Histogenesis of Peripheral Cyto-Trophoblastic Cell

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The Chorionic or trophoblastic lining of placental villi, consist of two layers, the outer plasmodial trophoblast and the inner cyto trophoblast or so called langhan cell layer. The langhan cells are found not only around the placental villi but also at some other situations or sites. They are particularly developed around the tips of the villi. Detached langhans cells are also found around the choriodecidual junction forming so called the `cell islands' cell columns as well as the cells in the placental septae. These detached cytotrophoblastic or langhans cells are collectively known as peripheral cyto-trophoblast.

Theodore Langhans (1870) working to ascertain the histogenesis of these cells came to the conclusion that they are maternal i.e. decidual in origin. Subsequently Langhan himself after his view, and concluded that the cytotrophoblastic cells are developed from the foetal villi. Since then the cells are known as fanghan cells and thought to originate from foetal tissue. Upto the present time no further works have been undertaken to ascertain the validity of langhans works.

We became interested to ascertain the exact origin of the langhan cells for the reason that the Langhan or the peripheral cyto-trophoblastic cells are at present known to be the source of H.C.G. (Human Chononic Goradotrophin) - the classical protein hormone secreted during pregency. Certain works undertaken in our laboratory suggested that the H.C.G. might be of maternal (decidual) rather than foetal (trophoblastic) in origin.

These evidences collected from the data in our Laboratory may be summarised as follows : -

01. Secretion of HCG like gonadotrophin substance from the non-pregnant human endometrial tissue.
02. The biological, chemical and immunological similarity of the above HCG like substance with pure HCG
03. Higher concentration of HCG in the macroscopically seperable de cidua! mentle of full term human placenta when compared to trophoblastic tissue of same organ
04. Higher concentration of HCG in the solid.material when compared to the vesicles in the material obtained from evacuation of hydatidiform mole.
05. Higher concentration of HCG in the endometrial curettings in cases of ectopic pregnancy.

These evidences along with the observed findings in comparative biology, such as

01. Secretion of P.M.S.G. from the endometrial cups of the mares which is entirely originated from the maternal tissue without any foetal components.

02. Sudden and precipitus fall of maternal HCG secretion at the end of first trimester while the placenta and its steroidal secretion goes on increase with advancing pregancy - led us to investigate whether H G G. secreting cells i.e. Langhan cells are maternal or foetal in origin

The haemochorial arrangement of human placenta results in an extremely, complex admixture of the foetal i.e. trophoblastic and the maternal i e. decidual cells, which is extremely difficult to separate by the usual method. However, we took a different approach in our effort to achieve the separation.

It was thought that all the cells derived from the mother ought to be chromatin positive (i.e. showing

the sex chromatin in the nuclei) - irrespective of the sex of the accompanying foetus. 1n other words if the Langhan cells were of foetal origin they should be chromatin negative in cases of male foetuses and chromatin positive in cases of only female foetuses. On this basis we examine the sex chromatin in the langhan cells of the peripheral cyto-trophoblast associated with male and female foetus.

As expected, the cells of the peripheral cyto-tropho-blast are chromatin positive in cases of female foetus. However, much to our surprise it has been found that the peripheral cyto-trophoblastic cells in connection with male foetuses are persistently chromatin positive.

This evidences strongly suggest the possibility that the langhan cells might be originating from the decidual rather than as universally accepted at present time from the foetal cells.

Chromatic positive nature of the peripheral cytotrophoblastic cells in association with male foetus appears to be a very strong evidence in favour of the maternal origin of the cells.

All our present understanding regarding the physiological significance and the pathological aberration of the cells of the pe heral cyto-trophoblast are based on the fact that the cells originate from the toetus. Such physiological changes envisages the foetus as a source of HCG, such pathological aberration envisages the neo-plasm like chorion epithelioma to be a implanted tumour originating from the foetal tissue. Maternal origin of peripheral cyto-trophoblast as indicated in our work, if subsequently confirmed by future workers, is likely to radically alter such present concept.