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Electron Microscopical Investigations in Regenerating Olfactory Epithelium

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Abstract

From the surface of the supporting cells protrude tubular protoplasmic projections, which support the vesiculae olfactoriae with their cilia. These projections are not identical with the microvilli. Moreover, the so-called microcilia, which may arise from the tubular protoplasmic projections, are found in pathological and in regenerating epithelium. It is suggested that the basal or replacement cells, which are the future olfactory and supporting cells, arise from the gland cells of Bowman. In repeated regeneration after repeated heavy infections, the stock of Bowman glands may be exhausted because of the presumable absence or decrease of mitotic proliferation. In this way the regio olfactoria will diminish in size and consequently the sense of smell may decrease. Experimentally caused regeneration of all the superficial structures, viz. of the vesiculae olfactoriae and the tubular projections of the supporting cells, shows the same features as embryological development. Directly underneath the surface develops a syncytium with centriole-like structures; the central process of the olfactory cell develops first. During regeneration of the cat's olfactory epithelium, indentation of the olfactory cell nuclei may be caused by the growing out of the supporting cells in a peripheral direction, and by the possible migration of the olfactory cells from the superficial to the middle layers. In the regeneration of the surface of human olfactory epithelium after a superficial infectious damage there seems to exist a migration of the olfactory cell nuclei to the superficial layers, where they possibly induce the growth of the tubular projections and the vesiculae olfactoriae with the help of centriole-like structures.