

Curriculum Vitae

Jacob Galan, Ph.D.

Associate Professor
Department of Genetics
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Contact Information

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Education & Training

Ph.D. in Biochemistry, Purdue University, West Lafayette, IN
M.S. in Chemistry, Texas A&M University, Kingsville, TX
B.S. in Biology, Texas A&M University, Kingsville, TX
Postdoc Scholar in Cancer Biology and Proteomics, Institute for Research in Immunology and Cancer (IRIC), University of Montreal, Montreal, QC, Canada
Research Fellow in Cancer Biology and Cell Signaling, Massachusetts General Hospital (MGH) Harvard Medical School, Boston, MA

Work Experience

2022-Pres	Associate Professor in Medicine, Department of Human Genetics, University of Texas Rio Grande Valley-School of Medicine (UTRGV-SOM)
2018-2022	Assistant Professor, National Natural Toxins Research Center (NNTRC) and Department of Chemistry, Texas A&M University-Kingsville (TAMUK)
2014-2018	Research Fellow, Massachusetts General Hospital (MGH)-Harvard Medical School
2011-2014	Postdoctoral Scholar, Institute for Research in Immunology and Cancer (IRIC) University of Montreal, Montreal, QC, Canada
2005-2011	Research Assistant, Purdue Cancer Center
2003-2005	Research Associate, NTRC, Kingsville, TX
1999-2003	Undergraduate Research Assistant, NTRC, Kingsville, TX

Professional Memberships

- American Chemical Society (ACS)
- American Society of Mass Spectrometry (ASMS)
- North American Toxinology Society (NAST)

- International Society of Toxicology (IST)

Honors & Awards

2022	UTRGV NSF I-CORP regional program team selection
2021	Nomination to Golden Keys Faculty TAMUK
2021	University of Washington NSF I-CORP team selection
2014-2017	National Institute of Health (NIH) T32 Training Grant Government of U.S.A
2013- 2014	Fonds de Recherche du Québec - Santé (FRQS) Fellowship Quebec Health Department
2012	G.E. Healthcare Prize, 3 rd Place Oral Presentation Institute for Research in Immunology and Cancer
2011-2013	Canadian Institutes of Health Research (CIHR) Fellowship Government of Canada
2011	Fonds de Recherche du Québec - Santé (FRQS) Fellowship (declined) Quebec Health Department
2010	Henry A. Moses Award, 1 st Author Publication Early in Graduate Career Department of Biochemistry, Purdue University
2010	A. K. Balls Award, Outstanding Graduate Student Department of Biochemistry, Purdue University
2008-2010	National Institute of Health (NIH) RO1-Supplement Government of U.S.A
2008-2009	Midwest Crossroads Alliance for Graduate Education and the Professoriate Grant Purdue University
2008	1 st place poster award, Purdue Cancer Prevention Retreat Purdue University Center for Cancer Research
2007	2 nd Place Team Project Award MAES Latinos in Science and Engineering Leadership Conference
2006-2008	Purdue Agriculture Fellowship Purdue University
2002	Undergraduate Research Poster Award Society for the Advancement of Chicanos/Hispanics and Native Americans in Science
2000-2005	Minority Biomedical Research Support (MBRS) National Institute of Health
1999-2000	McNair Research Fellowship Texas A&M University-Kingsville

Research Focus

Imagination, Innovation, Impact and Infinite Possibilities--Sharing UTRGV's Department of Human Genetics Tradition of Excellence, I am committed to changing South Texas, the Rio Grande Valley (RGV), and the world through advancing transformative research using state-of-the-art instrumentation and cutting-edge biomedical research. Through the Dept. of Human Genetics, our vision is to improve the quality of life through research and education for everyone by creating the most innovative learning experience. The mission of our research group is to bridge technology with biomedical discovery with high-throughput proteomics and metabolomics using mass spectrometry. Mass spectrometry-based proteomics and metabolomics is highly interdisciplinary, bringing together chemistry, biology, genetics, biochemistry, instrumentation, statistics, and bioinformatics. We are uniquely situated in the RGV and are dedicated to advance the latest science for the people of South Texas.

