

# Radio protective and Antioxidant Effects of Zinc Aspartate and Fermented Papaya Preparation F.P.P. in Children with Acute Myelo- Lympholeukemia

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The combined use of irradiation and chemotherapy is a fundamental principle in modern cancer management, especially in children. The only limitation is that cytotoxic drugs enhance the radiation damage to normal tissues. Radiation therapy can induce acute and late reaction of normal tissue. Although acute radiation injury is mostly expressed in the rapidly proliferating tissues such as skin, mucous membranes, spermatogonia and hematopoietic cells, the late deleterious effects of irradiation occur in the central nervous system. The encephalopathy syndrome has been documented in about 50% of children with acute lympholeukemia (ALL) subjected to cranial and spinal cord irradiation for 4 to 8 weeks. This includes headache, somnolence, anorexia, nausea, vomiting and sometimes unconsciousness. As the injury following the ionizing irradiation exposure is the most spectacular example of free radical-mediated pathology, it is not surprising that radioprotective agents usually possess free-radical scavenging properties. Earlier, we showed that FPP, a non-toxic natural food supplement is a powerful immunomodulator that stimulates macrophages and lymphocytes to produce  $\alpha$ -TNF and interferons. In addition, FPP exhibits free-radical scavenging and antioxidant activities. Therefore, it seems interesting to study the effects of the zinc-aspartate and FPP administration to children suffering from acute myelo and lympholeukemia in order to prevent the late encephalopathy syndrome.

Examination of children by pediatricians during and after the completion of clinical trial (19 ALL, 9 AML) has shown that there were no toxic side effects, allergic reactions, or other adverse events during the Unizinc and FPP administration.

Data of these study suggest that the strong protocol treatment of lympho- and myeloproliferative malignancies caused the suppression of main intracellular antioxidant enzymes and drastically induced hydroxyl radical release from leukocytes which can be the source of the central nervous system oxidative damage induced by therapeutic irradiation. Unizinc can treat such deleterious effects of irradiation by the inhibition of oxygen radical overproduction by circulated leukocytes. The reasons for beneficial radio protective effects of FPP seem to be more complex. Besides its pronounced free-radical scavenging activity, FPP appears to increase the organism potency to be adapted to oxidative stress, inducing glutathione synthesis and/or preventing glutathione oxidation and enhancing MnSOD activity in leukocytes, especially in patients. Probably, FPP stimulates MnSOD indirectly, inducing  $\alpha$ -TNF production by myelocytic leukocytes. Collectively, zinc aspartate and FPP could be regarded as essential components of supportive care of cancer patients after intensive irradiation course.