Subependymal Giant Cell Astrocytoma with Tuberous Sclerosis: Significance and Possible Cytogenetic Implications of An Immunohistochemical Study.

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The tuberous sclerosis complex is a autosomal dominantly inherited entity characterized by hamartomatous neoplasm in organs of all three germinal layers, including brain, retina, skin, heart, kidneys, lungs, and bone (Critchley M. et al, Brain 55:311, 1932). The most common findings in central nervous system are cortical tubers, and subependymal giant cell tumor which originate near the foramen of Monro.

The nature of the cellular elements of the subependymal giant cell tumor associated with tuberous sclerosis is still debating (Nakamura Y. et al, Acta Neuropathol. 60:271, 1983). In this study at Chang Gung Memorial Hospital, 11 cases of tuberous sclerosis were found in past 10 years. Of these 11 cases, 4 had intracranial tumors and had tissue proved at operation. Morphologically, the tumor cells can be recognized into three types : gemistocytic-like cells, pyramidal-like polyhedral cells, and spindle spongioblastic-like cells. All of these 4 cases were examinated by avidin-biotin complex immunohistochemistry for glial fibrillary acidic (GFA) protein, vimentin, neurofilament triplet (NF) protein, neuron specific enolase (NSE) and S-100 protein. There were differences of the immunoreactivity of the NSE, S100, vimentin had NF, and absent of GFAP in these cell types of the 4 cases, suggesting that tumor cells of different cell types have same origin. The majority of the tumor cells was strong positivity for NSE and NF in all 4 cases and the intensity of staining of the tumor cells for vimentin and S-100 protein showed variably from case to case.

Our findings emphasized that the neoplastic cells of subependymal giant cell tumor were probable neuronal origin.

Immunoelectron microscopical study for intracellular processing of proopiomelanocortin (POMC).

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Peptide hormones have been considered to be produced in perinuclear space (PNS) and rough endplasmic reticulum (RER), and secreted through Golgi apparatus and secretory glanules (SG). It has been known that they are produced as precursors and large molecules which are processed through the secretory pathways. In the pituitary glands, proopiomelanocortin (POMC) is a precursor molecule for ACTH, β-LPH, β-endorphin, α-, β-, γ-MSH. In order to elucidate the relationship between the secretory pathways and the processing of POMC, the following immunoelectron microscopic observations were performed. MATERIALS AND METHODS: Mouse cultured fibroblasts (L42 cells) and pituitary tumor AtT20 cells (A53 cells) transfected with human POMC gene were used. Wild non-transfected cells were used as control. Pre-embedding method was done as follows. These cells fixed in 4% paraformaldehyde, were stained by peroxidase-labeled streptoavidine biotin method, post-fixed in 2% osmium tetroxide, dehydrated in alcohol, and embedded in Quetol. Ultrathin sections were observed by electron microscopy JEOL 1200EX. Anti-ACTH, β-LPH (NIH) and N-terminal fragment (NTF) of POMC (BCU). Antibodies were used. RESULTS AND COMMENTS: In L42 cells which lacked SG, NTF and β-LPH were localized in RER and PNS. Immunoblotting of L42 cells demonstrated large ACTH molecule. In AtT20 cells, NTF and β-LPH were localized in PNS, RER and SG. Immunoblotting demonstrated both large ACTH molecule and smaller ACTH reactive fragments. These data suggested that L42 cells secreted precursor POMC molecule by constitutive pathway and AtT20 cells secreted POMC as well as smaller peptides by regulated (via SG) pathway in addition to constitutive pathway.

Cytochemical Study of Effects of Compressive Force on Condylar Cartilage in Rats.

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Lanthanum chloride is used to examine the distribution of calcium-binding sites in various tissues. The purpose of this study is to analyse the effects of compressive force on endchondral calcification in temporomandibular joint of rats by means of lanthanum chloride fixation.

3-week-old SD rats, to witch applied compressive force with orthodontic appliance, were used in this study. The animals were fed on a conventional diet during each experimental period. The mandibular condylar cartilage were removed from the animals at 12 and 16 weeks after the initial treatment. Tissues were fixed in 2 % glutaraldehyde with 1 % lanthanum chloride in 0.1 M cacodylate buffer. After fixation, each piece of tissue was then dehydrated and embedded in araldite 502. Thin sections were cut in the coronal plane. After secondary fixation in 1 % osmium tetroxide, the sections were examined with an electron microscope.

At 12 weeks, the distribution of lanthanum deposits in the cartilage of experimental rats tended to decreased. At 16 weeks, fewer lanthanum deposits were seen on outer surface of chondrocyte and in the pericellular matrix. At this period, immature chondrocytes with rich organelles were observed in the deep hypertrophic zone of condylar cartilage.

From these results, it is considered that the compressive force tends to impedes the cartilage growth. It is therefore suggested that growth of condylar cartilage were locally controlled by occlusal function.

Histochemical Localization of Ferritin on Human Renal Cell Carcinoma.

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Renal cell carcinoma has no specific but several nonspecific tumor markers. Since serum ferritin is considered one of them, tissue ferritin was investigated using polyclonal rabbit anti-human ferritin antibody (DAKO). Five-micrometer sections from formalin-fixed, paraffin-embedded blocks were treated with Avidin-Biotin Complex method. The sections were incubated with primary antibody (100 X) at 4 °C overnight. It was defined as positive when more than 50% cells were stained. Fifty-four specimens which had been resected at Dep. of Urol., Univ. Tokyo from Mar. 1985 to July 1989 were analyzed. In normal portions of the stained specimens, none of 19, 9 (53%) of 17 and none of 18 specimens showed positive results in glomerulus, proximal tubule and distal tubule, respectively. In tumor portions, 13(24%) out of 54 specimens were positive. It is interesting that proximal tubule and tumor tissue were occasionally positive but glomerulus and distal tubule were never. Results according to grade, stage and flow cytometric DNA ploidy were as follows: 4 (25%) of 16 grade 1, 9 (26%) of 35 grade 2, none of 3 grade 3; none of 5 pT1, 10 (31%) of 32 pT2, 3 (18%) of 17 pT3; 3 (27%) of 11 normal (DNA diploid) and 10 (23%) of 43 abnormal (DNA tetraploid or aneuploid) tumors were positive. Ferritin appeared to be expressed in low grade and high stage tumors, though the difference was statistically insignificant. In recent 19 cases, serum ferritin was measured preoperatively to reveal only one elevated result, of which the tissue ferritin was not positive. Moreover, all of 4 cases showing positive tissue ferritin had unelevated level of serum ferritin. Serum ferritin level seemed not to reflect tissue ferritin content directly and tissue ferritin may have a limited role as a tumor marker.