

HOJA DE VIDA DE INVESTIGADORES INSTITUTO CLODOMIRO PICADO
Mariángela Vargas Arroyo
FORMACIÓN ACADÉMICA
<p>2015: Doctorado en Ciencias, Universidad de Costa Rica (graduación en diciembre)</p> <p>2009: Maestría de Ciencias con especialidad en Biotecnología, Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM), México.</p> <p>2006: Bachillerato en Ingeniería en Biotecnología, Instituto Tecnológico de Costa Rica (ITCR)</p>
EXPERIENCIA LABORAL
<p>2010 - Actualidad: Investigadora Sección de Desarrollo Tecnológico, Instituto Clodomiro Picado</p> <p>2006-2007: Investigadora Sección Investigación y Desarrollo, Instituto Clodomiro Picado</p> <p>2005: Laboratorio de Cultivo de Tejidos Vegetales, Centro de Investigación en Biotecnología, ITCR.</p>
APORTES TECNOLÓGICOS MÁS RELEVANTES
<p>Desarrollo de procesos para la bioseparación de biomoléculas de valor comercial.</p> <p>Desarrollo de formulaciones líquidas de antivenenos estabilizados con osmolitos.</p> <p>Desarrollo del antiveneno PoliVal ICP.</p> <p>Desarrollo del antiveneno TaipanOx-ICP contra serpientes de Nueva Guinea.</p> <p>Desarrollo de metodología para la purificación de biofármacos derivados de plasma humano.</p> <p>Desarrollo de estrategias para la obtención de productos nutracéuticos a partir de matrices alimenticias.</p>
PUBLICACIONES CIENTÍFICAS
<ol style="list-style-type: none"> 1. Segura, A., Herrera, M., González, E., Vargas, M., Solano, G., Gutiérrez, J.M., León, G. 2009. Stability of equine IgG antivenoms obtained by caprylic acid precipitation: Towards a liquid formulation stable at tropical room temperature. <i>Toxicon</i> 53, 609-615. 2. Segura, A., Castillo, M.C., Nuñez, V., Yarlequé, A., Gonçalves, L.R., Villalta, M., Bonilla, C., Herrera, M., Vargas, M., Fernández, M., Yano, M.Y., Araújo, H., Boller, M.A., León, P., Tintaya, B., Sano-Martins, I.S., Gómez, A., Fernández, G.P., Geoghegan, P., dos Santos, R.M.M., Drummond, E.D., Gonçalves, I.A., Higashi, H.G., León, G. and Gutiérrez, J.M. (2010) Preclinical assessment of the neutralizing capacity of antivenoms produced in six Latina American countries against medically relevant Bothrops snake venoms. <i>Toxicon</i> 56, 980-989. 3. Petras, D., Sanz, L., Segura, A., Villalta, M., Herrera, M., Solano, D., Vargas, M., León, G., Harrison, R., Durfa, N., Nasidi, A., Theakston, R.D.G., Warrell, D.A., Gutiérrez, J.M. and Calvete, J.J. (2011) Snake venomics of African spitting cobras. Toxin composition and assessment of congeneric crossreactivity of the Pan-African EchiTAB-Plus-ICP® antivenom by antivenomics and neutralization approaches. <i>Journal of Proteome Research</i> 10, 1266-1280. 4. Vargas, M., Segura, A., Herrera, M., Villalta, M., Estrada, R., Cerdas, M., Winkel, K.D., León, G., Williams, D. and Gutiérrez, J.M. 2011. Preclinical evaluation of a caprylic acid

- fractionated whole IgG antivenom for the treatment of envenomings by *Oxyuranus scutellatus canni* in Papua New Guinea. PLoS Negl Trop Dis 5(5): 1-7.
5. Segura, A., Herrera, M., Villalta, M., **Vargas, M.**, Uscanga-Reynell, A., Ponce, S., Jiménez-Corona, M.E., Reta-Mares, J.F., Gutiérrez, J.M., León, G. 2011. Venoms of *Bothrops asper* from México and Costa Rica: Intraspecific variation and cross-neutralization by antivenoms. Toxicon 59: 158–162.
 6. Herrera, M, Fernández, J., **Vargas, M.**, Villalta, M., Segura, A., León, G., Angulo, Y., Paiva, O., Matainaho, T., Jensen, S., Winkel, K., Calvete, J. Williams, D., Gutiérrez; J.M. 2012. Comparative proteomic analysis of the venom of the taipan snake, *Oxyuranus scutellatus*, from Papua New Guinea and Australia: Role of neurotoxic and procoagulant effects in venom toxicity. J. Proteomics 75: 2128-2140.
 7. **Vargas, M.**, Segura, A., Herrera, M., Villalta, M., Angulo, Y., Burnouf, T, Gutiérrez, J.M., León, G. 2012. Purification of IgG and Albumin from Human Plasma by Aqueous Two Phase System Fractionation. Biotechnology Progress 28 (4): 1005-1011.
 8. Díaz, C., **Vargas, M.** 2012. Estudio de validación pre-clínica del uso tradicional anti-tumoral de Uncaria tomentosa (Uña de gato). Revista Médica de la Universidad de Costa Rica 6 (1): 24-31.
 9. Villalta, M., Pla, D., Yang, S.L., Sanz, L., Segura, A., **Vargas, M.**, Chen, P.Y., Herrera, M., Estrada, R., Cheng, Y.F., Lee, C.D., Cerdas, M., Jiang, J.R., Angulo, Y., León, G., Calvete, J.J., Gutiérrez, J.M. 2012. Snake venomics and antivenomics of *Protobothrops mucrosquamatus* and *Viridovipera stejnegeri* from Taiwan: Keys to understand the variable immune response in horses. J. Proteomics 75: 5628-5645.
 10. Segura, A., Herrera, M., Villalta, M., **Vargas, M.**, Gutiérrez, J.M., León, G. 2012. Assessment of snake antivenom purity by comparing physicochemical and immunochemical methods. Biologicals 41 (2): 93-97.
 11. Rojas, A., **Vargas, M.**, Ramírez, N., Estrada, R., Segura, A., Herrera, M., Villalta, M., Gómez, A., Gutiérrez, J.M., León, G. 2013. Role of the animal model on the pharmacokinetics of equine-derived antivenoms. Toxicon 70: 9-14.
 12. León, G., Herrera, M., Segura, Á., Villalta, M., **Vargas, M.**, Gutiérrez, J.M. 2013. Pathogenic mechanisms underlying adverse reactions induced by intravenous administration of snake antivenoms. Toxicon 76: 63-76.
 13. Gutiérrez, J.M., Solano, G., Pla, D., Herrera, M., Segura, A. Villalta, M., **Vargas, M.**, Sanz, L. Lomonte, B., Calvete, J.J., León, G. 2013. Assessing the preclinical efficacy of antivenoms: From the lethality neutralization assay to antivenomics. Toxicon 69: 168-179.
 14. Olmedo, H., Herrera, M., Rojas, L., Villalta, M., **Vargas, M.**, Leiguez, E., Teixeira, C., Estrada, R., Gutiérrez, J.M., León, G., Montero, M.L. Comparison of the adjuvant activity of aluminum hydroxide and calcium phosphate on the antibody response towards *Bothrops asper* snake venom. 2013. J Immunotoxicology 11 (1): 44-49.
 15. Laines, J., Segura, Á., Villalta, M., Herrera, M., **Vargas, M.**, Alvarez, G., Gutiérrez, J.M., León, G. 2014. Toxicity of *Bothrops sp* snake venoms from Ecuador and preclinical assessment of the neutralizing efficacy of a polyspecific antivenom from Costa Rica. Toxicon 88:34-7.
 16. Herrera, M., Tattini, V. Jr, Pitombo, R.N., Gutiérrez, J.M., Borgognoni, C., Vega-Baudrit,

