a la infección por el coronavirus y al daño cerebral. La vacuna ha sido optimizada con expresión de la forma estabilizada de la proteína S (MVA-CoV2-S(3P) producida en condiciones GMP por la empresa española Biofabri y transferida por el CSIC a la OMS a través de Medicines Patent Pool para su uso por los países más necesitados. Como parte del proyecto europeo H2020-SOLVE iniciado en 2024 llevaremos a cabo un ensayo clínico fase I, cuyo objetivo es entender los mecanismos celulares, moleculares e inmunológicos del comportamiento de nuestra vacuna optimizada MVA-S(3P) en comparación con otras vacunas usadas en la pandemia basadas en nanopartículas de mRNA y proteína S contra el SARS-CoV-2.

En cuanto al proyecto de **vacunas contra cancer,** hemos clonado en MVA varios genes tumorales que se expresan selectivamente en tumores prostáticos. Disponemos de modelos de ratón que producen tumores de próstata y que son de utilidad para establecer procedimientos de inmunización que generen protección frente a la aparición de tumores en dichos animales. Se han obtenido resultados de reducción de tumores prostáticos así como de melanoma mediante vacunación con nuestros vectores. Para mejorar la eficacia antitumoral estamos desarrollando nuevos vectores de poxvirus con capacidad oncolítica mediante deleción selectiva de genes virales y por inserción en su genoma de genes inmunomoduladores, así como genes de ligandos de muerte programada. Mediante la combinación de la capacidad oncolítica e inmunogénica de vectores de poxvirus, el objetivo es conseguir una amplia activación de linfocitos T CD8+ específicos con alta eficacia para el control tumoral.

Research objectives:

The main objectives of our laboratory are geared to understand the molecular basis in the pathogenesis of infectious agents and their interaction with the host, as well as to use this knowledge in the development of vaccines that might be effective against prevalent diseases like HIV/AIDS, hepatitis C, Ebola, zika, chikungunya, SARS-CoV-2, mpox, malaria, leishmania and cancer. As a model system of infectious agent and as a delivery vector for expression of genes of interest, we used vaccinia virus (VACV) and the attenuated strains MVA and NYVAC as members of the Orthopoxvirus genus. The research areas of our lab are.

1. *Vaccinia virus (VACV) assembly*.
VACV assembly is a complex process in which more than 100 proteins participate, and by studying this process we might also provide important insights in cell biology. Our objectives are to understand, at the molecular and cellular levels, how viral membranes and cores are formed, and what are the viral proteins involved in these events that lead to virion assembly.

2. *Mechanism of antiviral and anticellular action of interferons.*
For years, our laboratory has been investigating the mechanism of action of interferons (IFN), since these molecules play major roles as a first-line of host defense against viral infections, tumor cell growth and regulation of the immune system. We have provided important insights into the mechanism of antiviral and apoptosis action by the IFN-induced ds-RNA dependent protein kinase (PKR), and we have identified the inhibitory effects exerted over PKR by a number of viral genes. The role of these proteins in defense, particularly on innate immune responses is being investigated.

3. *Virus-host cell interactions*
How poxviruses alter host cell responses following virus infection is a poorly characterized process. Our objective is to know the impact of vaccinia virus in host cell gene expression profiling in order to identify cellular genes relevant for VACV replication as well as for host cell defense, and to develop cell culture and animal models for functional gene studies. To this aim, we used microarrays and RNA-seq to identify cellular genes specifically induced in the course of virus infection using virulent and attenuated VACV strains with potential as human vaccines. A number of host genes have been identified and their role in virus pathogenesis is being investigated using animal model systems. The impact of virus infection over organoids is also been sought.

5. *Developmen of vaccines against prevalent diseases*.
Our laboratory has been developing immunization strategies against human pathogens based on the use of attenuated strains of VACV. We have pioneered the development of protocols based on heterologous immunization approaches (prime/boost) with vectors that induced enhanced cellular immune responses, leading to protection in murine models against malaria (*Plasmodium yoelii*), leishmania (*L. major and L. infantum*) and of virus infections (chikunugunya, zika, Ebola, SARS-CoV-2). These studies have defined immunological parameters to expand B and CD8+ T cells during primary and secondary immunizations, with significance in the development of prophylactic and therapeutic strategies against infectious agents and tumor diseases. We have engineered potential vaccines against HIV/AIDS based on VACV attenuated strains NYVAC and MVA and phase I clinical studies, prophylactic and therapeutic have been completed. Novel vaccines with enhanced and durable immunogenicity against HIV are being developed in our lab for testing in animal models, as well as we are producing new vaccines against hepatitis C, chikungunya, ebola, zika, SARS-CoV-2, mpox, and cancer.

