

CURRICULUM VITAE



NAME: Rosa M. del Angel

QUALIFICATIONS: M.Sc., Ph.D.

BIRTH DATE AND PLACE: March 14, 1962, Mexico City, Mexico

CITIZENSHIP: Mexican

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EDUCATION:

Centro de Investigacion y de Estudios Avanzados del IPN (CINVESTAV-IPN).
Ph.D. 1990. Molecular Biology.
Centro de Investigacion y de Estudios Avanzados del IPN (CINVESTAV-IPN). M.
Sc. 1988. Molecular Biology.
Universidad La Salle. B. S. in Chemistry (QFB)

POSTGRADUATE TRAINING:

1988-1989. Department of Microbiology. College of Physicians and Surgeons.
Columbia University. New York. USA
Vincent R. Racaniello Ph.D.

POSITIONS:

1990-1994. Department of Experimental Pathology. Associated Professor
1995-2014. Department of Infectomics and Molecular Pathogenesis. Full Professor
2015-now. Department of Infectomics and Molecular Pathogenesis. Head of the Department

RESEARCH INTERESTS:

1. Dengue and Zika virus replication
2. Dengue virus pathogenesis
3. Role of cholesterol in dengue, Zika and Yellow fever virus replicative cycle
4. Cellular proteins involved in dengue and Zika virus replicative cycle
5. Antiviral design.
6. Nuclear-Cytoplasmic transport during viral infection

HONORS /AWARDS:

- 1.- Honoric Mention. Universidad La Salle. 1986
- 2.- Medical Investigation Award Syntex. 2003.
- 3.- Member of the Mexican Academy of Science since 2003.
- 4.- State of the Art Lecturer. American Society for Virology Meeting. Montreal, Canada. 2004.
- 5.- Latin American Professor Award. American Society for Virology Meeting. Penn State University. 2005.
- 6.- Flavivirus session Convenor. American Society for Virology Meeting. Penn State University. 2005.
- 7.- Flavivirus III session Convenor American Society for Virology. Madison University. 2006.
- 8.- PVDI Latin-American professor award to assist to the 55th Annual Meeting of the American Society of Tropical Medicine and Hygiene. 2006.
- 9.- Member of the UC MEXUS-CONACYT fellowships and grants review committee for Health and Medical Sciences. University of California. 2008.
- 10.- Member of the Organizing Committee of the First Pan American Dengue Research Network Meeting in Recife, Brazil, del 22 al 25 de julio de 2008.
- 11.- Member of the CONACYT Basic Science Grants Review Committee for Biology. 2008-2012.
- 12.- Member of the National System of Researchers level 3. 2012.
- 13.- Member of the Organizing Committee of the First Pan American Dengue Research Network Meeting in Cancun, Mexico, 2010
- 14.- Member of National System of Researchers Review Committee for Biology. 2008.
- 15.- Member of the Editorial Board of "Virology". 2016-2019.
- 16.- Member of the Editorial Board of "Current opinion in Virology". 2013.
- 17.- Responsible for the Mexican Virology Network 2015-2016.
- 18.- Head of the Infectomics and Molecular Pathogenesis at Cinvestav 2015-2019.
- 19.- Member of the Mexican Dengue Expert Group. 2012-now.
- 20.- Plenary lecturer. 5th PanDengue Network Meeting. Panama. 2016.
- 21.- Langebio Award to the best Ph.D Thesis to Dr. Henry Puerta-Guardo. 2015
- 22.- Arturo Rosenblueth Award to the best PhD Thesis to Dr. Ruben Soto-Acosta. 2017.
- 23.- Miguel Alemán Award 2017.
- 24.- Plenary lecturer. 6th PanDengue Network Meeting. Galveston. 2018.