I am a bio-analytical scientist with expertise in protein biochemistry, cell signaling, and

mass spectrometry with more than 20 years of experience in the field. My long-term academic and research interests are the application of high-throughput technologies using mass spectrometry-based proteomics for biomarker and drug discovery in complex chronic diseases like Cancer, Diabetes, and Alzheimer's. In addition, I have research interests in exploring and developing integrative platform technologies in acute/traumatic biological injuries from toxic biochemical exposures such as in venomous animal bites, industrial compounds, and environmental toxins. My research group has recently developed breakthrough technologies to develop *in vivo* model to investigate snake envenomation and antivenom therapeutics interactions using the integration of exosome-based proteomics, machine-learning computation, and biomarker prediction. Moreover, we are exploring the toxicological impact of biological and environmental toxin burden on human health using opossum *in vivo* models. In collaboration with faculty in the Dept. of Human Genetics, we aim to discover and elucidate mechanisms in metabolic injury and complex diseases affecting the Hispanic population in South Texas to establish a model for diagnostics and therapeutics for healthier outcomes. Current projects in my lab are:

- To develop novel methods for plasma, cell culture media, and urine extracellular vesicles and exosomes in biomarker discovery.
- To explore and uncover the role of aflatoxin, a class 1 carcinogen, found in corn, soy, wheat, and other crops in hepatocellular carcinoma (HCC) affecting the Hispanic Population in South Texas.
- To investigate the toxicity of Per /Poly Fluoroalkyl Substances (PFAS), their mechanism of action, synergistic components, and impact on human health.
- To use the warm-blooded and naturally resistant *Monodelphis* as a model in novel drug/antivenom design and drug discovery for treating snakebites.
- To investigate the genetic basis and molecular mechanisms of snakebites from Texas using iPSC technology, phosphoproteomics, and G x E interactions.

Publications

My significant contributions to proteomics, cancer biology, molecular therapeutic, and toxins as evident by 66 published manuscripts. I have an h-index of 26 with over 1648 citations. Selected representative publications are listed below.

1. Manusov EG, Diego VP, Almeida M, Ortiz D, Curran JE, Galan J, Leandro AC, Laston S, Blangero J, Williams-Blangero S. Genotype-by-Environment Interactions in Nonalcoholic Fatty Liver Disease and Chronic Illness among Mexican Americans: The Role of Acculturation Stress. *Genes*. 2024; 15(8):1006. <https://doi.org/10.3390/genes15081006>
2. Zdyrski, C., Gabriel, V., Gessler, T.B. *et al.* Establishment and characterization of turtle liver organoids provides a potential model to decode their unique adaptations. *Commun Biol* 7, 218 (2024). <https://doi.org/10.1038/s42003-024-05818-1>
3. Salazar E, Cirilo A, Reyes A, Barrientos M, **Galan J.A**, Sánchez E.E, Suntravat M (2024). Snake venom cysteine-rich secretory protein from Mojave rattlesnake venom (C_{ss}-CRiSP) induces acute inflammatory responses on different experimental models Toxicon: X 21, pg 100180.
4. Bedraoui A, Suntravat M, El Mejjad S, Enezari S, Oukkache N, Sanchez E.E., **Galan J.A**, El Fatimy R, Daouda (2024). Therapeutic potential of snake venom: Toxin distribution and opportunities in deep learning for novel drug discovery, *Medicine in Drug Discovery*, Volume 21
5. Reyes, A., Hatcher, J.D., Salazar, E.; **Galan, J.**, Iliuk, A., Sanchez, E.E., Suntravat, M. (2023) Proteomic Profiling of Extracellular Vesicles Isolated from Plasma and Peritoneal Exudate in Mice Induced by *Crotalus scutulatus scutulatus* Crude Venom and Its Purified Cysteine-Rich Secretory Protein (C_{ss}-CRiSP). *Toxins*, 15, 434
6. Bala A.A, Malami S, Muhammad Y.A., Kurfi B, Raji I, Salisu S.M, Mohammed M,

