**Effect of serine protease inhibitor rBmTI-A in a model of pulmonary emphysema**


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Emphysema is a chronic obstructive pulmonary disease (COPD) which causes loss of respiratory surface, decreased elastic recoil and lung hyperinflation. It is considered incurable and its prevalence has increased across the planet, the main risk factors are smoking, pollution and genetic factors. Some enzymes are involved in the installation process of the disease, such as metallo and serine proteases, specifically the human neutrophil elastase. The serine protease inhibitors have been investigated as an alternative to prevent the development of emphysema. In this work we are investigating the potential of the recombinant serine protease inhibitor rBmTI-A (cloned from gut of the tick *Rhipicephalus Boophilus microplus*) against pulmonary emphysema development in mice. Methods: 40 adults C57BL/6 mice were submitted to either a nasal instillation of 50 uL (0.667 UI) of porcine pancreatic elastase or normal saline and 1 hour after, animals received a second nasal instillation of 50 uL of either a protease inhibitor (r-BmTIA, 35.54 pmol) or normal saline. After 21 days, Bronchoalveolar lavage (BAL) with phosphate buffer pH 7.4 was collected and lungs were removed; lungs extracts was prepared in 0.1M Tris-HCl pH 8.0 buffer containing 0.150M NaCl, and 0.1% tween 20. The proteolytic activities in BAL and lungs extracts were tested using the fluorogenic substrates Tosyl-GLY-PRO-ARG-MCA and Suc-ALA-ALA-PRO-VAL-MCA. Results: the samples from induced emphysema group treated with rBmTI-A presented differential proteolytic activity than the control groups, indicating a interference of rBmTI-A in balance of trypsin like proteases and neutrophil elastases from the mice lungs.

Keywords: Serine Protease Inhibitor, Kunitz-BPTI, *Rhipicephalus Boophilus microplus*, Emphysema, COPD.
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