Scientific, technological and socioeconomic impact

In spite of the spectacular scientific advances provided by the new technologies, genomics, proteomics and bioinformatics, and the elucidation of the human genome, the genomes of other species and of many microorganisms, we find ourselves in the the XXI century with major diseases for which there is no cure, like HIV/AIDS (0.7 million (M) deaths in 2022 and 38M infections), malaria (229 M infections and 0.5M deaths/year mostly childrem), tuberculosis (1.4 M deaths/year), hepatitis C (71 M infections), coronavirus SARS-CoV-2 (704 M infections and 7 M deaths), leishmaniasis (12 M infections), and cancer (9.6 M, the second leading cause of

human deaths). WHO considers a priority to develop prophylactic and therapeutic vaccines against these different deathly diseases and of those emerging and reemerging pathogens with epidemic/pandemic potential.

Our group at the CNB has developed two prototype vaccines against HIV/AIDS based on subtypes B (MVA-B) and C (MVA-C) that account for nearly 80% of all HIV infections wordlwide (patent PCT/ES2006/070114). In preclinical studies in mice and in macaques the prototype vaccines expressing four HIV antigens (Env/Gag-Pol-Nef) have fulfilled the expected characteristics of a potential good vaccine, ie, high immunogenicity, elicit in monkeys protection after challenge with pathogenic simian immunodeficiency virus, the vaccines can be safely delivered by aerosol which facilitates their easy administration specially in poor countries, and when given to human healthy volunteers triggered HIV-specific T-cell immune responses in over 90% of volunteers, being the immune response polyfunctional and durable. With the vaccine prototype MVA-B, we have performed in Spain two phase I clinical trials in healthy and in HIV-infected individuals, that has received wide attention by the media. Both trials showed good immunogenicity for HIV angtigen-specific CD4+ and CD8+ T cells. We are improving the poxvirus vectors and combination of immunogens to obtain stronger immune responses, broader humoral and celular, with wider specificities.

We have also generated potential vaccines based on the poxvirus strain MVA against, leishmaniasis (patent PCT/ES2006/070122), malaria, hepatitis C (patent PCT/ES2014/070246**),** chikungunya (patent PCT/EP2014/076310), ebola, zika, coronavirus SARS-CoV-2 (EP20382558.3) and prostate cáncer. The efficacy of these vaccines in animal models was 80-100% against ebola, chikungunya, zika and SARS-CoV-2.
A phase I clinical trial for our optimized MVA-CoV2-S(3P) vaccine in comparison to other approved COVID-19 vaccines is being planned for 2025 as part of the EU-Horizon2020 SOLVE funded project.

Our current studies are focused in the development of optimized vaccines against emerging and reemerging human pathogens, to establish best-in class protocols of immunization leading to long-term immune responses with high efficacy, understanding the role of immune cells, define correlates of protection and of potential assays of these vaccines in clinical trials.

GRUPO DE INVESTIGACIÓN / RESEARCH GROUP 2025

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Mariano Esteban, es Profesor de Investigación vinculado Ad Honorem del Centro Nacional de Biotecnología (CNB) del CSIC y Jéfe del grupo de Poxvirus y Vacunas del CNB. Es natural e hijo predilecto de Villalón de Campos (Valladolid), se licenció en Farmacia (1967) y en Ciencias Biológicas (1972), obteniendo el título de Doctor en 1970 en la especialidad de Microbiología por la Facultad de Farmacia, Universidad de Santiago de Compostela.

Entre 1970-74 trabajó como postdoctoral en el Centro Nacional de Investigaciones Médicas de Londres (MRC) sobre mecanismo de acción de los interferones y control de la síntesis de proteínas, siendo contratado posteriormente, 1974-77, como Instructor en el Departamento de Microbiología de la Facultad de Medicina de la Universidad de Rutgers en Nueva Jersey, Estados Unidos de América, sobre replicación del DNA del virus vaccinia. Tras una breve estancia en 1978 en el Centro de Biología Molecular de Gante en Bélgica sobre secuenciación de genomas virales, le fue concedida en 1979 una plaza de Profesor Titular (Assistant Professor) en el Departamento de Bioquímica de la Facultad de Medicina en la Universidad del Estado de Nueva York (SUNY), pasando luego a ser nombrado en 1982 Profesor Asociado (Associate Professor) con nivel funcionario y en 1985 Catedrático (full Professor) del Departamento de Bioquímica de la mencionada Facultad de Medicina de SUNY, donde trabajó sobre el modo de acción de los interferones y vacunas.

