



Digestive enzymes

Summer in Vancouver is one of the reasons why locals love this city. There is ample opportunity to get outside for some exercise and shed those extra pounds stored during the winter months. In my practice, increased physical activity often comes with it an increased incidence of musculoskeletal injuries, traumas and tears.

Among some of the most effective means to treat these situations naturally, I recommend proteolytic enzymes which target proteases that help break down proteins. Originally discovered in yeast, enzymes (specifically digestive enzymes) are the first step in the breakdown of food; enzymes are proteins that are produced by living organisms which facilitate biological activity such as metabolizing macronutrients – carbohydrates, fats, and proteins. Enzymes facilitate the process of digestion and thus are required for the absorption and assimilation of ingested food.

Oral enzyme supplementation may be derived from animal, plant or microbial sources with the first being derived primarily from porcine (pork) or bovine (cattle) pancreas (eg. trypsin, chymotrypsin) for its protease, amylase (breaks down carbohydrates) and lipase (breaks down fat) activity; the second from bromelain or papain, and lastly from the fermentation of the fungus *Aspergillus oryzae*, *Aspergillus niger* or *Rhizopus arrhizus*.

An excellent proteolytic enzyme used to manage trauma and inflammation is bromelain. Bromelain is obtained from the fruit and stem of *Ananas comosus/bracteatus* (pineapple), with superior ability to break protein bonds; similarly, papain is used for this purpose. Papain is a mixture of proteolytic enzymes derived from latex of the unripe fruit of *Carica papaya* (papaya). The latex derived from laticifers (the dense network of vessels from aerial parts of papayas) contains potent enzymes to aid in digestion and reduce inflammation.

Enzymes from non-animal sources are unique in that they can function synergistically with animal derived enzymes or as an alternative for vegetarians or vegans. These enzymes provide broad spectrum enzymatic activity in that they're effective in providing protease, lipase, amylase, lactase, maltase, invertase and cellulase activity.

The clinical use of enzyme therapy began with the publications of Beard and Cutfield over a hundred years ago; these investigators outlined the anti-cancer effects of enzymes in animal and human studies. Today, the broad application of enzyme therapy in clinical settings extend from its use as digestive aids to its application as proteolytic enzymes in wound debridement and healing as in ulcerated lesions, to soft tissue injuries such as

contusions, sprains, and general muscle injuries. For example, the therapeutic effects of bromelain have been identified and proven in a number of inflammatory diseases in both animal and human studies, including arthritis and inflammatory bowel disease.

Studies investigating the anti-inflammatory effects of bromelain suggest its efficacy in its ability to decrease the migration of immune cells to the site of acute inflammation as well as decrease the secretion of inflammatory chemical messages such as interferon-gamma, interleukins and tumor necrosis factor.

The use of bromelain also extends to the field of dermatology where oral bromelain was shown to be effective in the treatment of Pityriasis lichenoides chronica (PLC) a skin condition of unknown etiology. The authors of this study concluded that the treatment efficacy might be due to bromelain's "anti-inflammatory, immunomodulatory and/or anti-viral properties" ultimately managing the normal inflammatory processes within the body.

For those individuals who are either engaged in sports or some form of boot-camp style physical training, any subsequent injury or trauma can easily be managed with the use of proteolytic enzyme therapy in conjunction with icing the area, rest, and proper hydration. Always remember to warm up before stretching and apply proper form/techniques in order to minimize injury. Otherwise, there is always papayas and pineapples to save the day!

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