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## The development and morphological study of innervations in human fetal pancreas

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**Introduction:** The Pancreas is a well innervatedgland with the autonomic nervous system (ANS) in various species. The neurons are distributed singly or in the form of ganglia which are predominantly cholinergic. Sympathetic innervation is necessary for the formation of the pancreatic islets of Langerhans and for their functional maturation. The autonomic nervous system has a role in blood glucose levels regulation. The numerous nerve ganglion seen in the developing human pancreas in the inter lobular connective tissue from 14WG and in the intra lobular connective tissue from 16WG onward. Typical adult type islets were detected from 25–27 WG onward. Pancreatic innervations have been considered with enormous interest regarding pancreatic pain. The enteric nervous system (ENS) differs both structurally and functionally from other divisions of peripheral nervous system (PNS) and capable of functioning independently from the brain and spinal cord, hence called as 'Second Brain' of vertebrates. Conventional anatomical studies in human cadavers have provided only partial insight. The lack of information about the structure and the course of development of neuronal cells and intrapancreatic ganglions make this study persuasive.

**Aim:** The aim of this work is to study the morphological changes in the innervation of human fetal pancreas at various gestational ages.

**Materials & Methods:** The present study was performed on human fetuses (n=13) of different gestational ages. The sample collection was started after getting ethical permission from the Human Ethical Clearance Committee of All India Institute of Medical Sciences, New Delhi. Fetal weight, crown rump length (CRL), foot length, biparietal diameter (BPD) were taken. With the help of these parameters fetal age was determined. Pancreatic tissue samples (Head, body and tail) from aborted foetus aged 13–40 weeks of gestation (WG) were processed for enzyme histochemistry and immunohistochemistry. The neurons were visualized using NADPH-d and ChAT.

**Observation:** The number of neurons in human fetal pancreas was appeared to be reduced with increasing gestational age in the head, body and tail of the pancreas. The amount of the mesenchyme tissue is gradually decreasing with increasing gestational age. Numerical density of cholinergic neural tissue is more in tail than body and head, whereas, the nitrergic neuronal tissue is more in head than body than tail in human fetal pancreas. Though the results were not statistically significant. Regarding the size of neurons, there was no statistically significant correlation between the head, body and tail of the pancreas.

**Conclusion:** The knowledge of the development of the innervation of different parts of the pancreas in human fetuses from 13 to 40 WG may help in understanding the pathophysiology of various congenital disorders related to the innervation of the pancreas.

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