- Ambrose G.O., Jibril M, **Galan J.A.**, Sanchez E.E., and Chedi B.A.Z. (2022). Non-compartmental toxicokinetic studies of the Nigerian *Naja nigricollis* venom. *Toxicon X*. 1;14
7. Willard N.K., Salazar E., Wiebe C.S., Ocheltree J.O., Cortez M., Oyervides F.A., Perez P.R., Iluik A.B., Suntravat M., Sánchez E.E., and **Galan J.A.** (2021). Proteomic identification and quantification of snake venom biomarkers in plasma extracellular vesicles. *Toxins* 13 (9), 654
8. Szteiter S.S., Diego I.N, Ortegon J., Sanchez O., Suntravat M., Salazar E., Sanchez E.E and **Galan J.A.** (2021). Examination of the Efficacy and Cross-Reactivity of a Novel Polyclonal Antibody Targeting the Disintegrin Domain in SVMs to Neutralize Snake *Toxins*. 13 (4) 254
9. Suntravat, M., Sanchez, O., Reyes, A., Cirilo, A., Ocheltree, J.S., **Galan, J.A.**, Salazar, E., Davies, P., Sanchez, E.E. (2021). Evaluation of Signaling Pathways Profiling in Human Dermal Endothelial Cells Treated by Snake Venom Cysteine-Rich Secretory Proteins (svCRiSPs) from North American Snakes Using Reverse Phase Protein Array (RPPA). *Toxins*. 13, 613
10. Suntravat M., Cromer W.E., Marquez J., **Galan J.A.**, Zawieja D.C., Davies P, Salazar E, Sánchez EE. (2019). The isolation and characterization of a new snake venom cysteine-rich secretory protein (svCRiSP) from the venom of the Southern Pacific rattlesnake and its effect on vascular permeability. *Toxicon*. 165, 22-30
11. Sánchez, E.E., Migl, C., Suntravat, M., Rodríguez-Acosta, A., **Galan, J.A.**, Salazar, E. (2019) The neutralization efficacy of expired polyvalent antivenoms: An alternative option. *Toxicon*. 168, 32-39.
12. *Laflamme C., ***Galan J.A.**, Ben El Kadhi K., Carreno S., Emery G., and Roux P.P. (2017). Proteomics screen identifies class I Rab11-FIPs as key regulators of cytokinesis. *Mol Cell Biol*. 37(3) 1-16 * Co-First Authors
13. Borja M, ***Galan J.A.**, Cantu E Jr, Zugasti-Cruz A, Rodríguez-Acosta A, Lazcano D, Lucena S, Suntravat M, Sánchez EE. (2017). Morulustatin, A Disintegrin that Inhibits ADP-Induced Platelet Aggregation, Isolated from the Mexican Tamaulipan Rock Rattlesnake (*Crotalus lepidus morulus*). *Rev Cient*. 26(2) 86-94
14. Paradis J.S., Ly S., Blondel-Tepaz É., **Galan J.A.**, Beaudrait A., Scott M., Enslen H., Marullo S., Roux P.P., Bouvier, M. (2015). Receptor sequestration in response to β arrestin-2 phosphorylation governs steady-state levels of GPCR cell surface expression. *PNAS*. 112(37) 5160-8
15. **Galan J.A.**, Geraghty K.M., Lavoie G., Kanshin E., Tcherkezian J., Calabrese V., Turk BE, Ballif BA, Blenis J, Thibault P, and Roux PP. (2014). Phosphoproteomic Analysis Identifies the Tumor Suppressor PDCD4 as a RSK Substrate Negatively Regulated by 14-3-3. *PNAS*. 11(29) 2918-27
16. Wang P., **Galan J.A.**, Bonneil E, Roux P.P., Thibault P, Archambault V (2013). Spatial Regulation of Greatwall Kinase Is Required in the Cell Cycle. *J Cell Biol*. 202 (2) 277-93
17. Huang R, Hyunju O, **Galan J.A.**, Tao W.A., Borch R.F, and Geahlen R.L. (2013). Intracellular Targets for a Phosphotyrosine Peptidomimetic include the Mitotic Kinesin, MCAK. *Biochemical Pharmacology* 86, (5) 597-611
18. Zhang X, Lavoie G, Fort L, Huttlin EL, Tcherkezian. J, **Galan J.A.**, Gu H, Gygi S.P., Carreno S, and Roux P.P. (2013). Gab2 phosphorylation by RSK inhibits Shp2 recruitment and cell motility. *Mol Cell Biol*.33 (8):1657-70
19. Puchulu-Campanella E, Chu H, Anstee D.J., **Galan J.A.**, Tao W.A., and Low P.S. (2013). Identification of the components of a glycolytic enzyme metabolon on the human red blood cell membrane. *J Biol Chem*. 288(2):848-58
20. Ray H, Romeo Y, Lavoie G, Délérís P, Tcherkezian J, **Galan J.A.**, and Roux P.P. (2012). RSK facilitates G2 DNA damage checkpoint silencing and promotes melanoma chemoresistance. *Oncogene* 32(38):4480-9

