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Isolation and structure elucidation of new cytotoxic polypeptide from bee venom

Hesham R El-Seedi[1], **Aida A Abd El-Wahed**[1,2], **Robert Burmana**[1] and **Ulf Göransson**[1]
[1]University of Malaya, Malaysia
[2]Plant Protection Research Institute - Agricultural Research Centre, Egypt

Honeybee is an important economic insect, which have vital role in the pollination for crops and wild flowers. In addition to ecological importance, honeybee supplies with various products, including bee venom (BV). This venom has been used in traditional medicine for thousands of years and there is an increasing interest in their applications in modern medicine. BV has diverse biological activities as anticancer, antimicrobial, anti-inflammatory, antiviral and hepatoprotective. Today there is an urgent call to find anticancer agents from the natural products with less ecological damage and minimum health and environmental hazards. Our main aim is to identify and characterize the bioactive peptides from bee venom. These peptides have been poorly characterized, partly because they are generally present in trace quantities. Isolated active peptides from the bee venom have been identified using techniques including High Performance Liquid Chromatography (HPLC), Mass Spectrometry (MS, LC/MS, MS /MS), Amino Acid Analysis (AAA) and 2D-Nuclear Magnetic Resonance Spectroscopy (2D-NMR). Polar fractionation prior to screening of anticancer has been done. The bioassay-guided isolation for bee venom leads to isolation of four peptides melittin, apamin, MCD and secapin. Melittin showed cytotoxic activity on three cancer cell lines: lymphoma cells U-937GTB, myeloma cells RPMI 8226/s, leukaemia cells CCRF-CEM and two drug-resistant sub-lines (PRMI 8226/Dox40 and CEM/VM-1), with IC50 values of 1.3, 1.1, 1.4, 1.7, 2 μM, respectively.

hesham.el-seedi@fkog.uu.se

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