

CURRICULUM VITAE (Summary)

Principal Investigator

Name : MARIA DE LOURDES MUÑOZ

Place of birth: Mexico City

EDUCATION/TRAINING:

1970-1974 Escuela Nacional de Ciencias Biológicas, IPN. México City. Biochemical Engineering.

1976-1978 Department of Cell Biology, CINVESTAV-IPN. México City. Master in Science, Speciality in Cell Biology.

1978-1981 Department of Cell Biology, CINVESTAV-IPN. México City. PhD in science, Speciality in Cell Biology.

Positions and Employment:

1982-1983 Pathology Section de Patología CINVESTAV-IPN.

1983-1985 "Visiting fellow for Advanced Research Experience in Biochemistry". National Institute of Health, Bethesda, Maryland, USA.

1985-1987 Research professor C. Department of Genetics and Molecular Biology. Centro de Investigación y de Estudios Avanzados del IPN (CINVESTAV-IPN).

1987-1990 Research professor 3-A. Department of Genetics and Molecular Biology. CINVESTAV-IPN.

1991-1992 Visiting profesor 1991-1992. Sabaticla year, Genetics. Case Western Reserve University School of Medicine. Department of Genetics. 2109 Adelbert road. Cleveland Ohio, U.S.A.

1991-1993 Research professor CINVESTAV 3-B. Department of Genetics and Molecular Biology. CINVESTAV-IPN.

1994-1999 Research professor CINVESTAV 3-C Departamento de Genética y Biología Molecular. CINVESTAV-IPN.

1998-1999 Research professor A. Centro de Investigación en Ciencia Aplicada y Tecnología Avanzada del IPN.

1999-2001 Research professor 3-C. Centro de Investigación en Ciencia Aplicada y Tecnología Avanzada del IPN. (Sabbatical year)

2000-2013 Research profesor CINVESTAV 3-D. Department of Genetics and Molecular Biology. CINVESTAV-IPN.

2015- 2016 Investigador Invitado. University of Kansas, Laboratories of Biological Anthropology. USA (1 year).

2013-present Research profesor CINVESTAV 3-E. Department of Genetics and Molecular Biology. CINVESTAV-IPN.

Honors

1985-present Member of the Mexican National Research Sistem (level III).

1974 Biochemical Engineering degree with honors.

Selected peer-reviewed publications (in chronological order)

1. Calderón, J., Muñoz, M.L. and Acosta, H. Surface redistribution and release of antibody-induced caps in *Entamoeba*. J. Exp. Med. 151: 184-193, 1980. ISSN 002-1007.
2. Muñoz, M.L., Calderón, J. and Rojkind, M. The collagenase of *Entamoeba histolytica*. J. Exp. Med. 155: 42-51, 1982. ISSN 002-1007.
3. Muñoz, M.L., Claggett, C.E. and Weinbach, E.C. Calcium transport and catabolism of adenosine triphosphate in the protozoan *Giardia lamblia*. Comp. Biochem. Physiol. 91B: 137-142, 1988.
6. Muñoz, M.L., Das. P. and Tovar R. *Entamoeba histolytica* trophozoites activated by collagen type I and Ca^{2+} have structured cytoskeleton during collagenase secretion. Cell Motility and the Cytoskeleton 50:45-54. 2001.
7. Bennet, K.E., Olson, K.E., Muñoz, M.L., Fernandez-Salas, I., Farfan, J.A., Higgs, S., Black, W.C. and Beaty, B.J. Variation in vector competence for dengue 2 virus among 24

