

## 207 (2730)

**The diagnosis of early human pregnancy by the vaginal smear method.**

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The study of a large number of vaginal smears from different mammals, especially from guinea pigs, during the last several years has led me to realize that pregnancy as well as different pathological conditions of the ovaries and the genital tract might be diagnosed more or less accurately by such smears. The entire composition of the vaginal smear changes rather typically under different conditions. Pregnancy, cystic or other degenerative changes of the ovaries, inflammatory processes, growths, etc., affect the entire genital tract, including the vagina, in a way which produces definite and typical changes in the consistency and make-up of the vaginal smear. The presence or absence of different types of desquamated cells, as well as the varying form and number of leucocytes, lymphocytes and erythrocytes and bacteria, offer a variety of criteria upon which a diagnosis of certain conditions may be based.

Since diagnostic reactions are of more interest and importance in man than in other mammals, I have tried for some time to secure proper human material on which to further these studies. It had been difficult, however, to obtain good reliable human vaginal smears until recently. This has now been rendered possible by a coöperative arrangement between the Department of Anatomy of Cornell Medical College and the Woman's Hospital of New York aided by the Maternal Health Committee.

This arrangement has afforded the opportunity to study a large number of human vaginal smears from normal cases as well as from cases of pregnancy, and from several pathological conditions. The normal human smears differ considerably in cellular composition from those of lower mammals, yet they nevertheless show typical and characteristic changes which may serve to indi-

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cate a number of distinct stages. The ovulation moment itself is revealed by certain modifications in the smear which will be fully described in another paper. A subnormal condition of the ovary may be revealed or indicated by the absence of those reactions which characterize a normally functioning and ovulating ovary.

The occurrence of pregnancy may be definitely recognized by certain typical changes in the structure of the smear. The prevailing types of desquamated cells show during pregnancy a deviation from the usual types. Soon after the beginning of pregnancy there is a distinct tendency for the vaginal cells to assume certain characteristic forms. Many of them are elongated and concave. The cytoplasm is often partly or totally plasmolyzed or vacuolized. Some are more or less collapsed and appear boat like in shape. The nucleus is often also elongated and collapsed. Such cells may appear occasionally under normal or pathological conditions, but not so typically and steadily characteristic as in the pregnancy smear. The diagnosis of pregnancy, however, need not be based solely upon the presence or absence of such cells. Other characteristics, such as the absence of normal periodicity, the conditions of leucocytes, lymphocytes, erythrocytes and of the other types of cells, may be used in correlation with the above described cellular changes for the complete picture in a definite diagnosis. A further common characteristic of the pregnancy smear is the frequent presence of free nuclei and traces of broken cells.

An important fact is that typical reactions and changes characterize the vaginal smear during both uterine and ectopic pregnancies. This has been definitely established by several ectopic cases diagnosed as pregnant and later operated upon at the Woman's Hospital. The approach or occurrence of parturition, abortion or resorption may possibly also be revealed by certain smear changes. As soon as delivery, abortion or resorption takes place, and the *corpus luteum* begins to regress, the smear presents an entirely different appearance, indicating the onset of active destructive processes.

As a whole, the study of the vaginal smear seems to be of important diagnostic value. Its application may be very helpful in gynecology for the diagnosis of certain doubtful cases. The technic does not offer great difficulties and might be simplified so as to be used as a routine method.