



Brain Development ^[1]

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The human brain is an amazing core system of the body. From the moment it starts its development up to its full maturity, the brain performs wondrous processes that coordinates different body systems and directs them for proper functioning.

Embryonic Development

The brain originates from the epiblast, which developments into the ectoderm. The ectoderm forms the neural plate. Then, as early as 18 postovulatory days, the neural groove and folds come to fore. Neurons are formed once the notochord and the somites are formed. At somite level 4, the neural tube ^[3] begins to form. The neural tube zips the neural groove, leaving two openings at the ends.

Neural Tube

Four weeks later, the neural tube is closed completely. During this time, the neural tube forms the three primary brain vesicles: the forebrain (prosencephalon), the midbrain (mesencephalon), and the hindbrain (rhombencephalon). The spaces or cavities within the neural tube will form CNS ventricles. Initially, fetal CNS ventricles are filled with amniotic fluid. However, once the choroid plexus is formed in the ventricles, the cerebrospinal fluid or CSF fills in the spaces.

The neural tube's cranial expansion brings forth the central nervous system. On the other hand, the caudal reminder of the tube becomes the spinal cord.

At 8 weeks, the human embryonic brain develops the cortex. The ventricular layer is formed, where neuroblasts and glioblasts are generated. Thus, this neural layer gives birth to neurons and supporting glial cells.

Senses

Placodes are defined as ectodermal thickenings that differentiate in order to develop the five sensory systems. The ectodermal placodes comprise the special senses of the body. These include the otic placode (hearing), nasal placode (smell), lens placode (vision) and the trigeminal placode (touch).

The first sensory placode that is visible in the developing embryo is the otic placode. At four weeks, the otic placode becomes visible, and then disappears on the 5th week. The differentiation of the otic placode will eventually result to the parts of the inner ear. The optic placode develops into the eye's lens at week 8.

Adult Brain Development

Unknown to many, the brain still develops in adult humans. This process is called "neuroregeneration". The process of adult neurodevelopment includes several mechanisms like generation of new brain cells and components (neurons, axons, glia, synapses and even myelin), as well as remyelination of brain cells. Neuroregeneration occurs both in the central nervous system and the peripheral nervous system, although there are some differences in terms of speed and extent.

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