irradiation, vasoactive amines are released from the mast cell granules (Norrby et al., 1976; Dvorak, 1989; Soda et al., 1993; Theodorou et al., 1996). Leukotrienes may induce long-term contraction of the intestinal vessels, causing ischemia. All these changes cause reduced oxygenation of the intestinal tissue, leading to the fibrosis of the intestinal wall.

Mast cells are the only cells in the body which have receptors for IgE and can therefore bind IgE (Vanloveren et al., 1985; Haig et al., 1992). New antigens, which may be produced in the damaged intestinal mucosa after irradiation, might also bind to the IgE on the mast cells. Degranulation of mast cells and release of vasoactive amines and inflammatory mediators (Schwartz and Austen, 1984; Deschryves-Kecskemeti et al., 1992) such as leukotrienes follow the antigen-antibody reaction. The results of our experiments have confirmed our hypothesis that lymphocytes and mast cells of the intestinal mucosa are most probably deeply involved in the fibrotic response after irradiation. Ten days after irradiation, the loss of involved cells in the intestinal mucosa was not due to apoptosis.

In our experiment we were looking for programmed cell death in the intestinal mucosa ten days after irradiation. It was surprising that we did not find a higher number of apoptotic cells in the irradiated group compared to the nonirradiated group. This finding could be due to the short half-time of apoptosis, since the maximum apoptotic yield occurs in the first few hours after irradiation (Merrit et al., 1994; Cai et al., 1997; Potten et Grant, 1998). Another possibility for the low apoptotic yield could be that after irradiation of the intestine, the necrotic process plays a more important role than the apoptotic process (Andrushchak et al., 1993). Our results differ from the results of Ijiri (1989); however, the author used much lower doses of irradiation in his experiment. Similar results were described by Andrushchak et al. (1993), who suggested that high doses of irradiation have a cytotoxic effect leading to necrosis and late fibrosis.

The research of the apoptotic process just after irradiation, as well as the exact way of stereologically established cellular loss will be the matter of our additional study.

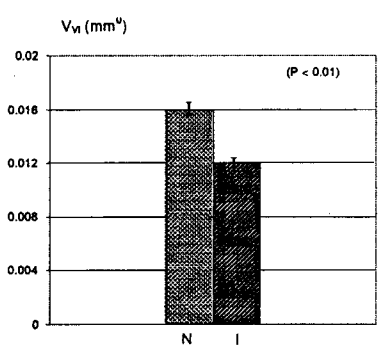

Figure 5. Volume density (V_{VI}) of lymphocytes in the nonirradiated (N) and irradiated (I) group (mean ± SE).

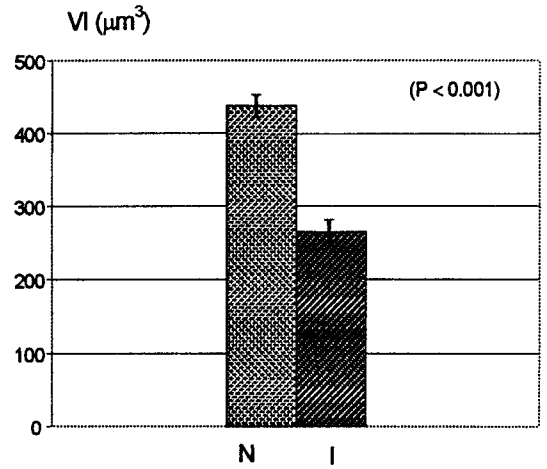

Figure 6. Average volume (Vl) of lymphocytes in the nonirradiated (N) and irradiated (I) group (mean ± SE).

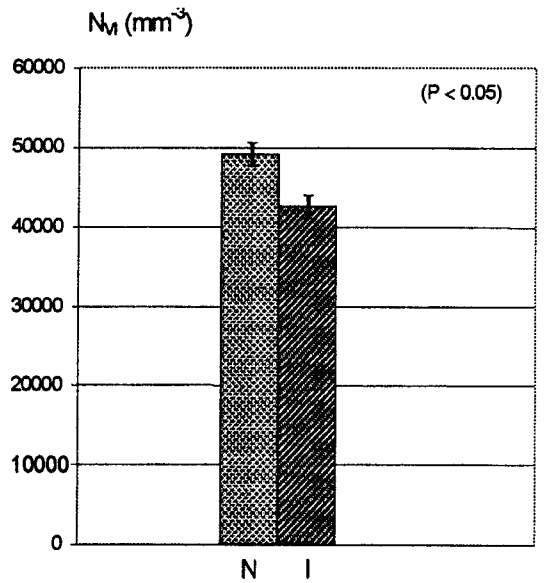

Figure 7. Numerical density (N_{VI}) of lymphocytes in the nonirradiated (N) and irradiated (I) group (mean ± SE).

