SYSTEMIC ENZYME SUPPORT

Natural Immunomodulation with Systemic Enzyme Support (SES)

Inflammation

Inflammation is a complex biological process in which the body's white blood cells and chemicals provide protection from infection and foreign substances, such as bacteria, yeast, and viruses and some chemicals. It is a protective attempt by the body to remove the injurious substance and to initiate the healing process for the tissue. As such, inflammation is part of the regenerative process. Without inflammation, wounds and infections would never heal and there would be progressive destruction of tissues. The goal is not to stop inflammation, but to restore normal inflammatory processes.

In some conditions, however, the body's immune system inappropriately triggers an inflammatory response when there are no foreign substances to fight off. In these autoimmune situations the body's normally protective immune system causes damage to its own tissues. The ability of the immune system to cause too much inflammation, and actually damage tissue instead of helping it heal, is why the inflammation process must be tightly regulated by the body.

Again, the goal is not to stop inflammation, but to restore normal inflammatory processes. The biological processes of the immune system which maintain the normal inflammatory processes are heavily regulated by cytokines - signaling proteins and glycoproteins involved in cellular communication.

The Effects of Abnormal Inflammation

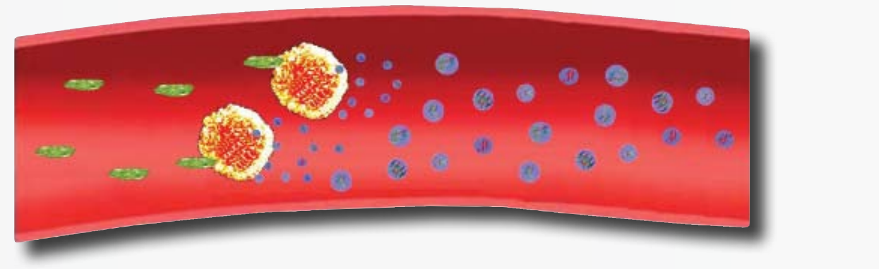
The five clinical characteristic signs of inflammation are redness (Latin *rubor*), heat (*calor*), swelling (*tumor*), pain (*dolor*), and loss of function (*functio laesa*). Excessive or chronic inflammation also result in increased biomarkers of inflammation, which are also associated with increased morbidity and mortality.

