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Anti-Hypertensive Effect of Proteolysate Generated from Actinopyga lecanora in Rats

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Abstract : Hypertension is a common and serious chronic health problem and known as the most important risk factor for development of many diseases such as stroke. Since angiotensin I-converting enzyme (ACE) is the key enzyme involved in blood pressure, one of the well accepted mechanisms to control hypertension is through ACE inhibition. The ACE inhibitory effect of Actinopyga lecanora (stone fish) proteolysate in vitro had been reported. Hence, this study aimed to evaluate the ACE inhibitory potential of Actinopyga lecanora proteolysate in vivo in normotensive rats. Therefore the ACE inhibitory capability of the proteolysate to prevent increasing systolic blood pressure, after inducing hypertension by angiotensin I was examined. The pre-fed rats with the proteolysates at various doses (200, 400, 800 mg/kg body weight) revealed the significant ($p \leq 0.05$) suppression effect compared with control groups. Furthermore, different doses of the proteolysate (200, 400, 800 mg/kg body weight) were examined to find its optimum effective dose. Results depicted that 800 mg proteolysate/kg body weight significantly reduced systolic blood pressure without negative effect on normal blood pressure ($p \leq 0.05$). Furthermore, Sub-acute toxicity study based on OECD guideline demonstrated the safety of the proteolysate in vivo. The present study indicated that the proteolysate at a dose of 1000 mg/kg daily for 14 days did not cause toxicity signs such as death, changes in activity, or piloerection. Since there are no significant differences between treated groups and control groups, hematological and biochemical analysis confirmed safety of the proteolysate ($p > 0.05$). In addition, there were no significant differences between organs weights of the treated groups and the control groups. Morphologically, neither histopathological changes, nor gross abnormalities were observed. However, the proteolysate caused significant decrease in body weight in relation to the control groups ($p \leq 0.05$) probably due to appetite stimulation by the proteolysate, leading to decreased food consumption in sub-acute group. It is concluded that the proteolysate generated from Actinopyga lecanora possess a significant anti-hypertensive effect and would be potentially used as natural alternative of ACE inhibitors.

Keywords : ACE inhibition, Actinopyga lecanora, anti-hypertensive activity, bioactive peptides, normotensive rats
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