SOCIETY MEMBERSHIPS

1. Sociedad Mexicana de Bioquímica. Since 1997
2. American Society of Virology. Since 2003.

MEMBER OF EDITORIAL BOARD

Virology

Current Opinion in Virology

PUBLICATIONS

- 1.- Gariglio, P., **del Angel, R.M.**, Herrera, A. and Bonilla, M. 1987. Theoretical model for the posttranscriptional regulation of the human c-myc gene expression, involving double-stranded RNA processing. *J. Theor. Biol.* 125: 83-92.
- 2.- **Del Angel, R.M.**, Papavassiliou, A.G., Fernández-Tomás, C., Silverstein, S.J. and Racaniello, V.R. 1989. Cell proteins bind to multiple sites within the 5' untranslated region of poliovirus RNA. *Proc. Natl. Acad. Sci.* 86: 8299-8303.
- 3.- Gutierrez, L., Castro, E., **del Angel, R.M.**, Soler, C. y Fernández-Tomás, C. 1994. Las Ribosondas: una alternativa en el diagnóstico de secuencias virales. *Salud Pública Mex.* 36:140-147.
- 4.- Rojas-Eisenring, I, Cajero-Juarez, M. and **del Angel, R.M.** 1995. Cell proteins bind to a linear polypyrimidine-rich sequence within the 5'-untranslated region of rhinovirus 14 RNA. *J. Virol.* 69:6819-6824.
- 5.- Villareal, M.T., Chavez, M., Lezana J.L., Cuevas, F., Carnevale, A., Córdova, E., **del Angel, R.M.** and Orozco, L. 1996. G542X mutation in mexican cystic fibrosis patients. *Clin. Genet.* 49:54-56.
- 6.- Gutiérrez-Escolano, L., **del Angel R.M.** 1996. Nuclear proteins bind to poliovirus 5' untranslated region. *Arch. Med. Res.* 27:413-419.
- 7.- Gutiérrez-Escolano, A.L., Medina, F., Racaniello, V.R. and **del Angel, R.M.** 1997. Differences in the UV-crosslinking patterns of the poliovirus 5'-untranslated region with cell proteins from poliovirus-susceptible and resistant tissues. *Virology* 227:505-508.
- 8.- Gutiérrez-Escolano, A.L., Denova-Ocampo, M., Racaniello, V.R. and **del Angel, R.M.** 1997. Attenuating mutations in the poliovirus 5'-untranslated region alter its interaction with polypyrimidine tract-binding protein. *J. Virol.* 71:3826-3833.
- 9.-Orozco, L, Zielenski, J., Markiewics, D., Villarreal, T., Lamp-Arce T., Lezana, J.L. and **del Angel, R.M.** 1997. Two novel frame shift deletions (192del7,2055del9>A) in the CFTR gene in mexican cystic fibrosis patients. *Hum. Mutat.* 10:239-240.
- 10.- García, G., Vaughn, D. and **del Angel R.M.** 1997. Sera from dengue virus infected children recognize synthetic oligopeptides from NS1 and NS3 proteins from dengue 4 virus. *Am. J. Trop. Med. Hyg.* 56:466-470.
- 11.- Salas-Benito, J.S. and **del Angel R.M.** 1997. Identification of two surface proteins from C6/36 cells that bind dengue type 4 virus. *J. Virol.* 71:7246-7252.