- populations of *Aedes aegypti* from Mexico and the United States. Am. J. Trop. Med. Hyg. 67: 85-92. 2002.
8. León-Avila, G., Hernández, M., Camacho-Nuez, M., Luna-Arias, J.P., Salazar, I., Pérez, A. and Muñoz, M.L. *Entamoeba histolytica* up-regulates the Cdc48-like protein, an AAA family member, during the activation of trophozoites with collagen type I and calcium. Molecular & Biochemical Parasitology 146: 113-119. 2006.
 9. Lozano-Fuentes S, Ildefonso Fernandez-Salas, Maria de Lourdes Munoz, Jose. A. Farfan-Ale, Ken E. Olson, Barry J. Beaty, and William C. Black IV. The Neovolcanic Axis is a Barrier to Gene Flow among *Aedes aegypti* Populations in Mexico That Differ In Vector Competence for Dengue 2 Virus. PLoS Negl Trop Dis. 2009;3(6):e468.
 10. Muñoz, M.L., Pérez-Ramírez, G., Díaz-Badillo, A. y Morales Gómez, M.C. La genética de poblaciones prehispánicas mexicanas y su importancia. Editores: G. Álvarez, I. Bus, C. Castañeda, J. Guevara, I. Romero, H. Vázquez. Mensaje Bioquímico, Vol. XXXIV, pg. 31-42, 2010.
 11. Noris G, Carla Santana, María de Lourdes Munoz, Abraham Majluft-Cruz, Marco Antonio Meraz-Ríos, Jonathan J. Magana, Rosa Quezada, María Cristina Revilla, Sergio Martí'nez-Salas, Salvador Xihuitl, Gonzalo Martínez de la Escalera, Emma S. Calderon-Aranda, Alvaro Dí'az-Badillo, Rocío Gómez. Mexican mestizo population Sub-structure: effects on genetic and forensic statistical parameters. Molecular Biology Reports **39** (12): 10139-56. Article DOI: 10.1007/s11033-012-1888-1. 2012.
 12. Cervini-Silva J, Eduardo Palacios, María de Lourdes Muñoz, Paz del Angel, José Ascención Montoya, Eduardo Ramos, and Arturo Romano-Pacheco. Cinnabar-preserved bone structures from primary osteogenesis and fungal signatures in ancient human. Geomicrobiology Journal. 30 (7): 566-577, 2013.
 13. Cervini-Silva J, Eduardo Palacios, Maria de Lourdes Muñoz, Paz del Angel, Elizabeth Mejía-Pérez Campos, Ximena Chávez-Balderas, Alberto Herrera. A High-Resolution Electron Microscopic and Energy-Dispersive Spectroscopic Study on the Molecular Mechanism Underpinning the Natural Preservation of 2,300 Y.O. Naturally-Mummified Human Remains and the Occurrence of Small-Sized [Zn][Al]Carbon Spheres. Journal of Archaeological Science. 2013: **40** (4) 1966-1974, 2013.
 14. Montiel-Sosa J F, María Dolores Herrero, Maria de Lourdes Muñoz*, Luis Enrique Aguirre-Campa, Gerardo Pérez-Ramírez, Ruben García-Ramírez, Eduardo Ruiz-Pesini, Julio Montoya. A novel 7,630 base pair mitochondrial DNA deletion in a Mexican patient with Kearns-Sayre Syndrome. Mitochondrial DNA. doi:10.3109/19401736.2012.760550, 2013.
 15. Moore M, Sylla M, Goss L, Burugu M.W. , Sang R, Kamau, LW, Kenya EU. Bosio C, Munoz ML, Sharakova M, and Black WC. Dual African origins of global *Aedes aegypti* s.l. populations revealed by mitochondrial DNA. (PNTD-D-12-00937R2) in PLoS Neglected Tropical Diseases, 7(4): e2175, 2013.
 16. Díaz-Badillo A, Muñoz Mde L, Perez-Ramirez G, Altuzar V, Burgueño J, Mendoza-Alvarez JG, Martínez-Muñoz JP, Cisneros A, Navarrete-Espinosa J, Sanchez-Sinencio F. A DNA microarray-based assay to detect dual infection with two dengue virus serotypes. Sensors (Basel). 2014 Apr 25;14(5):7580-601. doi: 10.3390/s140507580. ISSN 1424-8220. IF:2.048
 17. Adirajlyer, M., GoldieOzaa, Velumania, S., Maldonado A., Romero J., Muñoz M. deL, Sridharan M., Asomoza R., Yid J. Scanning fluorescence-based ultrasensitive detection of dengue viral DNA on ZnO thin films. Sensors and Actuators B: Chemical, 202 (2014) 1338–1348. Imprint ISSN: 0925-4005. IF: 3.840. <http://dx.doi.org/10.1016/j.snb.2014.06.005>
 18. Santana C1, Noris G, Meraz-Ríos MA, Magaña JJ, Calderon-Aranda ES, Muñoz Mde L, Gómez R. Genetic Analysis of 17 Y-STRs in a Mestizo Population from the Central Valley of Mexico Hum Biol. 2014 Fall;86(4):289-312. PMID: 25959695. DOI: 10.13110/humanbiology.86.4.0289
 19. Angélica Saldaña-Martínez, Gerardo Pérez-Ramírez, and María de Lourdes Muñoz. Invited manuscript entitled "Regulatory elements (Cis/Trans); regulatory genes. Manuscript ID is ieba0424. The International Encyclopedia of Biological Anthropology.
 20. Miriam Givisay Domínguez-Cruz, María de Lourdes Muñoz, Armando Totomoch-Serra1, María Guadalupe García-Escalante, Nina Valadez-González, Doris Pinto-Escalante, and Álvaro Díaz-Badillo. Distribution of Six Polymorphisms in Two Communities with a Historical

High Incidence of Diabetes and Obesity in Yucatan, Mexico. British Journal of Medicine & Medical Research 2016, 17(12): 1-12. Article no.BJMMR.28660 ISSN: 2231-0614, NLM ID: 101570965.

