EPIDERMAL GROWTH FACTOR-RECEPTOR INTERACTION IN RAT PHEOCHROMOCYTOMA (PC12) AND HUMAN EPIDERMOID A431 CELLS: BIOCHEMICAL AND ULTRASTRUCTURAL STUDIES.

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Pheochromocytoma cells (clone PC12) have specific plasmamembrane receptors for both epidermal growth factor (EGF) and nerve growth factor (NGF). These growth factors have however, opposite biological effects in PC12 cells; EGF acts mitogenically, while NGF induces differentiation and causes arrest of cell proliferation (1).

EGF-receptor interaction in PC12 cells was characterized biochemically by ^{125}I-EGF binding studies. EGF binding was concentration-dependent and saturable. Scatchard graph analysis indicated that two different classes of EGF binding sites may be present in PC12 cells. Addition of NGF to PC12 cells caused a reduction in EGF binding, the result of a decrease of the number of binding sites and in their affinity for EGF. The reduction of EGF binding was dependent upon the duration and concentration of NGF exposure.

Ultrastructural localization of growth factor receptors has been performed initially on A431 human carcinoma cells, in view of their large number of EGF receptors. The EGF-receptors were labeled by immuno-gold methods in cryo-ultramicrotomy derived thin sections. Cells were exposed to a specific monoclonal antibody to EGF receptor at various temperatures, cryo-sectioned and immuno-gold labeled. A homogenous, random distribution of gold particles was observed at the cell surface following labeling at 4°C, while heavily labeled intracellular, multivesicular bodies were found following labeling at 37°C (Fig. 1). It is shown that the multivesicular bodies are involved in the temperature dependent process of receptor internalization.

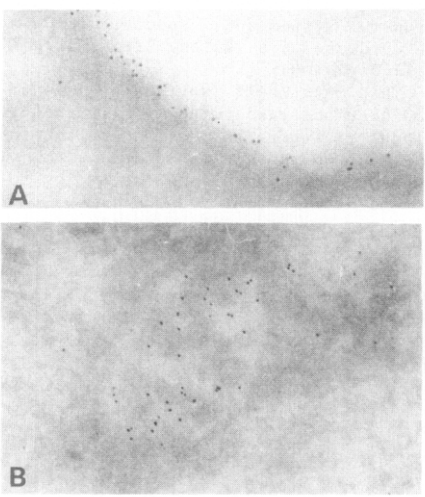

Figure 1. Distribution of EGF-receptor in human epidermoid A431 cells.

Cells were labeled with a monoclonal antibody against EGF-receptors at 4°C (A) and 37°C (B) for 2 hours prior to fixation with 2% paraformaldehyde/ 0.1% glutaraldehyde. After cryo-sectioning, the sections were labeled with rabbit-anti-mouse antibody and protein A-colloidal gold (7 nm).

REFERENCE:
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