BETA GLUCURONIDASE ACTIVITY OF HUMAN OVARY DURING PREGNANCY AND PUERPERIUM

by

J. KAR,* M.B.,B.S., M.S.

and

RAJ BAVEJA,** M.B.,B.S., D.G.O., M.S., D.Phill.

Introduction

Extensive studies of the ovary have been made, Human ovary, especially of the pregnant stage has not been subjected to detailed histochemical study. In the present study histochemical methods have been adopted for the demonstration of the Beta-glucuroidase in the ovary during pregnancy and puerperium. There is no such comparable data in the literature available.

Material and Methods

Twenty-five ovarian tissues were procured from patients (Table I) admitted to the obstetric unit of Moti Lal Nehru Medical College, Allahabad. The specimens were collected from patients subjected to hysterotomy and sterilization, lower segment caesarean section and puerperal sterilisation (Table II).

TABLE I
Material Collected

Groups	No. of cases
I. Normal pregnancy groups	
(a) Early pregnancy	7
(b) Term pregnancy	10
II. Puerperal group	8
Total	25

TABLE II
Distribution of Puerperal Cases

	Day of Puerperium						Total
	1	3	4	6	9	42	
No. of cases	1	3	1	1	1	1	8

For demonstrating Beta-glucuronidese the method of Fishman and Baker (1966) using ferric hydroxyquinoline was employed. A microcrystelline deposit of prussian blue indicated sites of activity (Pearse 1961).

Results

Surface epithelium; Minimal to moderate activity of beta-glucucuronidese was been in the cells of the surface epithelium.

Follicle: Primordial, Graafian, Atretic. In the oocyte beta-glucuronidase was concentrated in the juxta nuclear position and the granulosa cells showed minimal to moderate activity. The overall content of the follicle was more than the stroma—granules were bigger whereby it was easy to locate the follicles.

In the graafian follicle the granulosa cells showed minimal to moderate activity. It was more concentrated in the theca

*Lecturer.
**Professor and Head.
Department of Obstetrics and Gynaecology, M.L.N. Medical College, Allahabad.
Accepted for publication on 6-3-80.

cells. With atresia the activity was not much altered.

Interstitial Gland Tissue: The cells of the interstitial gland tissue showed intense enzyme activity. The cell outline was not made.

Corpus Luteum and Albicans: The granulosa lutein cells of the corpus luteum showed moderate to intense enzyme activity Fig. 1. It was negligible to minimal in the paralutein cells. There was minimal activity in the corpus albicans. The theca lutein cells surrounding it were rich in the enzyme. There was no activity in macrophages.

Stroma: The stromal cells showed minimal to moderate activity. Circular areas with concentration of the enzymatic activity were seen (Fig. 1). They were variable in size and were collected more near the blood vessels. Exact nature of the cells with this type of activity was difficult to ascertain. They were thought to be collection of granulosa cells or certain specialised cells with more activity than the rest of the stroma. The blood vessels also showed moderate activity. Certain stromal cells showing decidual reaction had intense enzyme activity.

Discussion

The functional significance of Beta-glucuronidase in the reproductive tract is not yet certain. It is considered to play a role in the utilisation of steroids (Fishman 1952) or mobilization of polysaccharide moieties for tissue reorganisation and growth (Kerr *et al* 1949). It is thought that beta-glucuronidase has special affinity and also synthesizes particularly oestradial beta-glucuronidase. It therefore, plays an important role in the binding of cestrogen in the tissue of target organs and in its biological effect (Fishman 1947, 1952).

No comparable histochemical study of the ovary is available in the literature, but to understand the enzyme activity during pregnancy, Odell and Fishman (1950) had done the serum studies. They reviewed the work done and stated that in human beings the serum activity of this enzyme increased approximately fourfold during pregnancy (Fishman 1947; Medonald and Odell 1947), and was still higher during pre-eclamptic toxaemia of pregnancy as well as during pregnancy associated with excessive water retention.

Ovarian constituents which revealed the presence of the enzymes in this study were of two types:

1. Moderate activity
   a. Surface epithelium
   b. Stroma, especially the specialised cells
   c. Granulosa cells

2. Intense activity
   a. Theca lutein cells
   b. Corpus luteum
   c. Interstitial gland tissue

In view of the fact that the overall enzyme content did show an increase with the advancing gestation and a fall after the placenta was expelled, it may therefore be postulated that the enzymetic concentration is under the influence of placental hormones. Presence of Beta-glucuronidase is essential for intrinsic cell function of the ovarian elements for tissue organisation, growth and better utilizations of its own hormones whereby the ovary morphologically and histochemically is

kept in a functional state during pregnancy.

References

1. Fishman, W. H.: B-glucuronidase. Its relation to the action of the estrogenic hormones. J. Biol. Chem. **169**: 7, 1947.
2. Fishman, W. H.: In: Ciba Foundation Coloquia on Endocrinology, Vol. 1, J. & A. Churchill, London, 1952.
3. Fishman, W. H. and Baker, J. R.: J. Histochem. Cystochem., **4**: 570, 1966.
4. Kerr, L. M. H., Campbell, J. C. and Levvy, G. A.: Biochem. J. **44**: 487, 1949.
5. McDonald, D. F. and Odell, L. D.: J. Clin. Endocrinol., **7**: 535, 1947.
6. Odell, L. D. and Fishman, W. H.: Studies on B-glucuronidase: 1 Activities in human endometrium. Am. J. Obstet. Gynec. **59**: 200, 1950.
7. Pearse, A. G. E. (1961): Histochemical, theoretical and applied, Ed. 2, J. London: J. and A. Churchill, Ltd. 384.

See Fig. on Art Paper I