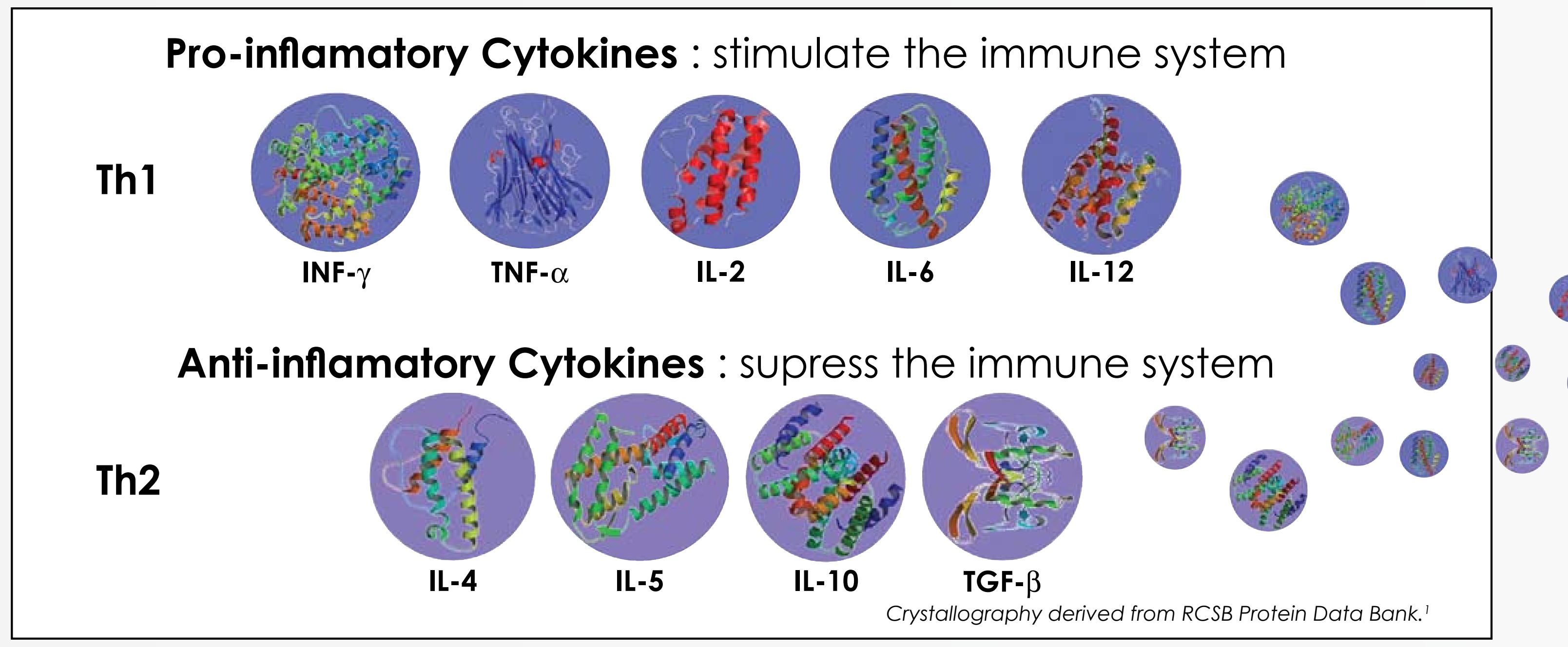
BIOMARKERS OF INFLAMMATION

Increased Erythrocyte Sedimentation Rate
Increased C-Reactive Protein
Increases Circulating Immune Complexes
Increase Cytokine Production with an Imbalance of Th1 & Th2 Cytokines
Abnormal Levels of Immunoglobulins (IgG, IgE, IgA, IgM)
Increased Fibrin Activation & Fibrosis
Increased Amyloid Production & Deposition

Inflammation & Cytokines

Cytokines such as interferon-gamma (INF-γ), tumor necrosis factor-alpha (TNF-α), transforming growth factor beta (TGF-β) and interleukins (IL-2, IL-6, IL-12, IL-4, IL-5, IL-10) are produced de novo in various cells as a direct response to stimulation of the immune system.

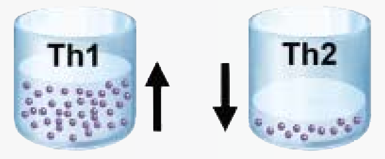




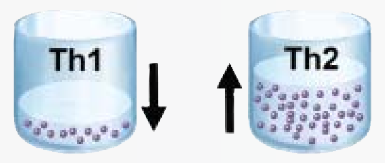
Crystallography derived from RCSB Protein Data Bank.[1]

Cytokines are signaling proteins and glycoproteins involved in cellular communication. They are produced by a wide variety of cells and are typically subdivided into two categories, Th1 & Th2.
A balance between Th1 and Th2 responses is best for optimal health.
Th1 cytokines tend to produce the pro-inflammatory responses involved in antibacterial and antiviral responses. Excessive Th1 responses can lead to uncontrolled tissue damage and may perpetuate autoimmune responses. A relative excess in Th1 is observed in acute inflammation.
Th2 cytokines tend to produce anti-inflammatory responses and can counteract the Th1 mediated microbicidal actions. Excessive Th2 responses are associated with allergies and atopy (asthma, eczema, allergic rhinitis & allergic conjunctivitis). A relative excess in Th2 is observed in chronic inflammation.

