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Institut d'Imagerie Biomédicale
Service Hospitalier Frédéric Joliot

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Salle de conférence
du Service Hospitalier Frédéric Joliot
(SHFJ)

Assessing animal venom toxins
for drug discovery

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Résumé

Nature is a generous source of compounds with potential to treat human diseases. In this scenario, the research on natural products has demonstrated significant progress in the discovery of compounds with therapeutic or biotechnological applications. Research in my laboratory has centered on the isolation and characterization of peptide toxins from venomous animals aiming to prospect for novel leads/drugs, and eventually identifying new pathways and mechanism(s) of action.

To take as an example we will present crotamine, which is a basic 42-residue polypeptide from the South American rattlesnake *Crotalus durissus terrificus* venom that has specificity for rapidly dividing cells. Crotamine penetrates and kills tumoral cells in vitro and also in vivo, besides showing antimicrobial activity with no hemolytic activity. Crotamine forms complexes with a variety of DNA and RNA molecules, and crotamine-plasmid DNA nanoparticles are selectively delivered into actively proliferating cells in culture or in mice. As such, these nanoparticles could form the basis for a nucleic acid drug-delivery system. More recently, the potential medical use of crotamine as a bioactive peptide killing aggressively growing cancer cells was demonstrated by us and its application as potential imaging agent for cancer diagnosis, as well as a theranostic agent is being explored (Patent PCT/BR06/000052; US-2008-0181849-A1; 1866332 EPO Bulletin No. 37/14 in Sept 10th, 2014).

Finally, should time permit, I will present some other similar examples of toxins from pit viper, scorpion and frog, with different properties and therapeutic applications.
