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Developmental dynamics of prepiriform cortex in prenatal human ontogenesis.

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Highlights

- Human fetal brain material was studied between the 8th gestational week and birth;
- NeuN-, SYP-, NSE-, TH-, GFAP-, MBP- assays were used to record neuronal and glial development of the prepiriform cortex;
- Based on the immunohistochemical findings and observations on cytoarchitecture four developmental periods of the prepiriform cortex are suggested;
- The prepiriform cortex approaches a state of maturation similar to that at birth on the 30th gestational week;
- The prepiriform cortex is characterized by earlier developmental rates and matures prior to other pallial regions.

1. Introduction

The mammalian cerebral cortex, including that of humans, consists of three main subdivisions – neocortex, archicortex and paleocortex – with transitional regions between them (Rose, 1935; Filimonoff, 1947). These pallial divisions are characterized by heterochrony of maturation course between each other and within itself (Zilles et al., 1986; Huttenlocher and Dabholkar, 1997). Neocortical and archicortical brain areas are of interest owing to leading role of the neocortex in cognitive functions of mammals and intelligence and ongoing neurogenesis in the adult archicortex. The paleocortex is phylogenetically the oldest cortical division representing the primary olfactory cortex that has received less attention both in developmental aspects and adult morphology (Sarma et al., 2011). Published data on the morphology of the paleocortical olfactory centers in humans are mainly restricted to the classic studies (Macci, 1951; Allison, 1954). Developmental timetable of the paleocortex in both human prenatal and postnatal ontogenesis remains obscure, while there is recent evidence that olfactory deficiency are involved in the wide spectrum of neurodegenerative diseases such as Alzheimer's, Parkinson's and Huntington's and others (Hof et al., 1995; Barresi et al., 2012; Wilson et al., 2014; Good and

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