

## The Histological Findings in Human Placenta at Different Gestational Ages

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**Abstract:** The placental examination provides significant information related to intrauterine and perinatal death, Intrauterine Growth Retardation, malformations, infection and effects of maternal diseases on fetal growth. The Magnitude of clinical problem related to the development the function of placenta is so vast, that it is worth to undertake the histological aspect of human placenta A thorough examination of placenta is neglected and often underestimated by the physician gynecologist, pediatrician and pathologist in spite of its invaluable role in the fetal development. A sound knowledge of normal structure and development is highly essential to appreciate the pathological changes. Here I am presenting histological findings of 50 placenta at different gestational ages. present study was conducted in the Department of anatomy Sri venkateswara medical college, Tirupati in collaboration with the department of Obstetrics and Gynecology of maternity hospital Tirupati. small placental bits of fresh tissue of various gestational ages were collected from the Government maternity Hospital Operation Theatres and labour Rooms subjected for processing for histological studies. It is observed that In 33 cases of 6-12 weeks of gestation the histological observations of loose stroma, double layered trophoblast and small centrally placed foetal capillaries were observed. In 12 cases of gestation period between 13-24 week the histological findings are increased number of villi, scanty trophoblastic layer, large and peripherally placed foetal capillaries and less conspicuous Hofbauer cells. In 5 cases between 25 and full term the villi are numerous, with small syncytial knots, ill defined stroma, foetal capillaries are placed more peripherally and less number of Hofbauer cells

**Keywords** Trophoblastic layer, Hofbauer cells, syncytial knots, fetal capillaries

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### I. Introduction

All Eutherian mammals' possess the placenta. The Human placenta is described as discoid, deciduate, haemochorial, chorioallantoic, labyrinthine, and villous organ. The basic function of placenta is to provide nutrition for the developing fetus and to remove the fetal waste. To establish intrauterine pregnancy trophoblast must anchor and invade decidualised endometrium and the uterine vasculature must change to allow progressive increase in blood flow. Most commonly implantation takes place into the endometrium of the upper part and the more often on the posterior wall of the surface endometrium. The invading trophoblast burrow deeper into the endometrium and thus leading to the implantation. The role of the trophoblast in nutrition of the conceptus is reflected in its name. Its function as endocrine organ in human pregnancy is essential to maternal physiological adaptation and the maintenance of pregnancy. The aim of present study is to carry out histological observations of placenta at different gestational ages.

### II. Materials And Methods

The present study was conducted in the department of Anatomy, Sri.Venkateswara Medical College, Tirupati in collaboration with the Department of Obstetrics and Gynecology of Maternity hospital Tirupati.

Small placental bits of fresh tissue of various gestational ages were collected from the Government maternity Hospital Operation Theatres and labour Rooms. They are preserved in 10% formalin for about 5 days and then subjected to routine tissue processing method adopted for the formalin preserved tissue. 5-microns thickness slides were made from the paraffin blocks and stained with haematoxylin and eosin. Slides thus made observed for syncytial knots, cytotrophoblast cells, syncytiotrophoblast cells, nature stroma, stromal villous vessels, Hofbauer cells, location of fetal capillaries within the villi (Table-1) and micro photographs were taken.

