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2nd World Congress on
Bio Summit & Molecular Biology Expo
October 10-12, 2016 Dubai, UAE

Tracing the neuroblasts from subventricular zone to olfactory bulb in adult mice brains using anti-doublecortin antibodies and H&E stain

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Background: Neural stem cells are not confined to the embryonic development of the brain as believed in the past; in contrasts, it continues life-long in the adult mammalian brains even in non-pathological state. Neural stem cells and their progeny, the neuroblasts are residents in the subventricular zone (SVZ) of the lateral ventricle in the adult mammalian brains. The neuroblasts after they were produced in the SVZ would migrate in a well-defined pathway emerged from the SVZ and directed towards the olfactory bulb (OB). This pathway is called the Rostral Migratory Stream (RMS) and its main components are the neuroblasts.

Aims: To trace the chain arrangement of neuroblasts along the RMS using Hematoxylin and Eosin and the specific marker of the neuroblasts "anti-doublecortin antibody", describing grossly how the pathway emerges from SVZ proceeding rostrally to the OB in the adult mice brains.

Materials & Methods: Adult mice brains from both brain sexes were used in this experiment to view both coronal and sagittal sections upon which Hematoxylin and Eosin and immunohistochemical staining were exploited. Anti-doublecortin antibody, the specific marker of the immature neurons was used in the immunohistochemical staining of this study.

Results: This study revealed clustering of the neuroblasts in the SVZ and while this special arrangement carried out at the SVZ, the neuroblasts changed their arrangement when being traced sagittaly into chain-like strip of cells forming a sigmoidal shape stream. The chain of the neuroblasts in the stream demonstrated changing in shape and direction throughout its length with special arrangement at its starter from the lateral ventricle forming a funnel shape limb before joining the rest of stream. It delineated four limbs here along its pathway.

Conclusion: The neuroblasts take different arrangement through their period of life from their site of origin to their final destination, the olfactory bulb through the RMS. In the stream the neuroblasts follow a sigmoidal shape pathway described here as four limbs instead of 3 ones in previous studies. The new described part is the funnel shape limb which is named the infundibulum at which the neuroblasts in the stream starting up their migration from SVZ before they join the next limb, the vertical limb.

Biography

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