(41228.8 ± 2350,3 vs. 46558.7 ± 1172.2, $P < 0.05$, Fig. 8); V_v (0.011 ± 0.004 vs. 0.007 ± 0.005, $P < 0.001$, Fig. 9) and V (266.8 ± 0.05 vs. 183.7 ± 0.03, $P < 0.001$, Fig. 10) of these cells were significantly higher in the irradiated group of animals.

Only rare apoptotic cells in the crypts were detected in the irradiated group as well as in the nonirradiated group. There was no statistically significant difference between the number of apoptotic cells in tissue sections of the irradiated and nonirradiated group (2.5 ± 0.3 vs. 2.3 ± 0.3; ns.; Fig. 11).

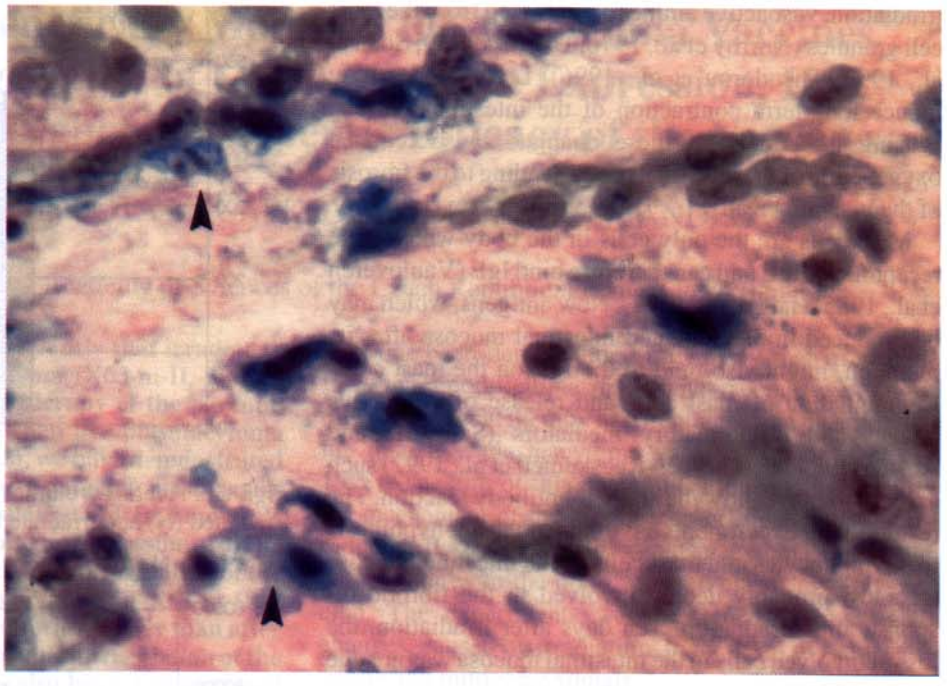

Figure 3. Degranulated mast cells in the intestinal mucosa of an irradiated animal (SAB, magnification 400x).

Discussion

The stereological analysis of lymphocytes following irradiation revealed reduction in V_v, N_v and V of lymphocytes; in other words, the irradiation reduces the number and size of the lymphocytes. Our findings are in agreement with those of Black et al. (1980) and Breiter and Trott (1986), who investigated histological changes of lymphocytes in the intestinal mucosa. They state that after irradiation, the number of lymphocytes and plasma cells, penetrating the intestine from the blood or produced in the mucosa, is smaller. In our opinion, irradiation diminishes the proliferative capacity of lymphocytes and thus reduces the numerical density of lymphocytes in the mucosa. Consequently, the response to the antigenic stimulation (Goetzl. et al., 1984; Rodgers et al., 1986) and the defense capacity are diminished. Another possible explanation is that the irradiation causes a pronounced vascular damage leading to tissue hypoxia and to the release of nucleoproteins and growth factors, which stimulate proliferation of fibroblasts and fibrotic response (Lukič et al., 1989, 1991; Julia et al., 1991; Bjelkengren et al., 1995).

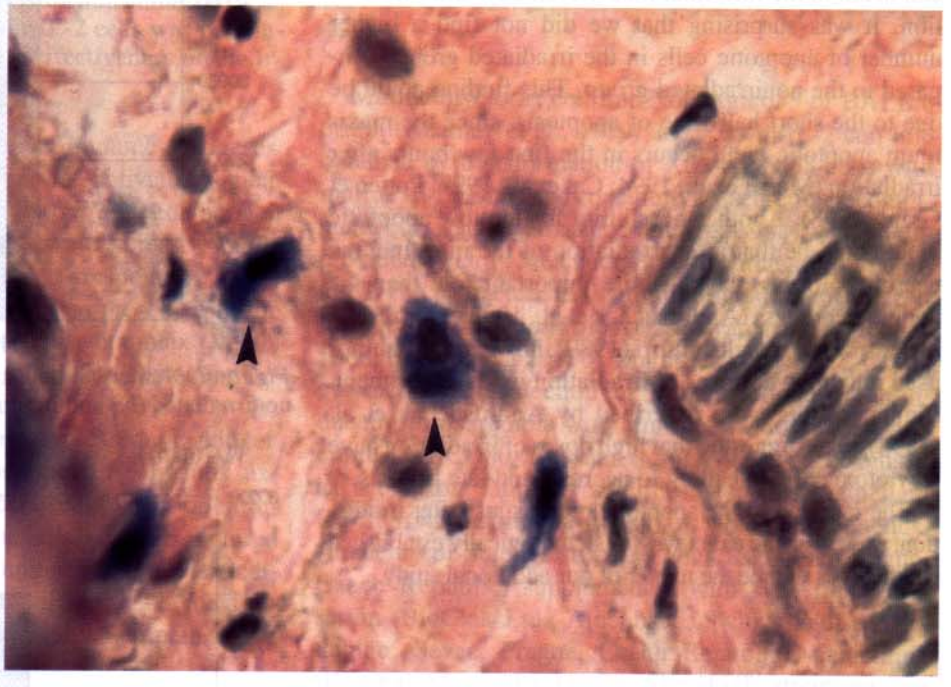

Figure 4. Mast cells in the intestinal mucosa of a nonirradiated animal (SAB, magnification 400x).

The stereological analysis of the irradiated mast cells revealed a significantly reduced N_v of mast cells. Higher V_v and average V may have resulted from compensatory hypertrophy of the reduced number of these cells. Irradiation also caused degranulation of mast cells. These results agree with the findings of Grand et al. (1984), Castex et al. (1993), and Sedgwich and Ferguson (1994), who investigated mast cells in the mucous membrane of the small intestine of irradiated mice and rats. During