En 1987 fue nombrado Profesor de Investigación del Consejo Superior de Investigaciones Científicas. En 1992, tras una estancia de 22 años en el extranjero, regresa a España para dirigir el nuevo Centro Nacional de Biotecnología (CNB) del CSIC, cargo que ocupó durante más unos 12 años (1992-2003). En un período corto reclutó excelentes líderes científicos y el Centro adquirió credibilidad internacional como lugar de excelencia en investigación biotecnológica en las áreas de salud humana y animal, agricultura y medio ambiente. Además, el CNB fue un polo de atracción de empresas estableciendo modelos de colaboración con compañías nacionales e internacionales. El CNB ha sido evaluado varias veces por Comités Científicos Internacionales que lo consideran como "centro de excelencia en biotecnología", siendo acreditado como Centro de Excelencia Severo Ochoa.

El interés de las investigaciones de Mariano Esteban se ha centrado en el conocimiento de la biología molecular de agentes patógenos como los virus, para de esta forma desarrollar procedimientos que permitan el control de enfermedades infecciosas. Sus descubrimientos sobre la biología del virus vacunal, que fue utilizado como vacuna para erradicar la viruela, le ha servido para generar nuevas vacunas basadas en vectores poxvirales (MVA y NYVAC) contra enfermedades prevalentes como el sida, hepatitis C, chikungunya, ébola, zika, malaria y leishmania, habiendo sido pionero en el campo de las vacunas al desarrollar procedimientos de inmunización combinada heteróloga de vectores (*prime/boost*) que incrementan la respuesta inmune celular y confieren protección frente a distintos patógenos. Estos protocolos de vacunación están siendo experimentados en ensayos clínicos de fases I/II contra patógenos y cáncer. Su grupo está participando en el programa EuroVacc y de la Fundación Bill y Melinda Gates para el desarrollo de una vacuna contra el SIDA habiendo generado dos vacunas contra el VIH, subtipos B y C, que han sido analizadas en ensayos clinicos en fase I/II en España y Reino Unido con buenos resultados inmunológicos y otros prototipos vacunales con la estirpe NYVAC que se han ensayado en fase 1b en Europa y EE.UU. Con algunas vacunas frente a virus emergentes (ébola, chikungunya y zika) su grupo ha demostrado en modelos animales una alta eficacia (80-100%) de protección frente a la infección por dichos agentes virales, y de un 70% frente a leishmania y malaria.

Mariano Esteban ha sido pionero en España al desarrollar en 2020 durante la pandemia de SARS-CoV-2/COVID-19 una vacuna MVA-S con 100% de protección en tres modelos animales (ratón, hámster y macaco), con amplio espectro de acción contra SARS-CoV-2 y sus variantes, con protección completa frente al daño cerebral, y que esta protección se correlaciona con la producción de altos niveles de anticuerpos neutralizantes y de activación de linfocitos T CD4+ y CD8+. La vacuna ha sido optimizada y producida en condiciones GMP

por la empresa española Biofabri para ensayos clínicos. Mediante un convenio del CSIC con la OMS y su agencia Medicines Patent Pool, la vacuna ha sido donada a la OMS para su uso por los países más necesitados. El modo de acción de dicha vacuna en comparación con otras tres vacunas forma parte de un ensayo clínico europeo H2020-SOLVE.

Otra área de las investigaciones de Mariano Esteban ha sido el entendimiento del modo de acción de los interferones. Sus contribuciones científicas en este campo han sido pioneras, al demostrar que los interferones actúan frente a los virus inhibiendo la iniciación de la síntesis de proteínas. Además, ha demostrado el papel que varios de los genes inducidos por los interferones, como la proteína quinasa PKR y el sistema 2-5A sintetasa/RNasa L, tienen como reguladores de la muerte celular programada (apoptosis). Estas contribuciones han potenciando el interés clínico de estos fármacos como agentes antivirales y antitumorales.

