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MEETING ABSTRACT

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Analgesic action of *Androctonus crassicauda* venom: evidence for new analgesic peptides

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Background: Scorpions are living more than 400 million years by the help of their powerful venom against almost all animals and mammals including humans. *Androctonus crassicauda* (Olivier 1807), known as black scorpion in Turkey, is one of the venomous scorpions and most toxic for mammals and humans. *Mesobuthus gibbous* (Brulle 1832), known as yellow scorpion is known as less toxic than *A. crassicauda* and reported to have ethnomedical use for limited inflammatory diseases. The aim of this study was to investigate analgesic actions of the whole venoms of *A. crassicauda* and *M. gibbous* in mice.

Methods: The venoms of *A. crassicauda* gathered from Southeast Turkey and *M. gibbous* gathered from Southwest Turkey were obtained by mild electrical stimulation of telsons and were lyophilized. Samples of dried whole venom were diluted by 0.9 % NaCl and used for analgesic tests (0.001 mg/kg, i.p.). Application of a bulldog clamp on the tail of Balb/c albino mice of either sex was used as mechanical algesic stimulus, and 52 °C water for thermal algesia. Cut-off time ($t_{\text{cut-off}}$) was 15 sec; pre-drug and post-drug withdrawal latencies ($L_{\text{pre-drug}}$, $L_{\text{post-drug}}$) were used to calculate percent analgesia as follows:

$$\%\, analgesia = \left(\frac{L_{post\text{-}drug} - L_{pre\text{-}drug}}{t_{cut\text{-}off} - L_{pre\text{-}drug}}\right) \times 100$$

Venom peptide sequences were downloaded from the Uniprot protein databank. R/Bioconductor packages were used for alignment of proteins, statistical evaluation and plotting. Differences between values were tested using Student's *t*-test; the null hypothesis was rejected when p was < 0.05.

Results: Analgesic activity on mechanical algesia was observed for *A. crassicauda* venom but not for the venom of *M. gibbous*. Both venoms were inactive on thermal stimulation. Alignment of the proteins of *A. crassicauda* and *M. gibbous* showed considerable differences, especially for the tyrosine amino acid residues.

Discussion: To the best of our knowledge, only *M. gibbous* has ethnomedical use in Turkey and the eastern Mediterranean regions. Alignment of toxins of the whole venom of *A. crassicauda* showed the 5th and 42th amino acids were tyrosine in toxins named SCX8 and the 41th was tyrosine in SCX5. Because of the importance of these located tyrosine amino acids on analgesic actions of toxins, SCX8 and SCX5 are new candidates for analgesic peptides.

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