61

A study on morphological and histological changes of suprarenal gland at various stages of development

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Aims and objectives: The fetal suprarenals are large glands due to the extensive development of the provisional cortex which comprises 80% of the fetal suprarenal gland. Carr and Casey (1982) reported that there is a rapid increase in adrenal weight after 12 weeks of gestation. Therefore, the study was undertaken on the supra renal gland morphology and histological changes between 3rd and 6th months of embryonic development.

Material and methods: Right and left suprarenals in 16 human fetuses aged between 9 and 24 weeks were used for study. The capsule, cortex and medulla were studied qualitatively and by morphometry on the H&E stained histological sections.

Results: In the 9th week fetus, suprarenal glands were identifiable as tongue shaped pale coloured masses while the regular shape attained by 18th week. There was a gradual steady increase in the measurements of length, thickness, breadth and weight with increasing gestational age. Capsule was identifiable by 12 weeks and increased in thickness with increasing gestational age. The adult cortex which is definitive cortex, was subcapsular in position with small basophilic cells. The fetal cortex was towards medulla with large eosinophilic cells. The adult cortex found to occupy 1/4th of the cortex while fetal cortex the remaining 3/4th. By 24 weeks, the fetal cortex became bulkier and measured 4/5th while adult cortex measured 1/5th. Medulla was ill defined by 12 weeks of age and became well defined and distinct with the presence of blood vessels by 24 weeks.

Conflicts of interest

The authors have none to declare.

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62

Expression of brain derived growth factor (BDNF) in hippocampus of mid gestational human fetuses

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Aims and objectives: In the present study an attempt was made to observe the expression of BDNF in the developing hippocampus of mid gestational human fetuses. BDNF is a sub member of neurotrophin family and is a critical regulator of formation and plasticity of neuronal networks in hippocampal formation. It acts in the activity dependent manner and its expression is highly sensitive to developmental and environmental factors.

Material and methods: In present study 10 aborted fetuses from 14 to 30 weeks of gestation were procured from the department of obstetrics and gynecology, LN hospital after obtaining ethical clearance. For each gestational age the tissue was stained with cresyl violet and H&E to see the general morphology of hippocampus and immunostaining of the selected sections of different age groups was done for the expression of BDNF.

Results: Subparts of hippocampus including Ammons horn, subiculum and dentate gyrus were identified in all age groups and immunostaining was detected in both cell bodies and fibers. Expression of BDNF was more marked in the hippocampus of higher gestational age groups as compared to lower ones.

Conclusion: Increased expression of BDNF in higher gestational age groups shows that neurotrophic factors like BDNF influences the neuronal differentiation and development. Expression profile of BDNF will help in better understanding of pathophysiology of various neurobiological disorders like schizophrenia, Alzheimer's and depression.

Conflicts of interest

The authors have none to declare.

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63

Role of angiogenic factors in inducing endoplasmic reticulum stress in trophoblast: An in vitro study

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Aims and objectives: Preeclampsia, the *de novo* occurrence of hypertension and proteinuria after the 12th week of gestation is characterised by a defect in vascular remodelling, placental malperfusion, peripheral vasoconstriction, and a systemic anti-angiogenic response. Evidence suggests that the soluble form of the receptor, vascular endothelial growth factor receptor-1 (sVEGFR-1/sFlt1-1), is produced in excess by the placenta of women with preeclampsia in first trimester thereby reducing vascular endothelial growth factor (VEGF) bioavailability leading to hypoxia and oxidative stress in placental cells. The present study was planned to determine whether the imbalance in these circulating angiogenic factors can also lead to endoplasmic reticulum stress in trophoblast cells.

Material and methods: Blood sample was collected from 30 preeclamptic and 30 normotensive controls after Institute ethics committee approval and informed consent from subjects. The human choriocarcinoma cell line (BeWo) was procured from ATCC and was cultured with (i) preeclamptic sera (ii) normotensive sera (iii) preeclamptic sera with recombinant VEGF and (iv) normotensive sera with recombinant sFlt-1. Endoplasmic reticulum stress was observed by the presence of GRP78 using immunofluorescence.

Results: The GRP78 immunofluroescence was significantly higher in BeWo cells treated with preeclamptic sera as compared to the BeWo cells treated with control sera ($p < 0.05$). This effect was reversed when BeWo cells were treated with preeclamptic sera along with recombinant VEGF and BeWo cells treated with control sera after the addition of recombinant sFlt-1.

Conclusion: Altered serum levels of VEGF and sFlt-1 may induce the endoplasmic reticulum stress in trophoblast cell lines (BeWo) suggesting a role for circulating angiogenic factors in the pathogenesis of preeclampsia.