Human fetal endometrium – light and electron microscopic study* **

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Summary. Human fetal endometrium was examined by light and electron microscopy. Our study shows the following new morphological aspects: (1) Glands are already present. (2) Endometrium undergoes a maturation process during gestation and at late gestational age resembles late proliferative endometrium. (3) The nuclear bodies are present in cell nuclei throughout gestation. (4) Nucleolar channel systems (NCS) sometimes appear at a late gestational age. (5) Cells with the same morphology as that of endocrine cells are found in the basal layers of endometrium at a late gestational age. The significance of these morphological aspects is discussed.

Key words: Human fetal endometrium – Electron microscopy

Introduction

The morphology of the endometrium in sexually mature women has been studied by many authors (see Gordon 1975; Dallenbach-Hellweg 1981). Fetal endometrium has been studied by light microscopy (Kaiser 1963; Huber et al. 1971) but not by electron microscopy.

We now describe such a study and the significance of our findings will be discussed.

Methods

Endometrial tissue was obtained from the uterus of 20 human fetuses, who died (a) during a legally induced abortion process or (b) of asphyxia or unknown causes in the perinatal period. The

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gestation age of the fetuses ranged from 4 to 10 lunar months but in many cases the precise date of the last menstrual period was not known.

The specimens were immersed for 2 h at 4°C in a phosphate-buffered solution of glutaraldehyde (2.5%). After washing in the same buffer, they were postfixed in 1% phosphate-buffered osmium tetroxide solution for one hour at room temperature. The specimens were then dehydrated through graded series of alcohol and embedded in epoxy resin (Epon 812). Semithin and thin sections were prepared with a Reichert Ultracut E ultramicrotome. The semithin sections were stained with an alkalinized toluidin blue solution and used for light microscopy. The thin sections were stained with uranyl acetate and lead citrate, and examined with a JOEL 100 CX II electron microscope.

Results

Light microscopy

In the 4th and 5th gestational month. Scattered glands already existed in the endometrium. They were straight and narrow. Both in the glands and on its, the epithelium had a pseudostratified appearance with 3 to 6 rows of nuclei at differing levels, and it was approximately uniform in thickness. It was composed of pale and dark columnar cells, pale cells being more numerous than dark cells. On the free surface of the epithelium, microvilli, cilia and cytoplasmic projections were seen in places. The nuclei were large and usually elongated with one or more prominent nucleoli. The basement membrane was present but intercellular spaces were not perceptible (Fig. 1).

7th and 8th gestational month. There were more glands in the endometrium than before. The epithelium, both glandular and superficial, was still pseudostratified with only two to three rows of cell nuclei. It was somewhat thicker in the glands than on the surface. The epithelium consisted of pale cells. Dark cells only appeared in some places. On the free surface, microvilli, cilia and occasional bleb-like cytoplasmic projections could be seen. Most nuclei were elongated, while some were rounded and nucleoli were distinctly visible. At the 8th gestational month, one could sometimes find subnuclear vacuoles. The basement membrane was distinct and intercellular spaces were sometimes seen (Fig. 2).

9th and 10th gestational month. Glands were often seen many being slightly tortuous and somewhat dilated. The epithelium was mostly of simple columnar type, although places with pseudostratified appearance could still be found in the glands. The glandular cells were distinctly taller than those lining the uterine cavity and most were pale, dark cells being only rarely found. Occasionally, clear cells (those with a clear cytoplasm and nucleus) appeared in the basal epithelium. On the free surface, microvilli, cilia and cytoplasmic projections were increasingly seen. In the glandular epithelium the nuclei with one or more nucleoli were elongated, but they were round in the superficial epithelium and in the clear cells. In some cells, subnuclear vacuoles were observed. The basement membrane was distinct. On the apex of the epithelium, terminal bars were perceptible. Intercellular spaces could be seen in the basal and sometimes even in the middle portion of the epithelium (Fig. 3).