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Role of mast cells in pulmonary damage after *Androctonus australis* hector scorpion envenoming

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Abstract

Introduction: In the most severe cases of human poisoning by *Androctonus australis* hector, pulmonary edema is a frequent finding and can be the cause of death. Mast cells can release a range of mediators known to be involved in the development of lung edema following *Androctonus australis* hector (Aah) venom injection. The present study investigated the role of the mast cells in inflammatory response after Aah scorpion envenoming.

Materials and Methods: To elucidate the role of mast cells, mice were pretreated with compound 48/80 (mast cell depleting agent) for 4 days. A dose of 0.6 mg/kg of compound 48/80 was injected intraperitoneally twice daily for 3 days and 1.2 mg/kg, twice in the next day. On the fifth day, a sublethal dose of Aah venom was injected subcutaneously, and mice were sacrificed after 4h to collect BALF (bronchoalveolar lavage fluid), blood and lungs. Pulmonary water content was assessed, total cell count was performed in BALF and blood, eosinophil peroxidase activity (EPO) and myeloperoxidase activity (MPO) were determined in BALF, serum and lungs. The ability of Aah scorpion venom to increase vascular permeability and to induce oedema was also demonstrated by Evans blue dye (EBD) technique. Evans blue (20 mg/kg) was injected into the tail vein just prior to the administration of Aah venom or vehicle (saline). Changes in vascular permeability were assessed by measuring the amount of EBD extravasation in the bronchoalveolar lavage and in the lung after 2, 4, 6 and 24h.

Results: Our results demonstrate an important role for mast cells in the development of lung oedema, the recruitment of inflammatory cells and the increase of MPO and EPO activities in BALF and lungs in mice following the subcutaneous administration of Aah scorpion venom. The oedema and the increase in vascular permeability were maximal within 4 h and had resolved after 24 h.

Conclusion: In conclusion, Aah scorpion venom induces lung oedema by triggering the formation of different inflammatory mediators and pathways, where mast cells seem to play a pivotal role.

Keywords: *Androctonus australis* hector; Compound 48/80; Evans blue dye; Inflammatory mediators; Lung; Mast cells; Scorpion venom.