- 12.- Gutiérrez-Escolano, A.L, Uribe-Brito, Z., **del Angel, R.M.** and Jiang, X. 2000. Interaction of cell proteins with the 5' end of Norwalk virus genomic RNA. *J. Virol* 74:8558-8562.
- 13.- Martínez-Barragán, J.J. and **del Angel, R.M.** 2001. Identification of a putative coreceptor on Vero cells that participates in dengue 4 virus infection. *J. Virol.* 75:7818-7827.
- 14.- Mendoza, M.Y., Salas-Benito, J.S., Lanz-Mendoza, H., Hernández-Martínez, S. and **del Angel, R.M.** 2002. A putative receptor for dengue virus in mosquito tissues: Localization of a 45-kDa glycoprotein. *Am. J. Trop. Med. Hyg.* 67:76-84.
- 15.- De Nova-Ocampo, M., Villegas-Sepúlveda N., and **del Angel R.M.** 2002. Translation elongation factor-1a, La and PTB interact with the 3' Untranslated Region of Dengue 4 Virus RNA. *Virology.* 295: 337-347.
- 16.- González-Herrera, L. , García- Escalante G., Castillo-Zapata I., Canto-Herrera J., Cevallos-Quintal J., Pinto-Escalante D, Díaz-Rubio F , **Del Angel RM**, Orozco-Orozco L. 2002. Frequency of the thermolabile variant C677T in the MTHFR gene and lack of association with neural tube defects in the state of Yucatan, México. *Clinical Genetics.* 62:394-398.
- 17.- Yocupicio-Monroy, R.M.E., Medina, F., Reyes-del Valle, J., and **del Angel, R.M.** 2003. Cellular proteins from human monocytes bind to dengue 4 virus minus-strand 3' untranslated region RNA. *J. Virol.* 77:3067-3076.
- 18.- Aguilar-Maldonado, B., Gómez-Viquez, L., García, L., **del Angel, R.M.**, Arias Montaña, J.A. and Guerrero-Hernández, A. 2003. Histamine potentiates IP3-mediated Ca²⁺ release via thapsigargin-sensitive Ca²⁺ pumps. *Cellular Signalling* 15:689-697.
- 19.- Reyes del Valle, J. and **del Angel, R.M.** 2004. Isolation of putative dengue virus receptor molecules by affinity chromatography using a recombinant E protein ligand. *J. Virol. Meth.* 116:95-102.
- 20.- García-Montalvo, B.M., Medina, F., and **del Angel, R.M.** 2004. La Protein binds to NS5 and NS3 and to the 5' and 3' ends of Dengue 4 Virus RNA. *Virus Res.* 102:142-150.
- 21.- Reyes del Valle, J., Chavez-Salinas, S, Medina F and **del Angel, R.M.** 2005. Heat shock protein 90 and heat shock protein 70 are components of Dengue virus receptor complex in human cells. *J. Virol.* 79:4557-4567.
- 22.- **del Angel, R.M.** Chávez-Salinas, S., Ceballos-Olvera, I., Medina-Ramírez, F. y Reyes-del Valle, J. 2006. Proteínas celulares involucradas en la unión y entrada del virus del dengue. *Revista Latinoamericana de Microbiología* 48: 197-198.
- 23.- Yocupicio-Monroy, M., Padmanabhan, R., Medina, F, and **del Angel, R.M.** 2007. Mosquito La protein binds to the 3' Untranslated Region of the Positive and Negative Polarity Dengue virus RNAs and Relocates to the Cytoplasm of Infected Cells. *Virology.* 357: 29-40.
- 24.- González Durán, E., **del Angel, R.M.** and Salas Benito J.S. 2007. In Vitro interaction of poliovirus with cytoplasmic dynein. *Intervirology.* 50: 214-218.
- 25.-Salas-Benito, J., Reyes-Del Valle, J., Salas-Benito, M., Ceballos-Olvero, I., Mosso, C. And **Del Angel, R.M.** 2007. The 45 kDa glycoprotein, part of a putative dengue virus receptor complex in the mosquito cell line C6/36, is a heat shock related protein. *Am. J. Trop. Med. Hyg.* 77: 283-290.

