

Histological evaluation of human endometrium at different phases of hCG-primed menstrual cycle

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INTRODUCTION

Implantation is a complex process of interactions between the embryo and the endometrium, a layer of mucous membrane on the inner surface of the uterus. The embryo qualities making it fit for embedding, endometrium receptivity, as well as the exchange of multiple molecules between embryo and endometrium, determine whether and when is the best time for pregnancy to occur. In the context of a larger study we are conducting on the dynamics of microRNA expression in endometrium, an objective assessment of the endometrial phases is necessary.

Trial registration number:

Ethics Committee Certificate of Approval №3/02.09.2019 of The Research Ethics Committee of Faculty of Biology, Plovdiv University "Paisij Hilendarski", Plovdiv, Bulgaria.

HYPOTHESIS Human chorionic gonadotropin (hCG) administration which is expected to cause ovulation within 36-48 hours will allow for more accurate secretory phase dating.

PATIENTS, METHODS

Endometrial biopsies were taken from 7 volunteers, outpatient and without anesthesia. Ultrasound measurements of leading follicle and endometrial thickness, together with estradiol and luteinizing hormone levels were set as criteria for hCG application. It was applied on a strictly individual day for each patient as an inducer of ovulation. Part of each biopsy material was subjected to a classic histological examination by staining with hematoxylin and eosin, and the morphological evaluation was done according to the Noyes criteria.

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RESULTS

Biopsies were planned individually for each woman and conducted at 4 time points – hGC (before hormone application), hGC+2, hGC+7 and hGC+9 (numbers are days after hCG application).

Quality and informative histological preparations for all 4 time points were done for 5 of the 7 volunteers. Among the analyzed biopsy samples, different phases of the endometrial cycle were found according to the histological criteria. Representative histological samples of the detected phases are presented in Figure 1.

We observed that the histological descriptions at hGC+7 and hGC+9 time points showed no absolute compliance with the Noyes criteria for the secretory phase for some of the individuals (Table 1).

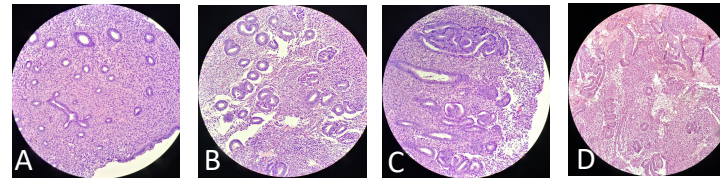


Figure 1. Representative histological samples of the detected phases of the endometrial cycle. A. Proliferative (P), B. Early-secretory (ES), C. Mid-secretory (MS), D. Late-secretory (LS)

DISCUSSION and CONCLUSIONS

We created a working group of endometrial samples according to the Noyes criteria that correspond to the mid-secretory phase which includes 4 samples from LH+9 and 1 sample from LH+7.

We consider it as a representative pool of the most appropriate period in terms of receptivity to be used to analyze the dynamics of microRNA expression in the next stage of the ongoing project

Table 1. Correspondance between LH time points and endometrial phases

Patient	LH	LH+2	LN+7	LH+9
1	P	P	ES	MS
2	P	ES	ES	MS
3	P	P	ES	MS
4	P	ES	MS	LS
5	P	N/A	P	ES
6	P	ES	N/A	MS
7	ES	N/A	MS	LS