Las contribuciones científicas representan 406 trabajos publicados en revistas internacionales de impacto, 13 patentes, 35 tesis doctorales y más de 390 comunicaciones en congresos nacionales e internacionales. Según Google Scholar sus publicaciones se han citado 26.956 veces con un índice h (Hirsch Factor) de 91 y de 346 (índice i10).

Sus investigaciones en Estados Unidos de América fueron financiadas por los Institutos Nacionales de Salud (NIH) y la Fundación Nacional de las Ciencias (NSF). Desde su regreso a España, sus investigaciones están siendo financiadas por la Unión Europea, NIH, el Plan Nacional de Investigación y Desarrollo, Fondo de Investigación Sanitaria, Comunidad Autónoma de Madrid, Fundación para la Investigación sobre el Sida (FIPSE), Red de Sida, Instituto de Salud Carlos III, Fundación Botín, Fundación Bill y Melinda Gates, Fundación La Caixa y empresas.

En su laboratorio se han formado estudiantes de varias nacionalidades, pre y postdoctorales, y cuenta actualmente con 19 investigadores. Participa en actividades académicas de Master con la Universidad Autónoma de Madrid (UAM) y con la Universidad Complutense.

Mariano Esteban ha sido y es miembro de prestigiosas sociedades internacionales (American Society of Microbiology; American Society of Virology; British Society of Microbiology; Spanish Society of Microbiology; Harvey Society; The Society of Sigma Xi; New York Academy of Sciences; American Association for the Advancement of Science). Miembro Editorial, y evaluador de artículos de revistas prestigiosas y de proyectos nacionales e internacionales. Ha participado en varios Comites Europeos (Member of the European Action Programme Against AIDS. 1994-1997; Member of the COST /STD Initiative for a European Vaccine Program,1994-97; Member of the European Concerted Action Against Malaria, 1996-98; Member of External Advisory Group (EAG) of the European Commission, key action 2, Control of Infectious Diseases, Fifth Framework Programme (1998-2002). Member of WHO Advisory Committee on Variola Virus Reseach, 1998-actual. Member of Strategic Advisory Group of Experts (SAGE) for Vaccines and Biologicals, WHO, 2003-2007. Member of Advisory Group for the Science Foundation of Ireland, 2000. Member of European Science Foundation (ESF) Group for Research Infraestructures on Biomedical Sciences, 2003, y nacionales (ANEP; Grandes Instalaciones Científicas, 2003-2013). Entre 2013-2017 ha sido miembro del Comité Científico Asesor del CSIC y entre 2020-2021 fue miembro del Grupo de Trabajo Multidisciplinar (GTM) que asesoró al Ministerio de Ciencia e Innovación en los temas de SARS-CoV-2/COVID-19 preparando más de 30 informes sobre distintos aspectos de la pandemia.

Ha impartido un gran número de conferencias en varios países, organizado cursos, workshops. Ha organizado congresos internacionales: presidente del XI International Poxvirus and Iridovirus Meeting, Toledo,1996; presidente, Fifth European Conference on Experimental AIDS Research (ECEAR-2000), Madrid, Co-Presidente II European Virology Congress (EuroVirology-2004) en Madrid y Co-Chair del 7th Vaccine & ISV Congress-2013 in Sitges, Spain.

Ha sido socio fundador y presidente (1991-1992) de la primera asociación de profesionales españoles en el extranjero, Asociación de Licenciados y Doctores Españoles en Estados Unidos (ALDEEU), habiendo recibido en 2012 el máximo galardón, medallón de oro ALDEEU. Es fundador y miembro de la Fundación Europea contra el Sida (EuroVacc). En 2006 fue nombrado Académico de Número de la Real Academia

Nacional de Farmacia (RANF) de España, posteriormente presidente (2013-2019) y desde 2022 es Presidenbte de Honor de dicha academia. En octubre de 2017 fue nombrado presidente del Instituto de España, institución que integra a las diez Reales Academias. Es también miembro correspondiente de la Real Academia de Farmacia de Galicia y de la Académie Nationale de Pharmacie de Francia.

