Institute of Zoology and Biomedical Research

**Topic: Chemical communication in lizards: pheromone diversity in relation to environmental cues**

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**Background information**

The chemical compositions of pheromones are linked to the environmental conditions that a species inhabits. Lizards possess femoral glands that produce secretions composed of lipids and proteins. These secretions play a pivotal role in sexually-mediated behaviour and may also indicate body/social condition and should therefore be under strong selection. Not all lipid components are known in lizards, and many species remain unstudied. Nothing is known of the proteins in femoral gland secretions. This project aims to describe the femoral gland lipidome and proteome of several lacertid species, and then test specific hypotheses on whether the chemical compositions of the secretions are fine-tuned to the local climatic and geophysical conditions.

**The main question to be addressed in the project**

Do environmental factors promote the evolution of divergent chemical signals in lacertid lizards at the intraspecific and interspecific levels?

**Information on the methods/description of work**

The student will conduct fieldwork (sampling femoral gland secretions, habitat evaluation) and use chromatographic/spectrometric and proteomic techniques to determine the composition of pheromones. Other responsibilities include data analysis, drafting manuscripts, and presenting results at seminars and conferences. Additional avenues of research could involve comparative analyses of the lipidome across multiple species and behavioural studies investigating the functions of femoral gland secretions.

**Additional information (e.g Special requirements from the student):**

Candidates are expected to have a strong interest in evolutionary biology and a basic knowledge of chemical ecology. Previous work on lizard ecology is highly desirable.

**Place/name of potential foreign collaborator: Museo Nacional de CienciasNaturales, Madrid, Spain**

**References**

Houck, L. D. (2009). Pheromone communication in amphibians and reptiles. *Annual Review of Physiology*, 71, 161-176.

García‐Roa, R., Jara, M., López, P., Martín, J., &Pincheira‐Donoso, D. (2017). Heterogeneous tempo and mode of evolutionary diversification of compounds in lizard chemical signals. *Ecology and Evolution*, 7, 1286-1296.

Ibáñez, A., Klein, C., Quezada, G., Krüger, M., Brodesser, S., &Steinfartz, S. (2018). Characterization of lipid structures in femoral secretions of Galápagos marine iguanas by shotgun lipidomics. *Chemoecology*, 28, 21-28.