- 26.- Ludert, J.E., Mosso, C., Ceballos-Olvera I, and **del Angel R.M.** 2008. Use of a comercial enzyme immunoassay to monitor dengue virus replication in cultured cells. *Virology J.* 5:51
- 27.- Mosso, C., Galván-Mendoza, I.J., Ludert, J.E. and **del Angel, R.M.** 2008. Endocytic pathway followed by dengue virus to infect the mosquito cell line C6/36 HT. *Virology* 378:193-199.
- 28.- Chavez-Salinas, S., Ceballos-Olvera, I., Reyes-del Valle, J., Medina, F., **del Angel, R.M.** 2008. Heat shock effect upon dengue virus replication into U937 cells. *Virus Res.* 138: 111-118.
- 29.- Agis-Juarez RA, Galvan I, Medina FJ, Daikoku T, Padmanabhan R, Ludert JE, **Del Angel RM.** 2009. The Polypyrimidine-Tract Binding protein is relocated to the cytoplasm and is required during dengue virus infection in Vero cells. *J Gen Virol.* 90: 2893-2901.
- 30.- Ceballos-Olvera I, Chávez-Salinas S, Medina F, Ludert JE, **Del Angel RM.** 2010. JNK phosphorylation, induced during dengue virus infection, is important for viral infection and requires the presence of cholesterol. *Virology* 396: 30-36.
- 31.- Puerta-Guardo H, Mosso C, Medina F, Liprandi F, Ludert JE, **Del Angel RM.** 2010. The antibody dependent enhancement (ADE) of dengue virus infection in U937 cells requires cholesterol rich membrane microdomains. *J Gen Virol* 91:394-403.
- 32.- Alcaraz-Estrada SL, Manzano MI, **Del Angel RM,** Levis R, Padmanabhan R. 2010. Construction of a dengue virus type 4 reporter replicon and analysis of temperature-sensitive mutations in non-structural proteins 3 and 5. *J Gen Virol.* 91:2713-2718.
- 33.- Alcaraz-Estrada, S.L., Yocupicio-Monroy M. and **del Angel R. M.** 2010. Insights into dengue virus genome replication. *Future Virology* 5: 575-592.
- 34.- de la Cruz Hernandez, S.I., González Mateos, S., Flores Aguilar, H., López Martínez, I., Alpuche Aranda, C., Ludert, J.E., **del Angel, R.M.** 2012. Evaluation of a novel comercial rapid test for dengue diagnosis base don specific IgA detection. *Diagn Microbiol. Infect Dis.* 72:150-155.
- 35.- Puerta-Guardo, H. De la Cruz Hernández, S.I., Rosales, V.H., Ludert, J.E. and **del Angel, R.M.** 2012. The 1 alfa, 25-Dyhidroxy-Vitamin D3 reduces dengue virus infection in human myelomonocyte (U937) and hepatic (Huh-7) cell lines and cytokine production in the infected monocytes. *Antiviral Res* 94:57-61
- 36.- Juárez-Martínez, A.B., Salas-Benito, M., García-Espitia. M. De Nova-Ocampo, M. **del Ángel, R.M.** and Salas-Benito, J.S. 2013. Detection and sequencing of defective viral genomes in C6/36 cells persistently infected with dengue virus 2. *Arch Virol.* 158:583-599.
- 37.- De la Cruz-Hernandez, S.I., Flores-Aguilar, H., Gonzalez-Mateos, S., Lopez-Martinez, I., Alpuche-Aranda, C., Ludert, J.E., **del Angel, R.M.** 2013. Determination of viral load and concentration of circulating NS1 protein in an open mexican population infected with dengue virus. *Am. J. Trop. Med Hyg.* 88:446-454.
- 38.- Vega-Almeida TO, Salas-Benito M, De Nova-Ocampo MA, **Del Angel RM,** Salas-Benito JS.- 2013. Surface proteins of C6/36 cells involved in dengue virus 4 binding and entry.- *Arch Virol.* 158:1189-1207
- 39.- Soto-Acosta R, Mosso C, Cervantes-Salazar M, Puerta-Guardo H, Medina F, Favari L, Ludert JE, **del Angel RM.** 2013. The increase in cholesterol levels at

early stages after dengue virus infection correlates with an augment in LDL particle uptake and HMG-CoA reductase activity. *Virology*.442:132-147.

40. Puerta-Guardo H, Sandino AR, González-Mariscal L, Rosales VH, Ayala-Dávila J, Chávez- Mungía B, Martínez-Fong D, Medina F, Ludert JE, **Del Angel RM**. 2013. The cytokine response of U937-derived macrophages infected through antibody dependent enhancement of dengue virus disrupts cell apical junctional complexes and increase vascular permeability. *J Virol*. 87:7486-7501

41.- De La Cruz Hernández SI, Ortiz-Navarrete V, Ludert JE, **Del Angel RM**. 2013. Dengue specific IgM seropositivity correlates with severe clinical outcome *J Clin Virol*. 58:751.

42.- De La Cruz Hernández SI, Flores-Aguilar H, González-Mateos S, López-Martínez I, Ortiz-Navarrete V, Ludert JE, **Del Angel RM**.- 2013. Viral load in patients infected with dengue is modulated by the presence of anti-dengue IgM antibodies.- *J Clin Virol*. 58:258-61.

43.- Del Angel RM, Reyes-del Valle J.- 2013. Dengue vaccines: strongly sought but not a reality just yet.- *PLoS Pathog*.;9(10):e1003551. doi: 10.1371/journal.ppat.1003551. Oct 3. PMID:24098108.

44.- Reyes-del Valle, J., Salas-Benito J., Soto-Acosta, R., and **del Angel R.M**. 2014. Dengue virus cellular receptors and tropism. *Current Trop. Med. Reports*. 1:36-43.

45.- Alcaraz-Estrada SL, **Del Angel R**, Padmanabhan R. 2014. Construction of self-replicating subgenomic dengue virus 4 (DENV4) replicon. *Methods Mol Biol*. 2014;1138:131-50.

46.- De La Cruz Hernández SI, Puerta-Guardo H, Flores-Aguilar H, González-Mateos S, López- Martínez I, Ortiz-Navarrete V, Ludert JE, **Del Angel RM**. 2014. A strong interferon response correlates with a milder dengue clinical condition. *J Clin Virol*. 60:196-199.