Ha obtenido varias distinciones científicas, entre ellas, el premio del Consejo de Salud de Nueva York, premio de la Universidad del Estado de Nueva York, premio Farmacéutico del Año. Premio IBERDROLA de Ciencia para Profesores visitantes. Premio de la Sociedad Española de Virología, Premio Medalla de Oro Carracido de la Real Academia Nacional de Farmacia. En 2016 fue elegido miembro de la Selección Española de Ciencia en reconocimiento a los mejores científicos del año por la revista QUO. En 2020 recibió la Medalla al Mérito en la Investigación y en la Educación Universitaria otorgada por el Ministerio de Ciencia e Innovación. También recibió el Premio Castilla y León de Investigación Científica y Técnica e Innovación 2020. Entre 2021-2023 recibió los siguientes premios: Premio "Admirables" del Diario Médico; XXI Premio Fundación Neumomadrid en investigación médica; Distinción Honorífica del Colegio Oficial de Farmacéuticos de Madrid (COFM); Medalla de Honor de la Real Academia de Medicina y Cirugía de Valladolid; Premio TELVA a las ciencias; Premio de investigación "Mayores en acción" CEOMA; Premio Foro de Empresas Innovadoras (FEI); Premio Fundación Ana de la Paz en investigación; Premio H-de oro Colegio Oficial de Farmacéuticos de Málaga en investigación; Premio de TV La Sexta "Contantes y Vitales" a la trayectoria científica en investigación biomédica; premio IPfest 2023 "Allende La Transferencia de Conocimiento".

Actualmente, Mariano Esteban y su laboratorio están generando candidatos vacunales con amplio espectro de acción y durabilidad para proteger frente a las distintas variantes del SARS-CoV-2 que vayan surgiendo por mutaciones y se hagan resistentes a las vacunas actuales, así como el desarrollo de vacunas y combinación de inmunógenos (DNA, LNP-mRNA, replicon de alphavirus, vectores virales, proteína), frente a otros virus emergentes y reemergentes con potencial para producir futuras epidemias y pandemias. El grupo sigue trabajando en la optimización de vacunas frente al VIH/SIDA con capacidad para producir anticuerpos neutralizantes de amplio espectro de acción y eficacia para el control de la infección. El plan del grupo es hacer contribuciones científicas relevantes sobre los mecanismos moleculares, celulares e inmunes de activación de las células B y T que confieren la inmunidad de las vacunas, correlatos de protección, duración de las respuestas inmunes y establecer la eficacia de las vacunas en modelos animales, con traslación hacia los ensayos clínicos. Para el período 2024-2028, sus investigaciones sobre vacunas frente a virus emergentes y reemergentes están siendo financiadas por 4 proyectos europeos concedidos a su laboratorio en 2024, así como proyectos nacionales. El objetivo final es desarrollar inmunógenos óptimos y procesos de vacunación que confieran seguridad, eficacia y protección duradera contra agentes infecciosos con potencial epidémico y pandémico.

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Mariano Esteban is currently Professor Ad-Honorem of the Spanish Research Council (CSIC) at the National Center of Biotechnology (CNB) in Madrid, Spain and Head of the Poxvirus and Vaccines Group. He obtained his PhD in Microbiology at the School of Pharmacy, University of Santiago de Compostela and spent 22 years abroad in various research centers: postdoctoral (1970-74) at the National Institute for Medical Research, Mill Hill (London); Instructor (1974-77) at the Department of Microbiology, Rutgers Medical School, Piscataway, New Jersey, USA; research scientist (1978) at the Molecular Biology Institute, Ghent, Belgium; Assistant (1979-82), Associate with tenue (1982-85) and full Professor (1985-92) of SUNY at the Department of Biochemistry, Downstate Medical Center, Broklyn, New York. In 1987 he was appointed Professor of Science by the Spanish Research Council of Spain (CSIC), and Director (1992-2003) of the newly created National Center for Biotechnology (CNB) in Madrid. Within a short time, he recruited excellent Group Leaders and the CNB won international credibility, as a place of excellence for basic and applied science in biotechnology in the areas of health, agriculture and environment.