Common Cytokine Imbalances

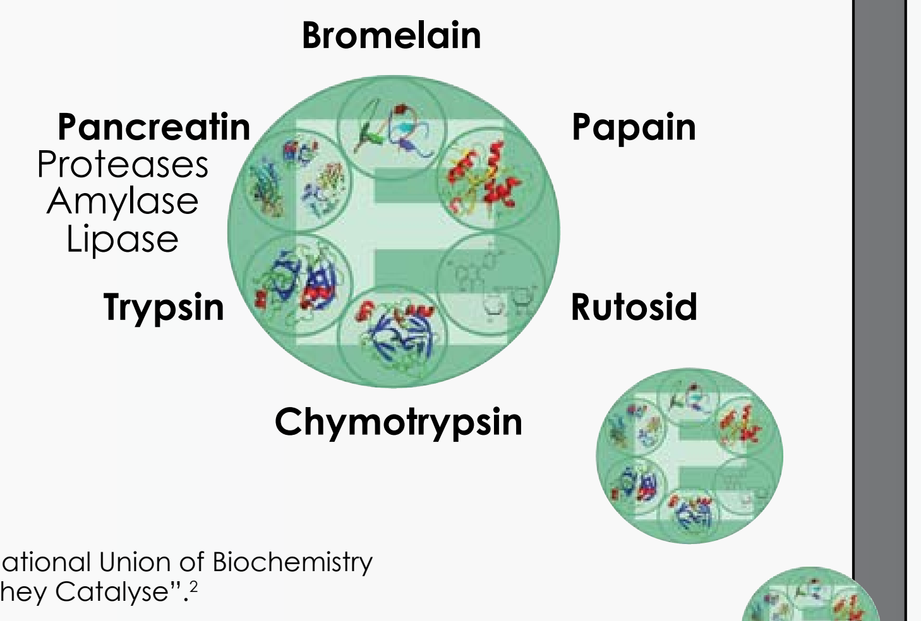


Th1/Th2 cytokine imbalance with a relative excess of Th1. This type of imbalance is often seen in acute inflammation.
The uncontrolled and excessive Th1 cytokines may often destroy tissues throughout the body and precipitate autoimmune disease in susceptible individuals.



Th1/Th2 cytokine imbalance with a relative excess of Th2. This type of imbalance is often seen in chronic inflammation.
An excess of Th2 cytokines may overly suppress microbicidal actions of Th1 cytokines. Allergies may result from excessive Th2 activity, and can often result in atopic conditions in susceptible individuals.

About Systemic Enzymes



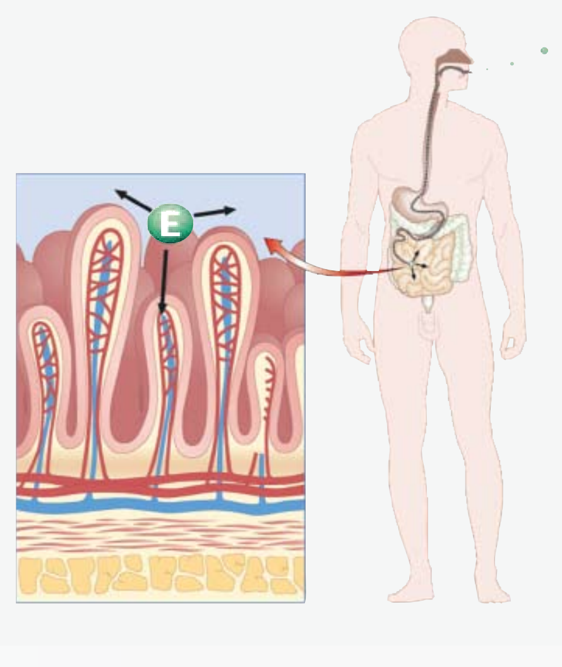
A unique clinically researched combination of proteolytic enzymes (proteases) from both plant and animal sources, which is combined with rutosid, contains endoproteinases (break peptide bonds inside protein molecules) such as the animal serine endoproteinases trypsin (EC 3.4.21.4) and chymotrypsin (EC 3.4.21.1) and the plant cysteine endoproteinases bromelain (EC 3.4.22.32) and papain (EC 3.4.22.2). Pancreatin provides additional endoproteinases as well as exopeptidase (remove an amino acid from the end of protein molecules), in addition to α-amylase (EC 3.2.1.1), the enzyme that hydrolyses starch, and lipase (EC 3.1.1.3), the enzyme that hydrolyses fats.

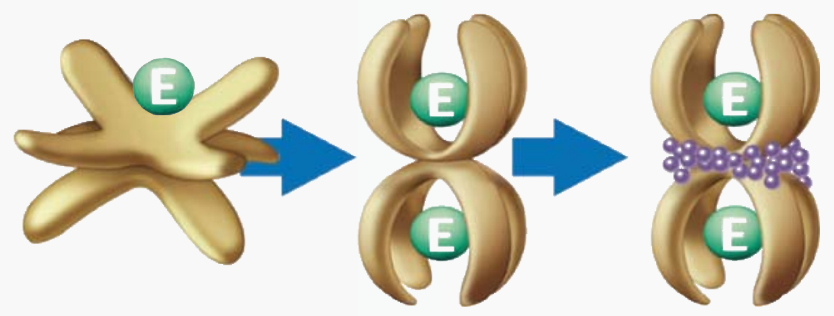
EC Numbers are based on "Recommendations of the Nomenclature Committee of the International Union of Biochemistry and Molecular Biology on the Nomenclature and Classification of Enzymes by the Reactions they Catalyse".[2]

Rutosid is a bioflavonoid that supports capillary wall strength. Improved capillary wall strength can decrease edema and vein dysfunction. Rutosid is also an antioxidant that supports the endogenous anti-inflammatory functions of the body.

Enteric coated, animal enzyme, plant enzyme and rutosid combinations are the most researched systemic enzyme formulations in the world; used by athletes, doctors and millions of people to help normalize inflammation, speed recovery from sports and other routine injuries, and promote healthy circulation.