47.- Salazar MI, **Del Angel RM**, Lanz-Mendoza H, Ludert JE, Pando-Robles V. 2014. The role of cell proteins in dengue virus infection. *J Proteomics*. 111:6-15.

48.- Soto-Acosta R, Bautista-Carbajal P, Syed GH, Siddiqui A, **Del Angel RM**. 2014. Nordihydroguaiaretic acid (NDGA) inhibits replication and viral morphogenesis of dengue virus. *Antiviral Res*. 109:132-140.

49.- Cabrera-Romo, S., Recio-Totoro, B., Alcalá, Ana C., Lanz, H., **del Angel, R.M**. Sanchez-Cordero, V., Rodriguez-Moreno, A. and Ludert, J.A. 2014. Experimental Inoculation of *Artibeus jamaicensis* Bats with Dengue Virus Serotypes 1 or 4 Showed No Evidence of Sustained Replication. *Am J. Trop. Med & Hyg*. 91:1227-1234.

50.- Betancourt-Cravioto M, Kuri-Morales P, González-Roldán JF, Tapia-Conyer R; **Mexican Dengue Expert Group**. 2014. Introducing a dengue vaccine to Mexico: development of a system for evidence-based public policy recommendations. *PLoS Negl Trop Dis*. 31:e3009. doi: 10.1371/journal.pntd.0003009.

51.- Escalera-Cueto M, Medina-Martínez I, **del Angel RM**, Berumen-Campos J, Gutiérrez-Escolano AL, Yocupicio-Monroy M. 2015. Let 7c overexpression inhibits dengue virus replication in human hepatoma Huh-7 cells. *Virus Res*. 196:105-112.

52.- González-Calixto C, Cázares-Raga FE, Cortés-Martínez L, **Del Angel RM**, Medina-Ramírez F, Mosso C, Ocádiz-Ruiz R, Valenzuela JG, Rodríguez MH,

- Hernández-Hernández FC. 2015. AeaRACK1 expression and localization in response to stress in C6/36 HT mosquito cells. *J Proteomics* 119C:45-60.
- 53.-** Angel-Ambrocio AH, Soto-Acosta R, Tamminen ER, Carrillo ED, Bautista-Carbajal P, Hernández A, Sánchez JA, **Del Angel RM**. 2015. An embryonic heart cell line is susceptible to dengue virus infection. *Virus Res* 198: 53-58.
- 54.-** De La Cruz Hernández, SI, Reyes-del Valle, J, Villegas-del Angel, E., Ludert JE and **del Angel RM**. 2015. Dengue Laboratory Diagnosis: still some room for improvement . *Future Virol.* 10: 845-857
- 55.-** Cervantes-Salazar, M, Angel-Ambrocio, AH, Soto-Acosta, R, Bautista-Carbajal, P, Hurtado-Monzón, AM, Alcaraz-Estrada, SL, Ludert, JE, **Del Angel, RM**. 2015. Dengue virus NS1 protein interacts with the ribosomal protein RPL18: This interaction is required for viral translation and replication in Huh-7 cells. *Virology* 484: 113–126.
- 56.-** Alcalá AC, Medina F, González-Robles A, Salazar-Villatoro L, Fragoso-Soriano RJ, Vásquez C, Cervantes-Salazar M, **Del Angel RM**, Ludert JE. 2016. The dengue virus non-structural protein 1 (NS1) is secreted efficiently from infected mosquito cells. *Virology.* 488:278-287.
- 57.-** de la Cruz Hernández SI, Puerta-Guardo HN, Flores Aguilar H, González Mateos S, López Martínez I, Ortiz-Navarrete V, Ludert JE, **Del Angel RM**. 2016. Primary dengue virus infections induce differential cytokine production in Mexican patients. *Mem Inst Oswaldo Cruz* 111: 161-167.
- 58.-** Cabrera-Romo S, Max Ramirez C, Recio-Tótoro B, Tolentino-Chi J, Lanz H, **Del Ángel RM**, Sánchez-Cordero V, Rodríguez-Moreno Á, Ludert JE. 2016. No Evidence of Dengue Virus Infections in Several Species of Bats Captured in Central and Southern Mexico. *Zoonoses Public Health.* 63:579-583.
- 59.-** Bautista-Carbajal P, Soto-Acosta R, Angel-Ambrocio AH, Cervantes-Salazar M, Loranca-Vega CI, Herrera-Martínez M, **Del Angel RM**. 2017. The calmodulin antagonist W-7 (N-(6-aminohexyl)-5-chloro-1-naphthalenesulfonamide hydrochloride) inhibits DENV infection in Huh-7 cells. *Virology* 501:188-198.
- 60.-** Avila-Bonilla RG, Yocupicio-Monroy M, Marchat LA, De Nova-Ocampo MA, Del Ángel RM, Salas-Benito JS. 2017. Analysis of the miRNA profile in C6/36 cells persistently infected with dengue virus type 2. *Virus Res.* 232:139-151
- 61.-** Soto-Acosta, R., Bautista-Carbajal, P, Cervantes-Salazar, M, Angel Ambrocio, AH and **del Angel R.M** 2017. DENV Up-Regulates the HMG-CoA Reductase Activity through the Impairment of AMPK Phosphorylation: A Potential Antiviral Target. *Plos Pathogen.* 10.1371/journal.ppat.1006257.
- 62.-** Alcalá AC, Hernández-Bravo R, Medina F, Coll DS, Zambrano JL, **Del Angel RM**, Ludert JE. 2017. The dengue virus non-structural protein 1 (NS1) is secreted from infected mosquito cells via a non-classical caveolin-1-dependent pathway. *J Gen Virol.* 98:2088-2099.
- 63.-** Trujillo-Ocampo A, Cázares-Raga FE, **Del Angel RM**, Medina-Ramírez F, Santos-Argumedo L, Rodríguez MH, Hernández-Hernández FC. 2017. Participation of 14-3-3 ϵ and 14-3-3 ζ proteins in the phagocytosis, component of cellular immune response, in Aedes mosquito cell lines. *Parasit Vectors* 10:362.
- 64.-** Dionicio CL, Peña F, Constantino-Jonapa LA, Vazquez C, Yocupicio-Monroy M, Rosales R, Zambrano JL, Ruiz MC, **Del Angel RM**, Ludert JE. 2018. Dengue