Prof. Esteban is a well-recognised scientist with a long experience in molecular and immunological basis of pathogenesis by infectious agents and in translational research. In particular, his group has made major contributions on the biology of vaccinia virus (from virion structure, entry into cells, transcription, translation, DNA replication and virus assembly), the mechanism of action of interferon (particularly on its role in the inhibition of virus mRNA translation and apoptosis action of the IFN-induced enzymes, PKR, 2-5A synthetase/RNase L and nitric oxide synthase), and development of vaccines against major diseases like HIV/Aids, hepatitis C, chikungunya, ebola, zika, malaria, leishmaniasis, and recently SARS-CoV-2. His group pioneered a heterologous prime/boost approach that has gained acceptance as an immunization protocol against different diseases, and has made significant contributions in the biology and application of the attenuated poxvirus vectors MVA and NYVAC as vaccine candidates. With some of the Esteban vaccines, an efficacy of 80-100% was observed in preclinical trials against Ebola, chikungunya, zika and SARS-CoV-2, as well as about 70% inhibition against malaria and leishmania. Two of Esteban´s developed vaccines for the most prevalent HIV clades B and C (MVA-B and MVA-C) were used in prophylactic phase I clinical trials in Spain, UK and Peru, and in a therapeutic trial in Spain, while a NYVAC-C vaccine was used in a phase Ib clinical trial, showing in all cases good immunological B and T cell behavior and neutralization against tier 1 HIV. Further improvements of HIV vaccines for induction of broadly neutralizing antibodies against tier 2 viruses are currently ongoing in the laboratory.

With the advent of the SARS-CoV-2 pandemic, Esteban and his group got in January 2020 deeply involved in the development of a vaccine based on MVA expressing SARS-CoV-2 S protein. The vaccine showed excellent immune profiles with activation of B and T cell immune responses that elicited broad and durable immune responses, leading to 100% efficacy in animal models (mice, hamsters and macaques) against SARS-CoV-2 infection and completely prevented brain damage. An optimized vaccine MVA-S(3P) was produced by the Spanish company Biofabri and donated by CSIC to WHO through the Medicines Patent Pool as a worldwide license, mainly for the low-income countries. The work developed on the SARS-CoV-2 vaccine by Esteban group received wide coverage from the press, radio and TV, and grants from national and international institutions as well as from public donations. The SARS-S(3P) vaccine will be tested during 2025-2026 for detailed molecular, cellular and immunological action in a phase I clinical trial in comparison with two other approved vaccines as part of EU-funded H2020-SOLVE project.

Prof. Esteban has published 406 articles in prestigious journals, with an h-index of 91 and 26.956 cites with an h-index (Hirsch Factor) of 91 and of 346 (índex i10) (Google Scholar), 13 patents, directed 35 PhD Thesis, and presented over 390 communications to national and international meetings. His research has been supported by grants from national (MICINN; FIS; FIPSE, Foundation Botín, Fundation La Caixa), international agencies (NIH, USA; Bill y Melinda Gates, European Union) and industries. Prof. Esteban collaborates actively with international teams in both Europe and USA.

He is Member of a number of prestigious scientific international societies, in 2012 was elected President of the Royal Academy of Pharmacy of Spain, currently is his Honorary President, and in 2017 he became President of the Royal Society of Spain that integrates the ten Royal Academies. In 2020 Esteban received the Medal for Research and University Education from the Ministry of Science and Innovation of Spain, and in 2021 was awarded the Prize for Science by the Autonomous region of Castilla and León. He has also received numerous awards from different institutions.

Prof Esteban has organized international scientific meetings: President of XI International Poxvirus and Iridovirus Meeting, Toledo, 1996; President of the Fifth European Conference on Experimental AIDS Research (ECEAR-2000), Madrid; Vice-president of the European Virology meeting in Madrid, in 2004; Co-Chair of the 7Th Vaccine and ISV Congress-2013, Sitges, Spain. He participates in academic activities at the Autonomous and of Complutense Universities of Madrid, is founder of EuroVacc and of Spanish Professionals in the USA (ALDEEU).

The current research interest of the laboratory on Poxvirus and Vaccines is in the control of emerging and reemerging human pathogens, by developing safe and effective vaccines. By studying the molecular, cellular and immunological behavior of the poxvirus vectors MVA and NYVAC expressing selected antigens from pathogens, alone and in combination with other immunogens (DNA, LNP-mRNA, alphavirus replicon, viral

vectors, protein), Prof. Esteban group plan to make important contributions in the immune biology of vaccines, the mechanism of T cell and B cell immune responses, correlates of protection, durability of the immune responses, efficacy in animal models, and to eventually perform clínical trials. The goal is to develop the best-in-class immunogens and vaccination protocols that can confer safe, effective and long-term protection against prevalent human diseases with epidemic and pandemic potential.