21. Chu H, Puchulu-Campanella E, **Galan J.A.**, Tao W.A., Low P.S., and Hoffman J.F. (2012). Identification of cytoskeletal elements enclosing the ATP pools that fuel human red blood cell membrane cation pumps. *Proc Natl Acad Sci U S A.* 109 (31) 12794-99
22. Xue L, Wang W.H., Iliuk A, Hu L, **Galan J.A.**, Yu S, Hans M, Geahlen R.L., and Tao W.A. (2012). Sensitive kinase assay linked with phosphoproteomics for identifying direct kinase substrates. *Proc Natl Acad Sci U S A.* 109(15) 5615-20
23. Hu L, Iliuk A, **Galan J.A.**, Hans M, and Tao W.A. (2011). Identification of Drug Targets in vitro and in Living Cells by Soluble Nanopolymer-based Proteomics. *Angewandte Chemie*; 50 (18) 4133-6
24. **Galan J.A.**, Paris L.L., Zhang H, Geahlen R.L., and Tao W.A. (2011). Quantitative proteomics analysis of Syk-interacting proteins complexes in chicken B cells using novel labeling reagent and GFP-nanotrap. *JASMS*; 22(2) 319-28
25. Girón ME, Rodríguez-Acosta A, Salazar AM, Sánchez EE, **Galán J**, Ibarra C, and Guerrero B (2011). Isolation and Characterization of two new Non-Hemorrhagic Metalloproteinases with Fibrinogenolytic activity from the Maparnare (*Bothrops colombienssis*) venom. *Toxicon* 57(4):608-18
26. Estrella A, Sánchez E.E., **Galan J.A.**, Tao W.A., Guerrero B, Navarrete L.F., Rodríguez-Acosta A (2011). Characterization of toxins from the broad-banded water snake *Helicops angulatus* (Linnaeus, 1758): isolation of a cysteine-rich secretory protein, Helicopsin. *Arch Toxicol.* 85 (4) 305-13
27. Paris L.L., Hu J, **Galan J.A.**, Ong S.S., Martin V.A., Ma H, Tao W.A., Harrison M.L. and Geahlen R.L. (2010). Regulation of Syk by phosphorylation on serine in the linker insert *The Journal of Biological Chemistry.* 285(51), 39844-54
28. Sánchez EE, Lucena S.A., Reyes S, Soto J.G., Cantu E, Lopez-Johnston J.C., Guerrero B, Salazar A.M., Rodríguez-Acosta A, **Galan J.A.**, Tao W.A., and Pérez J.C. (2010). Cloning, Expression, and Hemostatic activities of a disintegrin, r-Mojastin 1, from the Mohave rattlesnake (*Crotalus scutulatus scutulatus*) *Thrombosis Research* 126(3), 211-9
29. Salazar A.M., Guerrero B, Cantu B, Cantu E, Rodríguez-Acosta A, Pérez J.C., **Galán J.A.**, Tao W.A., and Sánchez E.E. (2009). Venom variation in hemostasis of the southern Pacific rattlesnake (*Crotalus oreganus helleri*): Isolation of hellerase. *Comp Biochem Physiol C Toxicol Pharmacol.* 149 (3), 307-16
30. **Galán J.A.**, Sánchez E. E., Rodríguez-Acosta A, Soto J.G., Brashir S, McLane M.A., Paquette-Straub C, and Pérez JC (2008). Inhibition of lung colonization and cell migration with the disintegrin Crotatroxin 2 isolated from the venom *Crotalus atrox*. *Toxicon* 51 (7), 1186-96
31. **Galán J.A.**, Guo M, Sánchez E.E., Cantu E, Rodríguez-Acosta A, Pérez J.C., and Tao W.A. (2008). Quantitative analysis of snake venom by soluble polymer-based isotope labeling. *Mol Cell Proteomics.* (7), 785-799
32. Guo M, Galan J.A, and Tao W.A. (2007). A novel quantitative proteomics reagent based on soluble nanopolymers. *Chem. Commun.*, (12) 1251-1253
33. Zhou F, **Galan J.A.**, Geahlen R.L., and Tao W.A. (2007). A novel quantitative proteomics strategy to study phosphorylation-dependent Peptide-protein interactions. *J Proteome Res.* 1, 133-40
34. Sánchez E.E., **Galan J.A.**, Russell W.K., Soto J.G., Russell D.H., and Pérez J.C. (2006). Isolation and characterization of two disintegrins inhibiting ADP-induced human platelet aggregation from the venom of *Crotalus scutulatus scutulatus* (Mohave Rattlesnake). *Toxicol Appl Pharmacol.* 212(1), 59-68
35. **Galan J.A.**, Brashir S, Sánchez E.E., and Pérez J.C. (2005). Characterization and identification of disintegrins in *Crotalus horridus* venom by liquid chromatography and tandem matrix-assisted laser desorption ionization - quadrupole ion trap time-of-flight (MALDI-QIT-TOF) mass spectrometry. *Can. J. Chem./Rev. can. chim.* 83(8), 1124-1131

