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### **Advantages in Application of a Natural Occurring Food Supplement in Oncological Patients**

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Bio-Normalizer (BN), a completely natural nontoxic nutraceutical prepared by yeast fermentation of *Carica papaya* and other tropical herbs, possesses antioxidant, anti-inflammatory, antifibrotic, and immunostimulatory activities. In the first part of this work, we investigated BN in the *in vitro* systems, to establish whether it is capable of affecting the tumor promoter PMA-induced reactive oxygen species (ROS) production by human blood monocytes and neutrophils, and rat tissue macrophages, and the TNF- $\alpha$  production by blood monocytes. Another goal was to evaluate a direct anti-tumor effect of BN on tumor cells in cultures. We found that BN inhibited significantly the PMA-activated H<sub>2</sub>O<sub>2</sub> and hydroxyl radical release from all kind of cells studied. On the other hand, BN increased superoxide, nitric oxide and TNF- $\alpha$  production by monocytes and macrophages. It has been shown also that BN itself exhibited a pronounced anti-tumor activity on lymphoma and sarcoma cell lines inducing their apoptotic death, and potentiated the anti-tumor effects of well-known anti-cancer agent vincristin.

On the grounds of the results obtained, we proposed the BN administration as a supportive care to patients with acute lympho- and myeloleukemias to prevent relapses and to decrease adverse effects of the conventional anti-tumor therapy. The randomized case-controlled open clinical trials have been performed. They have clearly shown that BN administration improved substantially the patients' free radical status decreasing H<sub>2</sub>O<sub>2</sub> and hydroxyl radical production by circulating leukocytes and lipid peroxidation in plasma, and enhancing the MnSOD expression and GSH content in the blood cells. Besides that, BN administration protected patients against both neurotoxic and hepatotoxic effects of chemo- and radiotherapies.