

Proteolytic Enzymes

Leipner, J. and R. Saller (2000). "Systemic enzyme therapy in oncology: effect and mode of action." *Drugs* **59**(4): 769-80.

Plant extracts with a high content of proteolytic enzymes have been used for a long time in traditional medicine. Besides proteolytic enzymes from plants, 'modern' enzyme therapy additionally includes pancreatic enzymes. The therapeutic use of proteolytic enzymes is partly based on scientific studies and is partly empirical. **The aim of the current review is to provide an overview of clinical trials of systemic enzyme therapy in oncology, and to discuss the evidence for their possible mechanisms of action.** Clinical studies of the use of proteolytic enzymes in oncology have mostly been carried out on an enzyme preparation consisting of a combination of papain, trypsin and chymotrypsin. **This review of these studies showed that enzyme therapy can reduce the adverse effects caused by radiotherapy and chemotherapy.** There is also evidence that, in some types of tumours, survival may be prolonged. **The beneficial effect of systemic enzyme therapy seems to be based on its anti-inflammatory potential.** However, the precise mechanism of action of systemic enzyme therapy remains unsolved. **The ratio of proteinases to antiproteinases, which is increasingly being used as a prognostic marker in oncology, appears to be influenced by the oral administration of proteolytic enzymes, probably via an induction of the synthesis of antiproteinases.** Furthermore, there are numerous alterations of cytokine composition during therapy with orally administered enzymes, which might be an indication of the efficacy of enzyme therapy. Effects on adhesion molecules and on antioxidative metabolism are also reviewed.

Gonzalez, N. J. and L. L. Isaacs (1999). "Evaluation of pancreatic proteolytic enzyme treatment of adenocarcinoma of the pancreas, with nutrition and detoxification support." *Nutr Cancer* **33**(2): 117-24.

Historically, large doses of proteolytic enzymes, along with diet, nutritional supplements, and "detoxification" procedures, have been used in alternative therapies to treat all forms of cancer, without formal clinical studies to support their use. A 2-year, unblinded, 1-treatment arm, 10-patient, pilot prospective case study was used to assess survival in patients suffering inoperable stage II-IV pancreatic adenocarcinoma treated with large doses of orally ingested pancreatic enzymes, nutritional supplements, "detoxification" procedures, and an organic diet. From January 1993 to April 1996 in the authors' private practice, 10 patients with inoperable, biopsy-proven pancreatic adenocarcinoma were entered into the trial. After one patient dropped out, an 11th patient was added to the study (however, all 11 are considered in the data tabulation). Patients

followed the treatment at home, under the supervision of the authors. **As of 12 January 1999, of 11 patients entered into the study, 9 (81%) survived one year, 5 (45%) survived two years, and at this time, 4 have survived three years. Two patients are alive and doing well: one at three years and the other at four years. These results are far above the 25% survival at one year and 10% survival at two years for all stages of pancreatic adenocarcinoma reported in the National Cancer Data Base from 1995.** This pilot study suggests that an aggressive nutritional therapy with large doses of pancreatic enzymes led to significantly increased survival over what would normally be expected for patients with inoperable pancreatic adenocarcinoma.

Adamek, J., J. Prausova, et al. (1997). "[Enzyme therapy in the treatment of lymphedema in the arm after breast carcinoma surgery]." *Rozhl Chir* **76**(4): 203-4.

The authors evaluate the contribution of proteolytic enzymes used in the treatment of the lymphatic oedema of the arm after mastectomy and radiotherapy for breast cancer. Proteolytic enzymes were successfully administered in monotherapy of lymphatic oedema as well as supportive therapy in other therapeutically ways.