36. Sánchez E.E., **Galan J.A.**, Powell RL, Reyes SR, Soto J.G., Russell W.K., Russell D.H., and Pérez J.C. (2005). Disintegrin, hemorrhagic, and proteolytic activities of Mohave rattlesnake, *Crotalus scutulatus scutulatus* venoms lacking Mojave toxin. *Comp Biochem Physiol C Toxicol Pharmacol.* 141(2), 124-32
37. **Galan J.A.**, Sánchez E.E., Rodríguez-Acosta A, and Pérez J.C. (2004). Neutralization of venoms from two Southern Pacific rattlesnakes (*Crotalus helleri*) with commercial antivenoms and endothermic animal sera. *Toxicon*, 43 (7), 791-799
38. Sánchez E.E., **Galan J.A.**, Rodríguez-Acosta A, Chase P.B., and Pérez J.C. (2003). The efficacy of two antivenoms against the venom of North American snakes. *Toxicon*, 41 (3), 357-365
39. Sánchez E.E., Ramírez M.S., **Galan J.A.**, López G, Rodríguez-Acosta A, and Pérez J.C. (2003). Cross reactivity of three antivenoms against North American snake venoms. *Toxicon*, 41 (3), 315-320

Review and Chapters

1. **Galan J.A.** and Avruch J (2016). The MST1/MST2 Protein Kinases: Regulation and Physiologic Roles. *Biochemistry.* 4;55 (39):5507-5519
2. Iliuk A, **Galan J.A.**, and Tao W.A. (2009). Playing tag with quantitative proteomics. *Anal Bioanal Chem.* 393 (2), 503-13
3. Guo M, **Galán J.A.**, and Tao W.A. (2007). Soluble nanopolymers-based phosphoproteomics for studying protein phosphatase. *Methods*, 42(3), 289-297
4. **Galan J.A.**, Iliuk A, and Tao W.A. Quantitative Proteomics by Mass Spectrometry, in Protein and Peptide Mass Spectrometry in Drug Discovery 2011, John Wiley & Sons, Inc. p. 101-128

Additional publications can be found by using the links below.

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