

NOMATEN Online Seminar

Time: 1 PM

Location: gotomeeting room - <https://meet.goto.com/NCBJmeetings/nomaten-seminar>

Seminar date: December 5th, 2023

Title:

Structural and functional diversity of venom toxins interacting with GPCRs

Speaker name: Dr. Denis Servent

**Speaker affiliation: French Alternative Energies and Atomic Energy Commission (CEA),
France**

Abstract: Peptide toxins from venoms have undergone a long evolutionary process allowing host defense or prey capture and making them highly selective and potent for their target. This has resulted in the emergence of a large panel of toxins from a wide diversity of species, with varied structures and multiple associated biological functions. In this way, animal toxins constitute an inexhaustible reservoir of druggable molecules due to their interesting pharmacological properties. One of the most interesting classes of therapeutic targets is the G-protein-coupled receptors (GPCRs) that represent the largest family of membrane receptors in mammals with approximately 800 different members. They are involved in almost all biological functions and are the target of almost 30% of drugs currently on the market. Given the interest of GPCRs in the therapeutic field, the study of toxins that can interact with and modulate their activity with the purpose of drug development is of particular importance. The presentation will focus on toxins targeting GPCRs, including peptide-interacting receptors or aminergic receptors, with a particular focus on structural aspects and potential medical applications. The toxins exhibit a great diversity in size, from 10 to 80 amino acids long, in disulfide bridges, from none to five, and belong to a large panel of structural scaffolds, including inhibitory cysteine knot (ICK), three-finger fold, and Kunitz-type toxins. These toxins belong to two distinct families, (i) agonist-mimicking toxins that act as endogenous agonists targeting the corresponding receptor, and (ii) toxins that differ structurally from natural agonists and which display agonist, antagonist, or allosteric properties.

Bio: Dr. Denis Servent is Research Director and Head of the Molecular Engineering for Health Department (SIMoS, 65 people) at CEA (French Alternative Energies and Atomic Energy Commission). Dr. Servent holds a PhD in Biotechnology at the University of Compiègne in 1990 and after a postdoctoral position in protein crystallography at Gif/Yvette, he was recruited by the CEA in Saclay. Since then, his research has focused on the exploitation of natural molecules present in venoms, and more recently also produced by marine microorganisms, for pharmacological and therapeutical applications. His expertise ranges from peptide chemistry and engineering to *in vitro* and *in vivo* characterization of their pharmacological interaction with two major families of membrane proteins: the ion channels and the G-Protein Coupled Receptors.