-Selected peer-reviewed publications from international conferences:

World Mummies Research/Proceedings of the VI World Congress on Mummy Studies (Teguise, Lanzarote=; Pablo Atoche, Conrado Rodríguez and Ma. Angeles Ramírez (eds.) Santa Cruz de Tenerife: Academia Canaria de la Historia (etc.), 2008. p 700. ISBN: 978-84-612-5647-1. 2008 de esta edición: Academia Canaria de la Historia, Ayuntamiento de Teguise, Cabildo Insular de Lanzarote, Caja Canarias, Fundación Canaria Mapfre Guanarteme, Universidad de las Palmas de Gran Canaria. Primera Edición, 2008:

1. López-Armenta, M., Bustos, Ríos, D., Moreno-Galeana, M.A., Herrera-Salazar, A., Pérez-Campos, E.M., Chávez-Balderas, X., Muñoz, M.L. Genetic origin of a mummy from Queretaro (Pepita). *Mummies and Science*. pp.251.
2. Bustos, Ríos, D., López-Armenta, M., Moreno-Galeana, M.A., Herrera-Salazar, A., Pérez-Campos, E.M., Chávez-Balderas, X., Muñoz, M.L. Purification of DNA from an ancient child mummy from Sierra Gorda, Queretaro. *Mummies and Science*. Pp.259.
3. Herrera-Salazar, A., Bustos, Ríos, D., López-Armenta, M., Moreno-Galeana, M.A., Martínez-Meza, A., Muñoz, M.L. Mitochondrial DNA analysis of mummies from the North of México. *Mummies and Science*. Pp.
4. Martínez, A., Moreno, M., Díaz, A., Muñoz, M.L., Mendoza, A.F. ADNmt Antiguo: Estado de conservación y medio ambiente. Colección Científica, Serie Antropología Física. Memoria del VII Congreso de la Asociación Latinoamericana de Antropología Biológica. Pg. 215-228. Primera Edición. D.R. © Instituto Nacional de Antropología e Historia. 2007. ISBN 10: 968-03-0184-2 e ISBN 13: 978-968-03-0184-3.

More than 330 SUMMARIES OF NATIONAL AND INTERNATIONAL CONFERENCES.

BOOK CHAPTERS (17).

1. Muñoz, M.L., Moreno-Galeana M., Díaz-Badillo, A., Loza-Martínez, I., Macías-Juárez, V.M., Márquez-Morfin L., Jiménez-López, J.C. y Martínez-Meza, A. Análisis de DNA mitocondrial de una población prehispánica de Monte Albán, Oaxaca, México. In: *Antropología y Biodiversidad*, Vol. 2, Ediciones Bellaterra S.L., Nava de Tolsa, 289 bis. 08026 Barcelona, España. M. Pilar Aluja, Asunción Malgosa y Ramon M.ª Nogués (eds.) ISBN: 84-7290-206-4. pag. 170-182. 2003.
2. Martínez-Meza, A., Moreno-Galeana, M. Díaz-Badillo A., Bastida-Bernal M., Muñoz, M.L. Análisis de la región hipervariable en la población prehispánica de el Caracol, Guerrero. Guerrero, una mirada antropológica e histórica. Editores: Gloria Artis, Miguel Ángel Rubio y Mette Marie Wachter. Colección Regiones de México. Pg. 201-213. Primera Edición. D.R. © Instituto Nacional de Antropología e Historia. 2007. ISBN 10: 968-03-0245-8 e ISBN 13: 978-968-03-0245-1.
3. Muñoz ML, Lopez-Armenta M, Moreno-Galeana M, Díaz-Badillo A, Pérez-Ramírez G, Herrera-Salazar, Mejía-Pérez-Campos E. and Martínez-Meza A. Extraction and electrophoresis of DNA from the remains of Mexican ancient populations. *Gel Electrophoresis - Part 2*". (Sameh Magdeldin, ed.) ISBN 979-953-307-276-9. 2012.
4. Muñoz ML, Ramos E, Díaz-Badillo A, Morales-Gómez MC, Gómez R, Pérez-Ramírez G. Migration of pre-hispanic and contemporary human Mexican populations. In: *Causes and Consequences of Human Migration. An Evolutionary Perspective*. Cambridge University Press. Edited by Professor Michael H. Crawford (University of Kansas) and Dr Benjamin C. Campbell (University of Wisconsin, Milwaukee). Por invitación. Section 4. Americas: Chapter 20. 2012. Pp. 417-435.

