

# **Effect of aging on apoptosis and proliferation of the colonic mucosa in albino rats**

Thesis

Submitted for the Fulfilment of the M.Sc. Degree in Histology

## **Abstract**

**Background:** Aging is usually accompanied by progressive changes in the function of different organs as well as in body composition. Although the incidence of colon cancer increases with advancing age, reasons for this increase are not fully understood.

**Aim:** To examine the age-related changes in proliferation and apoptosis in the colonic mucosa of the 4- and 24-month-old-albino rats by using histological, immunohistochemical and morphometric studies.

**Materials & Methods:** Forty male albino rats were divided into two groups, each group including twenty rats, group A: 4 month old and group B: 24 month old. Histological (using H&E and Masson's trichrome stains) and immunohistochemical (using PCNA, Caspase 3 and Bak) studies were performed. Morphometric measurements of Mean goblet cells and apoptotic cell counts, PCNA, Caspase -3 and Bak positively reactive cells per millimeter length of basement membrane of colonic epithelium were done followed by statistical analysis.

**Results:** PCNA immunoreactivity was significantly higher in old rats than in young ones. There was also a significant decrease in Bak level and caspase 3 in old rats. These changes were accompanied by reduction in the number of goblet cells and increased collagen assessed by Hx & E and Masson's trichrome stains.

**Conclusions:** Aging was associated with increased crypt cell proliferation coupled with decreased level of apoptosis in the colonic epithelium. These events are central to the development of cancer. Decreased number of goblet cells in the aged rats coupled with the increased amount of collagen may lead to constipation that might lead to the prolonged contact of the proliferating crypt cells with the possible carcinogens in feces, thus could lead to cancer initiation.

**Keywords:** Ageing, Colon, PCNA, Caspase 3, Bak