Snake Venom Peptides and Low Mass Proteins: Molecular Tools and Therapeutic Agents | Bentham Science (eurekaselect.com)

Abstract

Snake venoms are natural sources of biologically active molecules that are able to act selectively and specifically on different cellular targets, modulating physiological functions. Thus, these mixtures, composed mainly of proteins and peptides, provide ample and challenging opportunities and a diversified molecular architecture to design and develop tools and agents of scientific and therapeutic interest. Among these components, peptides and small proteins play diverse roles in numerous physiological processes, exerting a wide range of pharmacological activities, such as antimicrobial, antihypertensive, analgesic, antitumor, analgesic, among others. The pharmaceutical and cosmetic industries have recognized the huge potential of these privileged frameworks and believe them to be a promising alternative to contemporary drugs. A number of natural or synthetic peptides from snake venoms have already found preclinical or clinical applications for the treatment of pain, hypertension, cardiovascular diseases and aging skin. A well-known example is captopril, whose natural peptide precursor was isolated from Bothrops jararaca snake venom, which is a peptide-based drug that inhibits the angiotensin-converting enzyme, producing an anti-hypertensive effect. The present review looks at the main peptides (natriuretic peptides, bradykinin-potentiating peptides and sarafotoxins) and low mass proteins (crotamine, disintegrins and three-Finger toxins) from snake venoms, as well as synthetic peptides inspired by them, describing their biochemical, structural and physiological features, as well as their applications as research tools and therapeutic agents.

Keywords: Crotamine, sarafotoxin, natriuretic peptide, bradykinin-potentiating peptide, disintegrin, three-finger toxin.