Modulatory Effects of Bothrops jararaca and Lachesis muta Snake Venoms on the Rat Brain (Na⁺/K⁺)-ATPase Activity

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INTRODUCTION: The (Na⁺/K⁺)–ATPase bioelectrogenic property is essential for different physiological processes, such as the nervous cells excitability, muscular contraction, renal sodium reabsorption and osmotic control of the water cellular content. Several works have reported that venoms from different animals interfere in the (Na⁺/K⁺)–ATPasic activity. Venoms have proteins in their composition and they respond for different biological effects induced in the victims, such as cardiotoxicity, neurotoxicity, miotoxicity, hemolysis, hypotension and others. In the present work the effects of Lachesis muta and Bothrops jararaca snake venoms on the (Na⁺/K⁺)–ATPasic activity of rat brain homogenates were evaluated.

MATERIAL AND METHODS: The protein concentration in rat brain homogenates was determined by the method described by Bradford (1976). The (Na⁺/K⁺)–ATPasic activity was determined by the Fiske-Subarow modified method, as the 1mM Ouabain-sensitive production of the inorganic phosphate (Pi).

RESULTS AND DISCUSSION: At saturating (5 mM) ATP concentration, the (Na⁺/K⁺)–ATPasic activity was not significantly altered by the Bothrops jararaca or Lachesis muta venoms (from 0.08mg/mL to 0.4mg/mL). However, at sub-saturating (0.5 mM) ATP concentration, the Bothrops jararaca venom (0.4mg/mL) induced a significant reduction (53%) in the (Na⁺/K⁺)–ATPasic activity, while the Lachesis muta venom did not induce significant alterations in the (Na⁺/K⁺)–ATPasic activity.

CONCLUSIONS: Taken together, our results demonstrate that neither the Lachesis muta nor the Bothrops jararaca venoms affected the (Na⁺/K⁺)–ATPasic activity present in rats brain homogenates at saturating ATP concentration. On the other hand, at sub-saturating ATP concentration, our data demonstrate that the Bothrops jararaca reduces the enzyme activity while the Lachesis muta venom did not change the (Na⁺/K⁺)–ATPasic activity significantly.

Word Keys: (Na⁺/K⁺)–ATPase, Enzyme, Venom, Bothrops jararaca, Lachesis muta.

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