

A62

Cardiotoxic activity of polymeric 3-alkylpyridinium salts from the marine sponge *Reniera sarai*

Mojca Lunder¹, Lovro Žiberna¹, Kristina Sepčič² and Gorazd Drevenšek¹

¹*Institute of Pharmacology and Experimental Toxicology, Faculty of Medicine, University of Ljubljana, 1000 Ljubljana, Slovenia*

²*Department of Biology, Biotechnical Faculty, University of Ljubljana, 1000 Ljubljana, Slovenia*

E-mail: mojca.lunder@mf.uni-lj.si

Background

Marine sponges are a rich source of novel biologically active substances such as haemolytic proteins, hemagglutinins and proteins with antimicrobial, antiviral and antifungal activity. Toxic water-soluble polymeric 3-alkylpyridinium salts (poly-APS) have been isolated from the marine sponge *Reniera sarai*. Poly-APS has pore-forming properties expressed in a dose-dependent manner. These interactions with cell membranes results in increased Ca²⁺ permeability. In *in vivo* experiments performed in rats, poly-APS caused transient bradycardia, prolongation of expirium, lowered blood pressure, formed numerous thrombocyte aggregates and caused death. The aim of the present study was to investigate the direct cardiotoxic effects of poly-APS on isolated rat hearts.

Methods

Poly-APS isolated from the marine sponge *Reniera sarai* was purified and lyophilized. The experiments were carried out on the isolated rat hearts (Wistar rats, n = 30, weight 250–290 g) of both sexes according to Langendorff. The isolated rat hearts were perfused with different poly-APS concentrations (1, 10 and 100 nmol/L and 1 μmol/L). During the experiments, the coronary flow rate, lactate dehydrogenase (LDH) release rate, left ventricular pressure, heart rate and duration of arrhythmias were measured.

Results

The most evident activity in all of the studied parameters was observed in the group perfused with poly-APS in a concentration of 1 μmol/L. Only the lowest concentration of poly-APS that was used (1 nmol/L) did not influence the measured parameters. Poly-APS in a concentration of 1 μmol/L diminished the coronary flow 7.6-fold, increased LDH release rate 12.7-fold, increased the pressure in left ventricle 2.6-fold and diminished heart rate 2.9-fold compared to the control group (all p < 0.001). Poly-APS also showed proarrhythmogenic activity.

Conclusions

Poly-APS salts isolated from the marine sponge *Reniera sarai* showed potent cardiotoxic activity on isolated rat hearts.