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Ultrastructural Characteristics of Colorectal Tumors Experimentally Induced by 1,2-Dimethylhydrazine Dihydrochloride in Sprague-Dawley Rats

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랫드에서 1,2-Dimethylhydrazine Dihydrochloride에 의해 유발된 대장암의 형태학적특성에 대한 투과전자현미경적 연구

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This study was carried out to investigate the ultrastructural characteristics of colorectal tumors induced by 1,2-Dimethylhydrazine Dihydrochloride(DMH) in Spraque-Dawley(SD) rats. A total of 23 male SD rats received subcutaneous injections once a week for 5 weeks, with DMH at a dosage level of 20mg per kg. All rats were sacrificed at 21 weeks after the last carcinogen treatment. Colorectal tumor incidences showed 8 adenoma(34.7%) and 5 adenocarcinoma(21.7%). Adenomas are mainly composed of polypoid adenomas of crypt epithelium. In the polypoid adenomas, the glands were elongated, branched, and often dilated. On many occasions some inflammatory cellular infiltrate was also noticeable. Closely-packed glands of polypoid adenoma were composed mainly of neoplastic tall columnar absorptive cell, among which were interspersed varying numbers of mucus-secreting goblet cells. Adenocarcinoma were composed of well-differenciated adenocarcinoma. Exceptionally, one case is mucinous colloid adenocarcinoma. Mucinous colloid adenocarcinoma of the colon arising in the flat mucosa and invading into the submucosa. In the mucosa, there are mucus-filled areas, few basophilic granular elements and some crypts distended with mucus. The ultrastructural changes of colorectal tumors are as followed. The irregular microvilli of neoplastic absorptive cells are more clup-shaped and spaser than their normal counterparts. The cytoplasms of neoplastic absorptive cells are seen to contain the electron-dense granules, prominent Golgi bodies, abundance of free ribosomes, the electron dense matrix of the mitochondria, and numerous desmosomes. Goblet cells containing hyperdistended mucous vacuoles, dense cytoplasm and distended rough-surfaced endoplasmic reticulum lie adjacent to neoplastic absorptive cells.

Fig. 1 The cytoplasm of tumor cells are hyperdistended with mucinous vacuoles(M) varying in electron density, and have a few mitochondria, free ribosomes, and rough endoplasmic reticula. Slightly distended intercellular spaces(*) and irregularly arranged microvilli(MV) in the cell surface are seen. (X 4,000).
Lu : lumen
Fig. 2 Intracellular lumen is well developed in undifferentiated tumor cells. Microvilli are deformed and free ribosomes are slightly increased. Desmosomes(arrowhead) and cytoplasmic interdigitations(arrow) are seen. (X 4,000)