RESEARCH PAPERS FROM GRADUATE STUDENTS (26)

1. **Gorochotegui-Escalante, N.**, Muñoz, M.L., Fernandez-Salas, I., Beaty, J.B. and Black, W. Genetic isolation by distance among *Aedes aegypti* populations along the northeastern coast of Mexico. *Am. J. Trop. Med. Hyg.* 62 (2): 200-209, 2000.

2. Gorrochotegui-Escalante, N., **Gomez Machorro, C.**, Fernandez-Salas, I., Lozano Fuentes S., Muñoz, M.L., Farfan, J.A., Beaty, B.J. and Black IV, William. Breeding structure of *Aedes aegypti* populations in Mexico varies by region. Am. J. Trop. Hyg. 66(2): 213-222, 2002.
3. **García-Franco, F.**, Muñoz, M.L., Lozano-Fuentes, S., Fernández-Salas, I., Beaty B.J. and Black IV, W.C. Large genetic distances among *Aedes aegypti* populations along the south pacific coast of México. Am. J. Trop. Med. Hyg. 6 (5):594-598, 2002.
4. **Gómez-Machorro, C.**, Bennet, K.E., Muñoz, M.L. and Black, W.C. Quantitative trait loci affectin dengue midgut infection barriers in an advanced intercross line of *Aedes aegypti*. Insect Molecular Biology 13 (6), 637-648. 2004..
5. Cisneros, A., **Díaz-Badillo, A.**, Cruz-Martínez, S., Tovar, R., Ramírez-Palacios, L.R., Jiménez-Rojas, F., Beaty, B., Black IV., W.C. and Muñoz, M.L. Dengue 2 genotypes in the state of Oaxaca, México. Archives of Virology, 151:113-125. 2006. ISSN: 0304-8608 (print version).
6. **Díaz-Badillo A.**, Bolling B. G., Perez-Ramirez G., Moore C. G., Martinez-Munoz J. P., Padilla-Viveros A. A., Camacho-Nuez M., Diaz-Perez A., Beaty B. J., Munoz M. L.. The distribution of potential West Nile virus vectors, *Culex pipiens pipiens* and *Culex pipiens quinquefasciatus* (Diptera: Culicidae), in Mexico City. Parasites & Vectors 2011, **4**:70.
7. Muñoz ML, **Mercado-Curiel RF**, Díaz-Badillo A, Pérez-Ramírez G, Black WC IV. Gene Flow Pattern Among *Aedes aegypti* Populations in Mexico. Journal of the American Mosquito Control Association 29(1):1-18, 2013. **Print ISSN: 8756-971X; Online ISSN: 1943-6270.**
21. **Ochoa-Lugo MI**, Muñoz ML, Pérez-Ramírez G, Beaty KG, López-Armenta M, Cervini-Silva J, Moreno-Galeana M, Meza AM, Ramos E, Crawford MH, Romano-Pacheco A. Genetic Affiliation of Pre-Hispanic and Contemporary Mayas Through Maternal Linage. Hum Biol. 88(2):136-167, 2016.

-PATENTS.

International

Process to obtain monoclonal and polyclonal antibodies useful to identify pathogenic amebiasis and pathogenic *Entamoeba histolytica* trophozoites. Issued as No. 5,661,010. August 16, 1997.

-Teaching at least 30 POSTGRADUATE COURSES

-DIRECTION OF THESIS

PhD. Degrees: 19

Master in Science: 30

BACHELOR'S DEGREE: 22

RESEARCH GRANTS: 36

In progress: 2

1. Desarrollo y evaluación en laboratorio, semi-campo y campo de 2 modelos de *Aedes aegypti* transgénicos para reducir las poblaciones silvestres y bloquear la replicación del DENV, en Chiapas, Sur de México. Development and evaluation in laboratory cage experiment, into field cages, and in the field of two *Aedes aegypti* mosquito models to reduce mosquito populations and DENV replication in the state of Chiapas, México. Convocatorias del FONDO CIBIOGEM 2014 – Biotecnología. Convocatoria 2014. Noviembre 17, 2015- Noviembre 16, 2018.
2. La mitoepigenética como posible marcador molecular de la diabetes Mellitus tipo 2 en Población Mexicana. Ciencia Básica, CONACYT. Octubre 20, 2016- Octubre 19, 2019.