

Embryological study of audiovestibular system in *Rattus norvegicus*

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Despite the complexity and multiple functions, the ear forms one anatomical unit that serves both hearing and equilibrium. The molecular mechanisms dictating the morphogenesis and differentiation are largely unknown yet. In order to investigate the morphological aspects of the embryological development of ear several *Rattus norvegicus* embryos and fetuses were taken from the 9th to 19th day after conception (dpc) and their tissues were processed to study under a light microscope. Using routine histological techniques we follow the majority parts of the development of the outer, middle and inner ear by histological sections. Timed pregnant Wistar rat has a gestational period of 21-22 days, but we used animals with 09-19 days. All animals were held on a 24 hours dark/light cycle; the day of the plug was recorded as E0; ethyl ether vapor was used as an anesthetic and killer agent; two pregnant animals were used at each gestational stage. Tissue was prepared by 10% formaldehyde fixation of whole embryos or fragments tissues, which were paraffin wax embedded and sectioned at a thickness of 5 µm. The tissue sections were deparaffinized, hydrated, stained with hematoxylin-eosin (HE), Gomori's trichrome (TG), para-aldehyde fuchsin modified (PAF) and PAS reaction; dehydrated, cleared and sealed with cover glasses. Inner ear sensory organs and VIIIth cranial ganglion neurons of the auditory/vestibular pathway derive from an ectodermal placode that invaginates to form an otocyst, visible at E12 dpc. It was followed the development of the external ear: auricle or pinna and external auditory canal or meatus detectable in the auricular hillocks, areas of mesenchymal aggregation around the forming auditory meatus, these eventually become the auricle or pinna, which became externally visible at E13.5 dpc. The development of the middle ear was visible at E17-E19 dpc: ossicles, the pharyngotympanic cavity and tube. The inner ear development was visible at E13 dpc: membranous labyrinth composed by saccule and utricle; by semicircular ducts, continuous with the utricle; by cochlea duct, an extension of the saccule, and by the endolymphatic duct. Together, these diverse end organs form a closed, continuous epithelium known as the membranous labyrinth possessing sensory organs composed of structural and sensory epithelia (crista, macula, or organ of Corti), comprising a unique arrangement of mechanosensory (hair) and support cells. The results were compared with previous studies and we found that the development of the rat ear follows the same course as that in mouse.