

Role of Serratiopeptidase in Enzyme Therapy

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Abstract: *Enzymes are essential for each and every reaction in a living organism. They are necessary for adequate functioning of our whole metabolism. Enzymes often provide a means of monitoring a patient's response to therapy. Therapeutic use of natural enzyme is known as Enzyme therapy. They have even become one of the most innovative and expanding drug groups, and systemic therapy with proteolytic enzymes has become an important method of treatment in natural medicine. Serratiopeptidase is an enzyme derived from bacteria Enterobacteria serratia isolated from intestine of silkworms. Serratiopeptidase is used as an anti-inflammatory medicine. The activities of Serratiopeptidase is seen in this review. Serratiopeptidase has revealed new and more interesting applications in the field of pain management and transference of antibiotics.*

Keywords: Serratiopeptidase, anti-inflammatory, enzyme, pain

1. Introduction

Enzymes are biocatalyst which produce, with a small effort, a big effect. They are constantly produced within our body. The application of enzyme technologies to pharmaceutical research, development and manufacturing is a growing field. Enzyme therapy came into use around 1960s.[1]

Inflammation is the first step of healing process and it is the initial response towards injury, thus serves as a mechanism to protect our body. But inflammation can cause pain and damage to the body.[2]

Serratiopeptidase is a proteolytic enzyme excreted by nonpathogenic Enterobacteria serratia isolated from intestine of silkworms Bombyx mori L. It has a distinctive ability to digest the dead tissue of the Cocoon of the silkworm.[4] A grayish white to pale brown colour powder with characteristic odour.

It is widely recognised throughout Asia, Europe, US. In 1957 Japanese began using Serratiopeptidase for inflammation.[3] In human body it breaks down protein deposits such as fibrin. This is used as a natural alternative to steroids and NSAIDs without serious side effects. The enzyme causes proteolysis of all non-vital tissues including blood clots, cysts, tissue plaques and cellular debris and reduces the inflammatory response.

Serratiopeptidase binds to α_2 – macroglobulin in the blood in 1:1 ratio. It is slowly transferred to the exudates at the site of infection and inflammation. Mechanism of action is by hydrolysis of histamin, bradykinin and serotonin. By hydrolyzing bradykinin, histamine and serotonin it indirectly reduces dilatation of blood capillaries and controls permeability. Serratiopeptidase blocks plasmin inhibitors thus helping the fibrinolytic activity of plasmin. Degradation of extra-fibrin to small fragment prevent clogging of microcapillaries, helps clearance of exudates, reduces swelling and improves microcirculation. & expectoration of sputum etc.

Serratiopeptidase has been effective in transferring various antibiotics like Penicillin G, Ampicillin, Gentamicin or

Cefotaxim to the site of infection.[13] They have various activities like caseinolytic activities, fibrinolytic activities.

It was found that this enzyme is used for pain, inflammation due to arthritis, trauma, surgery, sinusitis, bronchitis, carpal tunnel and painful swelling of the breasts. Serratiopeptidase is stored at cool temperature and kept away from direct sunlight. They are available as enteric coated Serratiopeptidase granules.[16] On oral administration, serratiopeptidase is absorbed in GI tract and distributed throughout the body tissues unchanged via systemic circulation.[15]

Serratiopeptidase has few disadvantages as it is susceptible to degradation and vulnerable to acidic pH. The adverse effects may include nausea, vomiting, diarrhoea, epistaxis, haemoptysis and sometimes hypersensitivity. This increased risk of bleeding may also occur when this enzyme is taken with other natural remedies such as garlic, fish oil and turmeric.[14]

Serratiopeptidase for inflammation:

It acts in three ways in reducing the inflammation: it breaks down insoluble protein byproducts of blood coagulation, thins the fluids formed from inflammation and injury and facilitates the rate of tissue repair process. They reduce pain by blocking the pain inducing amines. It also dissolves the dead tissue surrounding the injured area and promotes healing.[5] Serratiopeptidase also works by modifying cell-surface adhesion molecules. Unlike NSAIDs pain medications, Serratiopeptidase does not cause dangerous internal bleeding and it is not addictive. They are used for the purpose of suppression and elimination of post operative bleeding, haematoma.[6]

Serratiopeptidase for Sinusitis and Bronchitis:

Inflammation is seen in the lining of the air way passage that prevent drainage of mucus during these two conditions. Obstruction is seen as the mucus in that area becomes thick. Serratiopeptidase has strong anti-inflammatory and anti-tumefacient effect. It acts by elimination of inflammatory oedema and swelling, acceleration of liquefaction of pus and sputum and enhancement of the action of antibiotics.[11] Serratiopeptidase alters the elasticity of the mucus by reducing the thickness and viscosity by

elimination of bronchopulmonary secretions and does not deplete the mucus.[8]

Serratiopeptidase for carpal tunnel syndrome:

Carpal tunnel syndrome is an inflammatory disorder of hand and wrist causing intense long lasting pain, inflammation and disability. Serratiopeptidase has an effect on this syndrome without causing side effects. It was proven to be effective at reducing swelling and pain intensity in individuals with carpal tunnel and sprained ankles.[6][9]

Serratiopeptidase for infection

Bacteria can produce biofilm which causes resistance to antibiotic. Serratiopeptidase enhances the effectiveness of antibiotics (ampicillin, cephalexin, cefotim) against biofilm and inhibits its formation. It acts as an adjuvant in infections such as alveolar abscess, periodontitis, septic abortion, salpingitis, pulmonary tuberculosis, etc. [11] It acts on the plaque accumulation in the arteries. It removes the deposits of fatty substances, cholesterol, cellular waste products, calcium and fibrin in side the artery. The anti-inflammatory activity helps in breast engorgements and pregnancy related thrombophlebitis. Serratiopeptidase restores microcirculation and increases antibiotic penetration in male genital organs. [7]

2. Conclusion

The use of enzymes in medical therapy has been limited. This Serratiopeptidase has a remarkable record of safety from decades of use by million of users all around the world. The recommended dosage for Serratiopeptidase is 10 mg to 30 mg a day. Serratiopeptidase is well known for its ability to reduce pain by blocking the release of pain-inducing molecules from inflamed tissues. [10] As enzymes bind and act on their targets with greater affinity and specificity, convert multiple target molecules to desired products, it has resulted in the development of enzyme specific drugs for a wide range of disorders.

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