MAX PLANCK INSTITUTE
FOR CHEMICAL ECOLOGY

Applications are invited for a

PhD position on molecular and cellular effects of toxin resistance mutations

Supervisor: Shabnam Mohammadi, Max Planck Research Group Leader

Group: Evolutionary and Integrative Physiology

Salary level: 65% E 13

Start date: 1st Nov 2024 is preferred

End of employment period: The initial fixed term is three years.

Scope of work: full-time (39 hours per week)

Job Description

The group's current work is focused on understanding how novel protein functions (e.g., resistance to toxins) evolve. We investigate broad-scale patterns of evolution as well as mechanisms of adaptation at different hierarchical levels of biological organization. Consequently, our work covers genomic evolution (in silico), molecular function (in vitro), and whole organism physiology (in vivo). We are currently applying this interdisciplinary approach to elucidate the evolution of cardiotonic steroid resistance in vertebrates. For more information about our work, please visit https://www.mohammadi-lab.com/.

The project aims to elucidate the effects that resistance-producing mutations have on protein function and cell physiology. You will address this goal by combining the functional characterization of recombinant proteins with assays of transgenic cells in an experimentally defined framework. You will have the option to apply this approach to examine the evolution of cardiotonic steroid resistance in several predator species, including snakes, frogs, birds, and mammals. You will measure the effects that mutations have on protein function, cell signaling, and cellular homeostasis. The data obtained will allow you to correlate the gene-, protein, and cell-level consequences and benefits of cardiotonic steroid resistance. Depending on your interests, this project can develop to address more

The Max Planck Society is one of Europe's leading research organizations and conducts basic research in the natural sciences, life sciences, and humanities. The Max Planck Institute for Chemical Ecology in Jena carries out fundamental research on how organisms communicate with each other via chemical signals. We analyze ecological interactions with molecular, chemical and neurobiological techniques. In the Institute, organic chemists, biochemists, ecologists, entomologists, behavioral scientists, insect geneticists and physiologists work in collaboration to unravel the complexity of chemical communication that occurs in nature.

The Max Planck Society is committed to gender equality and diversity and actively supports the reconciliation of work and family life. We want to increase the proportion of women in areas where they are underrepresented. The Max Planck Society has also set itself the goal of employing more persons with severe disabilities. We therefore encourage them to apply. We also welcome applications from all backgrounds.

Have we sparked your interest? Please apply. We are looking forward to getting your complete application documents.

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detailed questions about the evolution cardiotonic steroid resistance and/or be developed into a comparative study involving multiple species.

The Max Planck Institute for Chemical Ecology provides a thriving, international, and multidisciplinary research environment. The project can benefit from state-of-the-art facilities and equipment, access to expert service groups for mass spectrometry (with MALDI-MS imaging, untargeted metabolomics, and sensitive targeted metabolite quantification platforms) and NMR, as well as world-class researchers in chemical ecology and evolutionary biology. The working language of the institute is English. For more information, please visit www.ice.mpg.de. We offer a competitive salary, generous holiday entitlement, and pension scheme, as well as career development training. The Max Planck Society is committed to equal opportunities and diversity (www.mpg.de/equal_opportunities). We welcome qualified applicants from all backgrounds.

Candidate Requirements

- Proactive, dynamic, and curious
- Excellent communication and organizational skills
- Proficiency in written and spoken English
- University degree in a relevant field
- Experience with bioinformatics, biochemical analysis, and cell culture is preferred

To Apply

Please send a cover letter (≤ 2 pages) stating why you are applying for this position, what your proposed research goals are, and why you would be a good fit, along with your CV, copies of degree certificate(s), and the names and contacts of 2-3 references as a single PDF to here (https://jobs.ice.mpg.de/en/jobposting/2f627053ea0a39c91d5b679ea22c59de756eadff0/apply). Informal inquiries about the position can be addressed to Dr. Mohammadi (smohammadi@ice.mpg.de).

Review of applications will start on Sep 7, 2024 and will continue until the position is filled.

Reading (optional)

1. Mohammadi S., Yang L., Bulbert M.W., Rowland H.M. (2022). Defence mitigation by predators of chemically defended prey integrated over the predation cycle and across biological levels. Royal Society Open Science 9:220363. doi: 10.1098/rsos.220363

2. Mohammadi S., Yang L., Harpak A., Herrera-Álvarez S., Rodríguez-Ordoñez M.P, Peng J., Zhang K., Storz J.F., Dobler S., Crawford A.J., Andolfatto P. (2021). Concerted evolution reveals co-adapted amino acid substitutions in frogs that prey on toxic toads. Current Biology 31:2530–2538. doi: 10.1016/j.cub.2021.03.089

3. Lingrel JB. 2010 The physiological significance of the cardiotonic steroid/ouabain-binding site of the Na, K-ATPase. Annual review of physiology 72, 395–412.

4. Pierre SV, Blanco G. 2021 Na/K-ATPase Ion Transport and Receptor-Mediated Signaling Pathways. The Journal of Membrane Biology 254, 443–446.