virus induced changes in Ca²⁺ homeostasis in human hepatic cells that favor the viral replicative cycle. *Virus Res.* 245:17-28.

65.- Reyes-Ruiz JM, Osuna-Ramos JF, Cervantes-Salazar M, Lagunes Guillen AE, Chávez-Munguía B, Salas-Benito JS, **Del Ángel RM.** 2018. Strand-like structures and the nonstructural proteins 5, 3 and 1 are present in the nucleus of mosquito cells infected with dengue virus. *Virology.* 515:74-80.

66.- Elizondo-Quiroga D, Medina-Sánchez A, Sánchez-González JM, Eckert KA, Villalobos-Sánchez E, Navarro-Zúñiga AR, Sánchez-Tejeda G, Correa-Morales F, González-Acosta C, Arias CF, López S, **Del Ángel RM,** Pando-Robles V, Elizondo-Quiroga AE. 2018. Zika Virus in Salivary Glands of Five Different Species of Wild-Caught Mosquitoes from Mexico. *Scientific Rep.* 8:809. doi: 10.1038/s41598-017-18682-3.

67. - Osuna-Ramos JF, Rendón-Aguilar H, Reyes-Ruiz JM, **Del Ángel RM,** Romero-Utrilla A, Ríos-Burgueño ER, Velarde-Rodríguez I, Velarde-Félix JS. 2018. The correlation of TNF alpha levels with the lipid profile of dengue patients. *J. Med Virol.* 90:1160-1163.

68.- Apodaca-Medina AI, Torres-Avendaño JI, Rendón-Maldonado JG, Torres-Montoya EH, Flores-López BA, **Del Angel RM,** Velarde-Félix JS, Salomón-Soto VM, Castillo-Ureta H. 2018. First Evidence of Vertical Infection of Dengue Virus 2 in *Aedes aegypti* Mosquitoes from Sinaloa, Mexico. *Vector Borne Zoonotic Dis.* 18:231-233.

