

Ontogeny of the Rat Parietal Cells Using GSA-IB₄ Lectin.

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The development and maturation of fundic glands of Wistar rats were studied using GSA-IB₄ histochemistry and cytochemistry. In adult rats, parietal cells were specifically labeled with GSA-IB₄. Its specificity and sensitivity were more suitable than other immunohistochemical staining using anti-carbonic anhydrase antibody.

Ontogenetic studies revealed that GSA-IB₄ positive cells appeared at the bottom of the immature fundic gland at 18 days of gestation. At 1 day after birth, the GSA-IB₄ staining became strong. With differentiation and aging, the number of the positive cells increased. From 1 week after birth, strongly reactive cells were gathered to upper site of the fundic gland, whereas the parietal cells of lower part of the gland stained weakly. By 4 weeks after birth, the staining pattern and stainability were almost same as adults.

These results suggest that GSA-IB₄ is a valuable marker for studying parietal cells, and that the staining pattern of parietal cells using this lectin is compatible with enzyme histochemistry of several dehydrogenases.

Lectin Histochemistry of rat thyroid tumors

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The thyroid tumors were induced in rats with diisopropanolnitrosamine(DIPN) followed by methylthiouracil(MTU) administration, and their lectin-binding properties were studied histochemically. We also carried out flash labeling with BrdU and immunohistochemical detection of thyroglobulin to know the relationship of the lectin-binding pattern to cell proliferation and differentiation.

Ten weeks after the cessation of the carcinogen treatments, the thyroid glands were swollen and histologically conformed to adenomatous goiter. There were also carcinomas invading the surround tissue in most of the rats examined. The cancerous lesions showed higher labeling index with BrdU and poorer thyroglobulin than the background thyroid tissue, that is to say, adenomatous goiter, and they were positively stained with Maclura pomifera (MPA) and Solanum tuberosum(STA). Since these lectins did not react on the background thyroid tissue, they may be used as the specific tumor markers in the rat thyroid gland.

Immunohistochemical localization of swine Cu-Zn-SOD in tissues of swine

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Mammalian Cu-Zn-SOD has been localized in tissues of the human, monkey, dog and rat. This report is to localize swine Cu-Zn-SOD in the tissue from several organs of pigs.

Polyclonal antibody of Cu-Zn-SOD derived from swine erythrocytes was obtained from rabbits. Using this antibody, Cu-Zn-SOD was localized in the liver, heart, gastric gland, small intestine, large intestine, spleen, lymph nodes, adrenal gland, pancreas, and aorta with ABC method. These organs were fixed with 4% paraformaldehyde and cryostat sections were stained with ABC method for light microscopy. Electron microscopic specimens were fixed with either 1% glutaraldehyde or the mixture of 1% glutaraldehyde and 4% paraformaldehyde and embedded in Lowicryl K4M. In the cells of cardiac muscle, adrenal cortex and hepatocytes, most of nucleus were positive and cytoplasm was diffusively stained. In the adrenal cortex, the zona glomerulosa was intensively reacted. At electron microscopic level, cytoplasm nucleus, mitochondria, ER, and microvilli of bile canaliculus had reaction product. It was interesting that red blood cells had many reaction products but white blood cell had little, if any, reaction product. These reaction pattern remains to be compared with the cytochemical results of SOD stain.

A Sensitization Effect of Hematoporphyrin Oligomer for X-Ray Radiation of Skin Cancer

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Human malignant melanoma cells (G-361) were irradiated with a soft X-ray for different irradiation times. The amount of DNA damage induced in a single cell nuclei depended on the irradiation time and it was much increased by the treatment of the cells with hematoporphyrin (Hp) oligomer before X-ray irradiation. The sensitization effect was inhibited by adding sodium azide (NaN₃) used as a scavenger for singlet oxygen. It was suggested that the singlet oxygen produced from Hp oligomer by X-ray irradiation plays a role in the sensitized reaction.

Furthermore, we examined the effect of the caffeine on the DNA repair. It was found that the caffeine inhibited effectively the repair of the damaged DNA.

Next, we examined the sensitizing effect of Hp oligomer for the X-ray radiation of transplantable skin cancer in C3H mice and the effect was found in the tumor growth curve.