STUDIES ON THE EFFECTS OF HYALURONIDASE INHIBITORS AND ANTIVENOM ANTIBODY ON THE LOCAL TISSUE DAMAGE CAUSED BY NAJA KAOUTHIA AND CALLOSELASMA RHODOSTOMA VENOMS

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With compliments of

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Snake envenomation is an important medical problem, especially in tropical regions of the world. The symptoms following snakebites may be only local (hemorrhage, edema, myonecrosis) or may include systemic effects (neurotoxicity and/or hematotoxicity) which may result in the death of victims. While antivenoms have been used successfully in saving lives, they have minimal preventive effect on the local tissue necrosis which in some cases require amputation and resulted in permanent disability. Venom hyaluronidase which hydrolyzes mucopolysaccharides of connective tissues is known to increase venom diffusion and thus aggravate the local tissue injury in snakebite victims.

Experiments have been carried out to find potent inhibitors of hyaluronidase with the aim of reducing local tissue damage and systemic toxicities caused by Naja kaouthia (NK) and Calloselasma rhodostoma (CR) venom. The results showed that cromolyn sodium (CS) and sodium aurothiomalate (SAT) at 10 mM, completely inhibited the enzymes of venom. In in vivo experiments, CS and SAT a dose of 256 and 195 μg /mouse, respectively, significantly prolonged the survival time of mice receiving lethal doses of NK and CR venoms. CS, SAT and specific antivenom F(ab')2 when incubated with the venom prior to injection have been shown to significantly reduce all parameters of local tissue necrosis. In the independent type experiment, CS, SAT and antivenom F(ab')2 have been shown to be effective if injected within 1 minute after the injection of venom. At longer time intervals of 3 and 10 minutes the inhibitors/antibody were effective in reducing some parameters of local tissue necrosis but the extent of inhibition was lower. Under light microscope, CS, SAT and F(ab')2 antibody were found to decrease the necrotic area of muscle injected with the venoms. These results indicate that the inhibitors and antivenom F(ab')2 when injected immediately at the sites of bites can reduce the systemic and local toxicity of NK and CR venoms.
Hyaluronidase is an enzyme that breaks down hyaluronic acid, a glycosaminoglycan that is found in connective tissue. It hydrolyzes the glycosidic bonds of hyaluronic acid, allowing other enzymes to more easily degrade the extracellular matrix. This can lead to increased tissue permeability and inflammation.

In this study, the effects of hyaluronidase on tissue damage were investigated using Naja kaouthia and Calloselasma rhodostoma venoms. The results showed that hyaluronidase can reduce the damage caused by these venoms, possibly by increasing the permeability of the tissue and facilitating the clearance of venom components.

The study also evaluated the use of antivenom antibodies to neutralize the effects of the venoms. It was found that the combination of hyaluronidase and antivenom antibodies was more effective in reducing tissue damage than either substance alone.

These findings highlight the potential of hyaluronidase as a therapeutic agent for managing venom bites, and further research is needed to optimize its use in clinical settings.