69.- Taboada B, Isa P, Gutiérrez-Escolano AL, **Del Ángel RM,** Ludert JE, Vázquez N, Tapia-Palacios MA, Chávez P, Garrido E, Espinosa AC, Eguiarte LE, López S, Souza V, Arias CF. 2018. The viral structure of the Cuatro Ciénegas Basin, a unique oasis in Northern Mexico, reveals a highly diverse population at a small geographic scale. *Appl Environ Microbiol.* AEM.00465-18. doi: 10.1128/AEM.00465-18.

70.- Ramirez L, Betanzos A, Raya A, González-Mariscal L, **Del Angel RM.** 2018. Dengue virus enters and exits epithelial cells through both apical and basolateral surfaces and perturbs the apical junctional complex. *Virus Res.* 258:39-49. doi: 10.1016/j.virusres.2018.09.016.

71.- Osuna-Ramos JF, Reyes-Ruiz JM, Bautista-Carbajal P, Cervantes-Salazar M, Farfan-Morales CN, De Jesús-González LA, Hurtado-Monzón AM, Del Ángel RM. 2018. Ezetimibe inhibits dengue virus infection in Huh-7 cells by blocking the cholesterol transporter Niemann-Pick C1-like 1 receptor. *Antiviral Res.* 160:151-164.

72.- Osuna-Ramos JF, Reyes-Ruiz JM, Del Ángel RM. 2018. The Role of Host Cholesterol During Flavivirus Infection. *Front Cell Infect Microbiol.* 8:388. doi: 10.3389/fcimb.2018.00388.

1730 cites

H FACTOR: 21

ABSTRACTS IN INTERNATIONAL MEETINGS: 142

THESIS DISSERTATIONS FELLOWS-DIRECTED (STUDENTS)

B. S. Students:

- 1.- Marcos Cajero Juárez. 1991. B. S. in Biology. UNAM
- 2.- Mónica Denova Ocampo. 1995. B.S. in Biology. UNAM
- 3.- Francisco Perdomo. 2007. B.S. Biology. IPN

M. Sc. Students:

- 1.- Marcos Cajero Juárez. 1992. M. Sc. in Genetics and Molecular Biology. CINVESTAV-IPN
- 2.- Ana Lorena Gutiérrez Escolano. 1993. M. Sc in Biology. UNAM.
- 3.- Juan Santiago Salas Benito. 1995., M. Sc. in Experimental Pathology. CINVESTAV-IPN.
- 4.- José de Jesús Martínez Barragan. 1995., M. Sc. in Experimental Pathology. CINVESTAV-IPN.
- 5.- Lizbeth Gonzalez Herrera. 1996. M. Sc. In Molecular Biomedicine, CINVESTAV-IPN.
- 6.- Mónica Ascención De Nova Ocampo. 1998. M. Sc. In Molecular Biomedicine, CINVESTAV-IPN.
- 7.- Emilio Córdoba. . 1998. M. Sc. Molecular Biomedicine. CINVESTAV-IPN
- 8.- Rosa Matha Eugenia Yocupicio Monroy. 1998. M. Sc. in Experimental Pathology, CINVESTAV-IPN.
- 9.- Jorge García Cruz. 1999. M. Sc. in Experimental Patology, CINVESTAV-IPN.
- 10.- Martha Erika Navarro Sánchez. 1999. M. Sc. Experimental Pathology, CINVESTAV-IPN.
- 11.- Jaime Escobar Herrera. 2000. M. Sc. Experimental Patology, CINVESTAV-IPN.
- 12.- María de Jesús Elisa León Ramírez. 2000. M. Sc. Molecular Biomedicine. CINVESTAV-IPN.
- 13.- Jorge Reyes del Valle. 2001. M. Sc. in Experimental Pathology, CINVESTAV-IPN.
- 14.- Verónica Fernández. 2001 M. Sc. Molecular Biomedicine CINVESTAV-IPN.
- 15.- Alberto Yairh Limón Flores. 2001. Alberto Yairh Limón Flores. 2001. M. Sc. In Experimental Pathology. CINVESTAV-IPN.
- 16.- María Yazí Mendoza Miranda. 2002. M. Sc. in Experimental Pathology, CINVESTAV-IPN
- 17.- Román Sánchez Carrillo. 2003. M. Sc. in Experimental Pathology, CINVESTAV-IPN.
- 18.- Salvador Chávez Salinas. 2004. M. Sc. in Experimental Pathology, CINVESTAV-IPN.
- 19.- Iris Alejandra Rojas Eisenring. 2005. M. Sc. in Experimental Pathology, CINVESTAV-IPN.
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