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Proteases

by M. Mamadou, Ph.D.

It is important to take a protease supplement that contains proprietary, highly concentrated proteolytic (protein) enzymes. Proteolytic enzyme supplements taken by mouth on an empty stomach have been shown to be absorbed in substantial quantities into the blood, to bind to serum proteins (especially alpha 2-macroglobulin (a2M)), and to be delivered to sites of immune function. One of the best-established functions served by protease is in the maintenance of normal blood flow by breaking down blood clots (fibrinolysis). Toxins are also removed from the blood during protease supplementation, perhaps as a result of an overall improvement in blood flow.

Years of clinical experience have also led to the conclusion that hormonal imbalances may be helped by oral protease supplementation. For instance, in cases of gastrin deficiency, the secretion of acid and pepsin may be impaired, resulting in poor protein digestion and other digestive disorders. Oral protease supplementation will ensure protein digestion and proper nutrition. There is a well-recognized linkage between enzyme secretion / regulation and the neuroendocrine and immune systems. Research has shown that a result of correcting hormonal imbalances results is the strengthening and balancing of the immune system.

Tissue repair (or wound healing) is usually divided into three phases: inflammation, proliferation, and remodeling. The inflammatory phase is characterized by platelet accumulation, coagulation, and leukocyte migration. The proliferation phase is characterized by re-epithelialization, angiogenesis, fibroplasias, and wound contraction. The remodeling place takes place over a period of months, in which the dermis responds to injury with the production of collagen and matrix proteins and then returns to its pre-injury structure. Research has shown that these processes are regulated by various cytokines. Oral protease supplementation leads to the formation of activated a2M, which significantly modulates tissue cytokines.

Heavy metals, such as lead (Pb) and mercury (Hg), exert their poisoning effect by binding to things such as sulfhydryl groups of proteins that are ionizable, including vital enzymes. Once they bind to an essential functional protein, such as an enzyme, they denature and/or inhibit it. This interaction of heavy metals to proteins can lead

to degenerating diseases, nerve damage, or even death. It should also be noted that proteolytic enzymes, when taken on an empty stomach, are readily taken up into the mucosa cells of the intestine and passed into blood circulation. Clinical observations have noted that upon high intake of proteases, heavy metal concentrations have been significantly decreased in the blood. The binding of these toxic substances with the supplemental protease enzymes facilitates their removal through the kidneys or intestine, thus avoiding a life-threatening situation of poisoning. The result may spare other vital proteins (including metabolic enzymes) in the body.

Free radicals have been implicated in accelerating the aging process as well as several diseases, including diabetes, arteriosclerosis, and neurodegenerative conditions. Oxidative reactions generate free radical damage to various molecules, including proteins. In many instances, the body is overwhelmed by the load of pro-oxidants (free radical generating molecules), resulting in oxidative stress conditions. However, under proper conditions of nutrition and adequate activity of antioxidant enzymes, free radical damage is minimized.

One consequence of oxidative stress is the formation of oxidized proteins. Oxidized proteins often loose their function, become inactive, and undergo unfolding or conformational change of their structure, which enhances their susceptibility to proteolysis. Oxidized proteins in the blood or extracellular fluid include hormones, immune system proteins, transport proteins, and other proteins needed at various cellular locations. As these oxidized proteins loose their biological function, they may not carry out the cellular tasks and biochemical reactions they are meant to perform. For instance, an oxidized hormone may not be able to attach to its receptor on the cell surface, an oxidized enzyme may not perform its activity, and an oxidized antibody molecule will not bind to its antigen.

Oxidative reactions occur in a cascade manner. Therefore, oxidation of one protein may lead to further oxidation reactions within the same molecule and/or other molecules, which amplify the damaging effect. Thus, any oxidation of a protein, if not corrected, may result in the impairment of biochemical functions of vital importance to the cellular viability. In order to avoid the cascade effect, oxidized proteins may be reduced by an antioxidant or removed by proteolysis. Several studies have indicated that oral proteases bound to the a2-macroglobulin hydrolyze immune complexes, proteinaceous debris, damaged proteins, and acute phase plasma proteins in the blood stream. It is suggested that oral proteases may help hydrolyze and remove extracellular proteins damaged by free radicals that are especially susceptible to proteolysis, as mentioned above.