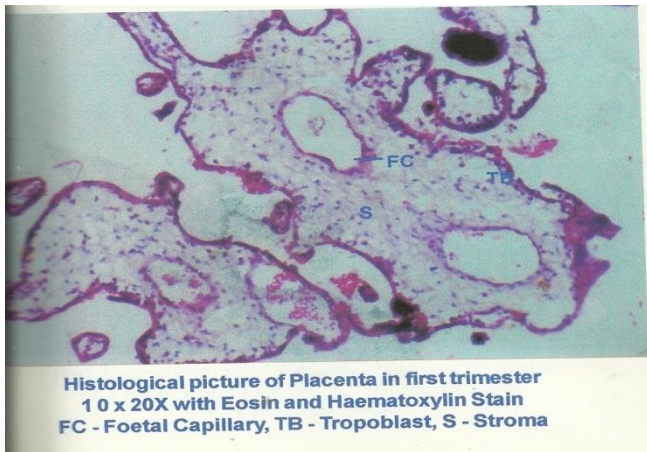


Figure 1 Histological features in 1<sup>st</sup> trimester

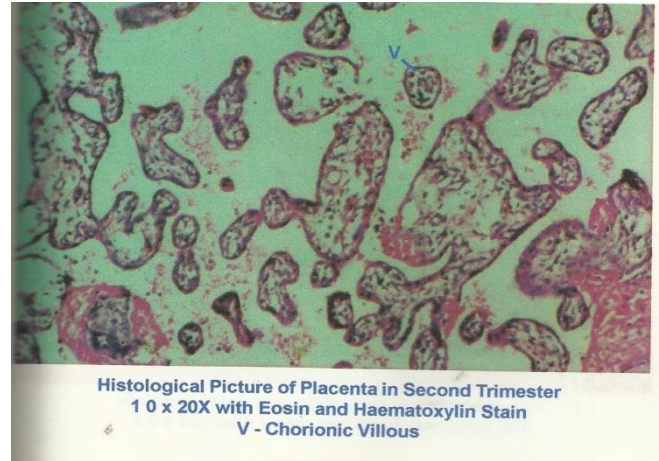


Figure 2 Histological features in 2<sup>nd</sup> trimester

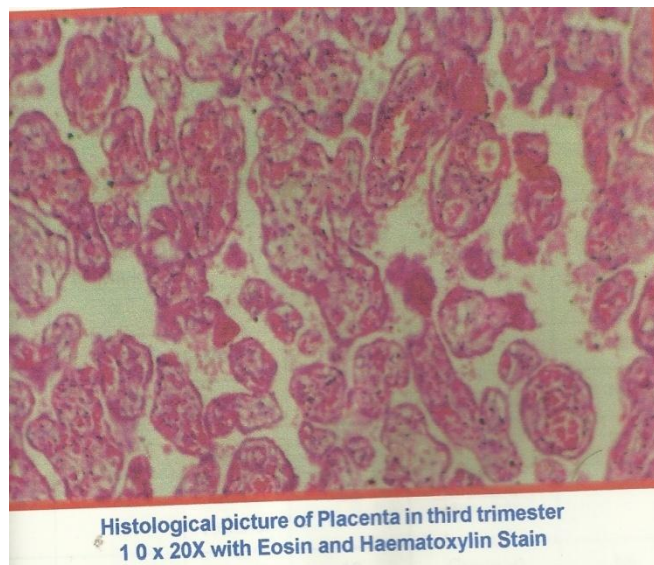


Figure 3 Histological features in 3<sup>rd</sup> trimester

In 33 cases of 6-12 weeks of gestation the histological observations of loose stroma, double layered trophoblast and small centrally placed foetal capillaries were observed. In 12 cases of gestation period between 13-24 week the histological findings are increased number of villi, scanty trophoblastic layer, large and peripherally placed foetal capillaries and less conspicuous Hofbauer cells. In 5 cases between 25 and full term the villi are numerous, with small syncytial knots, ill defined stroma, foetal capillaries are placed more peripherally and less number of Hofbauer cells. Figures 1,2,3, and Table 1 showed histological pictures of human placenta of 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> trimesters.

TABLE : 1

Gestational age weeks	Number of cases	Histological Number of cases findings
6-12	33	The stroma is loose Double layered trophoblast is seen. The cytotrophoblast cells are large with round nucleus and the syncytiotrophoblast cells with small nuclei. Hofbauer cells are numerous. Foetal capillaries are small and centrally placed.
13-24	12	The number of villi are increased in number syncytiotrophoblast layer is thinner and the nuclei are less evenly dispersed. Cytotrophoblastic cells are scanty and does not form a continuous layer. Villous capillaries are larger and peripherily located Hofbauer cells are less conspicuous with vacuolated

		appearance.
25-full term	5	The villi are numerous and small syncytial knots are present with reduced stroma. The fetal capillaries are placed more peripherally. Hofbauer cells are less in number and without vacuoles.

### III. Discussion

In the present study of 50 placentae at different gestational periods of 6–12 weeks, 13-24 weeks and 25 weeks to full term are subjected for histological work (). In the Gestation period of 6–12 weeks the histological feature of 33 cases were studied which exhibited loose stroma and two-layered trophoblast. The cytotrophoblastic cells are large with round nucleus and the syncytiotrophoblast cells with small nuclei. The capillaries are less in number, smaller in size and centrally placed. The stromal mesenchymal cells are stellate in shape. Hofbauer cells are numerous and are vacuolated. According to Midgley et.al.(ref.1)1963 in earlier stages of gestation cytotrophoblast cells form almost continuous layer on the basal lamina but after 4<sup>th</sup> month it gradually expands itself producing syncytium. According to Martinoli et.al.(ref.3)1984, small reticulum cells appear to delimit a collagen free stromal channel system through which Hofbauer cells migrate. Jones and Fox(ref.2) 1991 stated that the core of villi contain small and large reticular cells, fibroblasts and large phagocytic cells (Hofbauer) which are numerous in the 1<sup>st</sup> half of pregnancy. Cross et.al.(ref. 4)1994 suggested that maternal perfusion of the placenta not only supplies blood to the fetus but as well creates an environment favourable to trophoblast differentiation and to become more invasive. Trophoblast close to the inner cell mass continue to proliferate and those that are removed from inner cell mass become primary trophoblastic giant cells. According to D.J. Gersell (ref.5) 1994 the 1<sup>st</sup> trimester villi are of 170 micron in diameter and 2 layers of trophoblast an inner cytotrophoblast and outer syncytiotrophoblast are seen. Benirschke .K & Kaufman P (ref 6)1995 described that villus macrophages (Hofbauer cells) are numerous throughout the period of gestation. They may be seen conspicuous with spindle appearance. According to Schmorl (ref. 7) 1893, Park 1958, there is remarkable liberation of small portion (Sprouts) of syncytiotrophoblast from the villi into the intervillous space. From here sprouts passes to maternal veins and eventually to the capillaries of the Lungs. According to Fox 1978 by term upto 30% of villi may be involved in the formation of syncytial knots.

### IV. Summary And Conclusion

In the current study 50 specimens of placental bits at various gestational periods were collected from Govt. Maternity Hospital, Tirupati and subjected for histological study.

In the spectrum of histological study the 1<sup>st</sup> trimester villi exhibited two layers of trophoblast, loosely arranged stroma, less populated small sized centrally placed fetal capillaries and plenty of Hofbauer cells which are vacuolated.

The histological features of second trimester villi are increased in the number of villi, cytotrophoblastic layer showing discontinuity, thinner syncytial trophoblast compact stroma and large peripherally placed fetal capillaries and numerous Hofbauer cells.

In the third trimester, the villi are numerous, smaller in size, syncytial knots are seen, insignificant stroma, approximation of the vessels to the syncytium leading to the formation of “vasculosyncytial membrane” and reduced number of Hofbauer cells with loss of vacuoles.

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