- J., Solera, F., Cerdas, M., Segura, A., Villalta, M., **Vargas, M.**, León, G. 2014. Freeze-dried snake antivenoms formulated with sorbitol, sucrose or mannitol: Comparison of their stability in an accelerated test. *Toxicon* 90:56-63
17. Herrera, M., Paiva, O.K., Pagotto, A.H., Segura, A., Serrano, S.M., **Vargas, M.**, Villalta, M., Jensen, S.D., León, G., Williams, D.J., Gutiérrez, J.M. 2014. Antivenomic Characterization of Two Antivenoms Against the Venom of the Taipan, *Oxyuranus scutellatus*, from Papua New Guinea and Australia. *Am J Trop Med Hyg.* 91 (5):887-94
 18. **Vargas, M.**, Segura, A., Villalta, M., Herrera, M., Gutiérrez, J.M., León, G. 2014. Purification of equine whole IgG snake antivenom by using an aqueous two phase system as a primary purification step. *Biologicals* 43 (1): 37-46.
 19. **Vargas, M.**, Segura, A., Wu, Y-W, Herrera, M., Chou, M.L., Villalta, M., León, G., Burnouf, T. 2014. Human plasma-derived immunoglobulin G fractionated by an aqueous two-phase system, caprylic acid precipitation, and membrane chromatography has a high purity level and is free of detectable in vitro thrombogenic activity. *Vox Sanguinis* 108(2): 169-177.
 20. El-Ekiaby, M., **Vargas, M.**, Sayed, M., Gorgy, G., Goubran, H., Radosevic, M, Burnouf. T. 2015. Minipool caprylic Acid fractionation of plasma using disposable equipment: a practical method to enhance immunoglobulin supply in developing countries. *PLoS Negl Trop Dis.* 9(2).
 21. Arroyo, C., Solano, S. Herrera, Segura, Á., Estrada, R., **Vargas, M.**, Villalta, M., Gutiérrez, J.M., León, G. 2015. *Lachesis stenophrys* venom reduces the equine antibody response towards *Bothrops asper* venom used as co-immunogen in the production of polyspecific snake antivenom. *Toxicon* 103 (1): 99-105.
 22. León, G., Segura, Á., Gómez, A., Hernández, A., Navarro, D., Villalta, M., **Vargas, M.**, Herrera, M., Gutiérrez, J.M. 2015. Industrial production and quality control of snake antivenoms. En: *Venom Genomics and Proteomics* (Gopalakrishnakone, P., Calvete, J.J., Eds.). Springer, pp. 1-22.
 23. Rodríguez, C., Estrada, R., Herrera, M., Gómez, A., Segura, Á., **Vargas, M.**, Villalta, M., León, G. *Bothrops asper* envenoming in cattle: Clinical features and management using equine-derived whole IgG antivenom. *The Veterinary Journal.* En prensa.
 24. Sánchez, A., Coto, J., Segura, Á., **Vargas, M.**, Solano, G., Herrera, M., Villalta, M., Estrada, R., Gutiérrez, J.M., León, G. 2015. Effect of geographical variation of *Echis ocellatus*, *Naja nigricollis* and *Bitis arietans* venoms on their neutralization by homologous and heterologous antivenoms. *Toxicon.* En prensa.

PATENTES

Método para la producción de formulaciones inyectables de productos proteicos hemoderivados y productos obtenidos utilizando dicho método. Solicitud internacional publicada WO2012/136172A1.

DISTINCIIONES

2010: Premio “Espíritu Emprendedor”. Talent and Innovation Competition of the Americas. Young Americas Business Trust. Lima, Perú.