The Effect of Hyaluronic Acid and Glucose Concentration on Hyaluronidase Activity of Wound Pathogens Staphylococcusa aureus and Streptococcus agalactiae Isolated from Chronic Wounds

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Staphylococcus aureus and Streptococcus agalactiae are considered as significant wound pathogens and produce a large number of enzymes and toxins which are involved in pathogenic processes in chronic infected wounds. Hyaluronidase (hyaluronan lyase) hydrolyzes hyaluronic acid is one of the fundamental components of the dermal extracellular matrix and thus helps the bacteria to spread deeper into the body. The aim of this work was the study of the hyaluronidase activity of these pathogens in relation to the concentration of hyaluronate and glucose in the nutrient medium, with possible extrapolation of the results to the significance of hyaluronidase as the virulence factor in chronic wound infections. I performed identification of bacteria and I proved the hyaluronidase. Hyaluronidase activity was then assessed using the detection of reducing ends of carbohydrates and zymography. I used qRT-PCR method too. I found out that hyaluronidase production is regulated by hyaluronic acid and glucose in the medium. At hyaluronate concentrations of 0.1 % and higher the hyaluronidase activity was detected and consecutively increased with increasing hyaluronate concentrations. On the other hand, the addition of glucose at concentrations as low as 10 mM, significantly decreased the hyaluronidase activity. Based on these findings we may predict that the significance of hyaluronidase as a virulence factor of these bacteria depends on the type of chronic wounds and especially in diabetic wounds these factors can play an important role. Other mechanisms of tissue destruction are involved in pathogenic processes. These results are in accordance with earlier hypothesis and could be applied to the work of other researchers and maybe could be used in the development of new drugs.

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