ULTRASTRUCTURAL ALTERATIONS IN THE COLONIC MUCUS LAYER DURING CARCINOGENESIS: A SCANNING ELECTRON MICROSCOPY STUDY

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The colonic mucus layer is considered to have several functions, including lubrication, waterproofing, and protection of the mucosal epithelium (Forstner, 1978). The precise extent of its protective role is not certain but it seems likely that mucus affords some protection against noxious agents in the bowel lumen, possibly including carcinogens. The functions of mucus are intimately related to its structure (Allen, 1977) and minor alterations in its chemical composition may impair its protective functions. Histochemical and biochemical alterations in colonic mucus in malignancy have previously been reported (Filipe, 1969; Culling et al., 1977; Filipe and Cooke, 1974) but the effect of these alterations on the structure and functions of mucus have not been described. This study was designed to examine changes in the physical appearance of the colonic mucus layer during carcinogenesis, using the high magnifications which can be attained by scanning electron microscopy.

MATERIALS AND METHODS

The appearances of the mucus layer were studied in experimental animals during chemical carcinogenesis and also in humans with colorectal cancer and colonic polyps.

A: Animal studies:

Seventy five Sprague-Dawley rats were given weekly subcutaneous injections (20 mg/kg body weight) of 1,2 dimethylhydrazine (DMH) for 16 weeks. Groups of 6 treated animals plus 2 controls were sacrificed at 2 week intervals until the 16th week, and then at 4 week intervals until frank tumours appeared (28–36 weeks). The mucus layer was then examined by SEM.