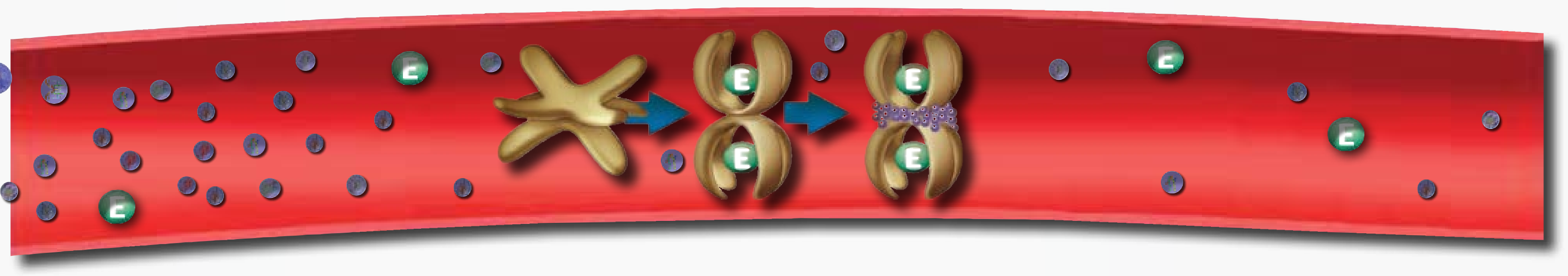
The animal enzyme, plant enzyme and rutosid combination is delivered through tablets that have a special enteric coating that can withstand the acid environment in the stomach, which is important since enzymes can be damaged by stomach acid. Once the tablet has passed a safe distance from the stomach acids, the tablet dissolves and the enzymes are efficiently absorbed by the mucosal membrane of the intestine. This process is most effective if the tablets are taken away from meals (45 minutes before meals or 1 ½ hour after meals).





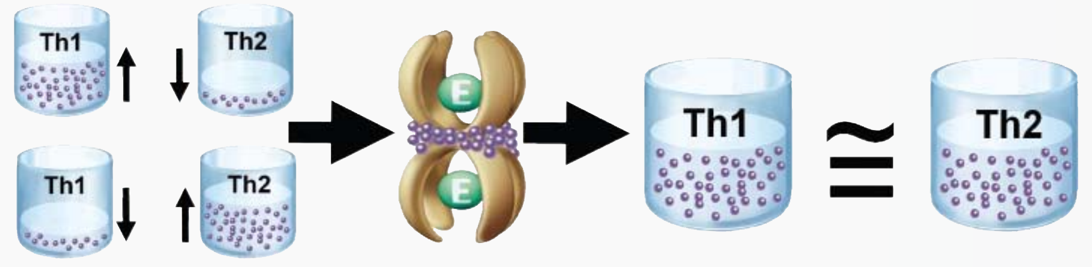
Once the proteolytic enzymes (proteases) are absorbed, protease molecules can bind with α-2-macroglobulin (alpha 2-macroglobulin), a high molecular weight plasma glycoprotein, to create α-2-macroglobulin-protease complexes.[3,4]

This binding changes the configuration of α-2-macroglobulin so that the newly activated α-2-macroglobulin-protease complex now has increased binding capacity for certain cytokines[5], as well as other proteins and glycoproteins. Protease activation of α-2-macroglobulin also facilitates its binding to, and elimination of, proteins damaged by oxidative stress or heat.[6] In addition, protease activation of α-2-macroglobulin facilitates the degradation and clearance of the amyloid beta peptide (A beta), a major component of senile plaques in degenerative brain conditions.[7-12]



The alpha 2-macroglobulin-proteinase complexes have become activated for receptor mediated endocytosis and are readily removed by hepatic α-2M-receptors (α-2M-R)[5], as well as other cells expressing α-2M-R, such as macrophages. The alpha 2-macroglobulin-proteinase complexes also modify immune responses and promote macrophage locomotion and chemotaxis[13], such that the activated alpha 2-macroglobulin-proteinase complexes are cleared from the circulation very quickly by macrophages.[14]

Immune System Balance Restored



Since cytokines are involved in inflammatory processes, the binding to cytokines and the removal of cytokines by the activated α-2-macroglobulin proteins support a balanced and properly functioning immune system. Once cytokine levels are restored to their optimal physiologically balanced state the immune system is able to resume its function of protecting the body and initiating the healing process. With renewal of the normal inflammatory process the regenerative processes of the immune system are again allowed to function.