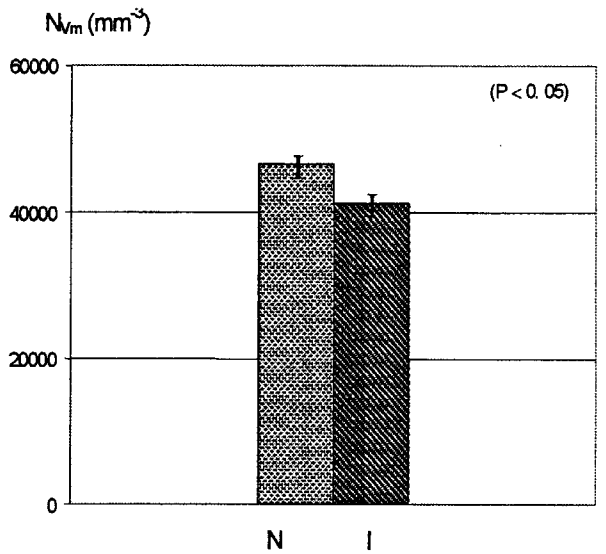

Figure 8. Numerical density (N_{Vm}) of mast cells in the nonirradited (N) and irradiated (I) group (mean ± SE).

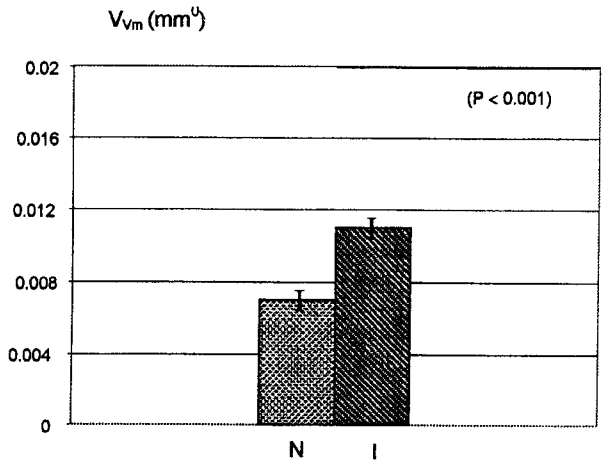

Figure 9. Volume density (V_{Vm}) of mast cells in the nonirradiated (N) and irradiated (I) group (mean ± SE).

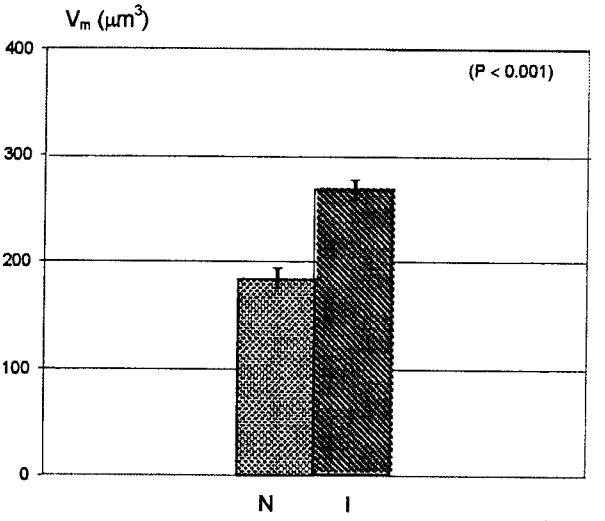

Figure 10. Average volume (V_m) of mast cells in the nonirradiated (N) and irradiated (I) group (mean ± SE).

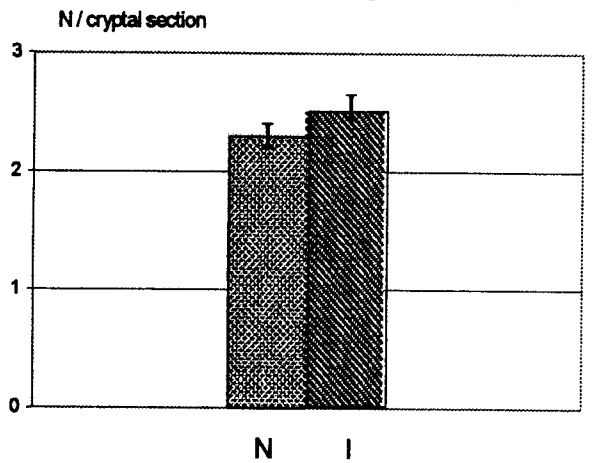

Figure 11. Number of apoptotic cells in 100 cryptal sections (N/cryptal sections) of the nonirradiated (N) and irradiated (I) group (mean ± SE).

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