Systemic Enzyme Support

Systemic Enzyme Support (SES) that uses clinically validated formulations of enzymes from both plants and animals is able to influence immunity in such a fashion as to reduce pain, swelling, inflammation, edema and lymphedema, and increase fibrinolysis, and the clearance of harmful immune complexes that are a result of antibody reactions. SES provides enzymes which can be utilized to assist the body's various regulatory and communications systems and supports the function of tissues at a cellular level. SES has application for degenerative conditions, immune conditions, as an adjuvant to improve management of infectious conditions, and to **support endocrine & reproductive systems** .

Systemic Enzyme Support is able to improve the management of conditions with auto-aggressive components by aiding endogenous decomposition and elimination of condition-associated circulating immune complexes that are typically noted in conditions that adversely affect **joint health, circulatory health, skin health, liver health, glucose health and heart health.**[15-23]

Promotes endogenous degradation and clearance of the amyloid beta (A beta) peptide, and could support **healthy neurological aging**.[7-12]

SES is effective for the management of **fibrocystic breast conditions** and does not interfere with already upset hormonal balance.[24-26]

Systemic Enzyme Support for **cardiovascular health** helps sustain optimal heart health by promoting healthy lipid metabolism and healthy immune function.[27-29]

The addition of Systemic Enzyme Support supports **healthy coronary circulation** and increases tolerance of physical work load.[30]

Adjuvant Systemic Enzyme Support improves **urinary tract health**, decreases concretion of urinary minerals and preserves **kidney health** when there are blood sugar disorders.[31-35]

♀ Effective support for the management of both acute and chronic **pelvic inflammation conditions**.[37]

Systemic Enzyme Support may diminish **sport & exercise related muscle discomfort and swelling**.[38]

Sports Health: Prophylactic administration of Systemic Enzyme Support in top athletes who are at risk of injury results in significantly **reduced duration of injury symptoms** and in absence from training and work due to such injuries. Systemic Enzyme Support also **improves recovery from sprains, as well as injuries requiring surgery**.[78-81]

Systemic Enzyme Support supports **healthy thyroid function** by promoting healthy immuno-thyroid function.[50]

Systemic Enzyme Support promotes normal healthy immune function within the **respiratory tract**.[51,52]

Systemic Enzyme Support promotes normal healthy immune function within the **central nervous system**.[53-55]

Skin health is supported by the immunomodulatory benefits of Systemic Enzyme Support.[56]

♂ Systemic Enzyme Support can benefit **prostate health**, as well as associated **sexual function**.[57-59]

♂♀ Systemic Enzyme Support provides immunomodulator support that can support **healthy reproductive function**.[60-62]

Knee and hip health is support by Systemic Enzyme Support in the management of degenerative joint conditions.[63-65]

Systemic Enzyme Support promotes and preserves **healthy joint cartilage in inflammatory joint conditions**.[66-76]

Venous system health and normal venous immune function benefit from Systemic Enzyme Support.[46-49]

Systemic Enzyme Support promotes **lymphatic tissue health** in both upper an lower extremities.[39-45]

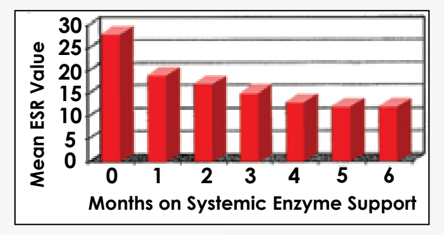
Management of **joint health in feet** can be significantly improved by the addition of Systemic Enzyme Support.[77]

The Benefits of Systemic Enzyme Support

Systemic Enzyme Support attenuates the characteristics signs of inflammation (*rubor, calor, tumor, dolor & functio laesa*) in a broad range of tissues, and is able to restore healthy levels of biomarkers associated with inflammation. The progressive inflammation, autoimmune, or immuno-deficient component of many conditions is ameliorated through the immunomodulating actions of Systemic Enzyme Support, resulting in decreased risk of disease and improved quality of life.

RESTORATION OF HEALTHY BIOMARKERS

Decreased Erythrocyte Sedimentation Rate[32, 37, 73, 74, 76, 81]
Decreased C-Reactive Protein Levels[45, 70, 81]
Decreased Circulating Immune Complex Levels[15-23, 34]
Normalization of Cytokine Levels[5, 22, 30, 68]
Normalization of Immunoglobulins (IgG, IgE, IgA, IgM)[20, 51, 71]
Restore Normal Fibrinolytic Activity[19, 37]
Promote Amyloid Catabolism[7-12]



Erythrocyte Sedimentation Rate (ESR) is progressively lowered in patients taking an animal enzyme, plant enzyme and rutosid combination for systemic enzyme support.[73]

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