ON
THE STRUCTURE
OF THE
CORPUS LUTEUM.

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THE Graafian vesicle in the human ovarium is a small spherical pellucid sac, which contains a fluid, the ovum, and the granular substance in which it is imbedded. The vesicle itself always consists of two distinct coats or membranous layers, which adhere firmly together. The external surface of the Graafian vesicle adheres loosely to the stroma or proper substance of the ovarium, in which it is imbedded by soft cellular substance, blood-vessels, and nerves.

Soon after impregnation, the coats of the Graafian vesicle and the peritoneum covering it give way by absorption, the contents of the vesicle escape, and between its outer coat and the substance of the ovary, the corpus luteum is gradually formed.

The observations of De Graaf, Haller, and others, have proved that a corpus luteum is invariably formed after impregnation in the situation of the Graafian vesicle, from which the ovum had escaped; but whether the corpus luteum is produced by a thickening of the inner layer of the vesicle, or is an entirely new substance deposited between its coats, or around its external surface, and whether corpora lutea are not formed in the ovaria of some women who have never been pregnant, physiologists have hitherto been unable to determine.

Professor Baer is of opinion that the corpus luteum is formed in all animals by a thickening of the inner membrane of the Graafian vesicle. "*De corporis lutei genesi satis dissentiunt observatores. Me judice minimè corpus novum est, sed stratum internum thecæ magis evolutum. Quod sequentibus observationibus demonstrari posse puto.**"

Dr. Montgomery believes that the corpus luteum is formed between the coats of the Graafian vesicle, and does not consist, as Baer has supposed, of a thickening and puckering of the inner layer of the vesicle. "It will appear," he observes, "very obviously from the above description, that I believe the corpus luteum to be surrounded externally by the outer membrane of the Graafian vesicle, while its cavity is lined by the inner membrane of this vesicle; the corpus luteum being, in fact, enclosed

* C. E. Baer, *De Ovi Mammalium et Hominis Genesi*. Lipsiæ 1828, p. 20.

between these two membranes, and its substance pervaded by the small vessels passing from the outer to the inner. Of this I have reason to be satisfied, and I would not have deemed it necessary to insist on it, but that a different account is given on the high authority of Baer, who thinks that the corpus luteum is not a new body, but merely the inner coat of the Graafian vesicle in a state of greater development, which appears to be the opinion of Valentin also. Now the fact is, that it lies around and outside of the inner membrane of the vesicle, which is to be seen distinctly forming its central cavity at earlier periods, and by the collapse or approximation of its opposite surfaces, afterwards gives rise to the radiated white line which remains an essential distinctive character of the true corpus luteum at every subsequent period at which this body is still visible.”*

On the 11th of July 1838, a woman, two months advanced in pregnancy, died of continued fever, in St. George’s hospital. The uterus and its appendages were presented to me on the 12th, by Dr. Macleod, and the following is a short description of the left ovarium, which contained the corpus luteum. It was larger than the right ovarium, and had a considerable prominence on its convex edge, around which were seen ramifying a number of minute arteries and veins. There was a small circu-

* An Exposition of the Signs and Symptoms of Pregnancy, by W. F. Montgomery, M.D. London, 1837. p. 218.

lar depression at the point of this prominence, but a bristle could not be made to pass through it into the substance of the ovarium. On cutting open the ovarium, the corpus luteum presented itself of an oval shape and deep orange colour, with a small cyst in its centre, resembling the Graafian vesicle, with its coats thickened and contracted. With little difficulty I succeeded in separating one half of this cyst into two distinct layers, which appeared to be the two coats of the Graafian vesicle.

The outer surface of this cyst is so loosely attached by cellular tissue to the corpus luteum, that it can easily be separated from it. The corpus luteum itself varies from a line to a line and a quarter in thickness, and when examined with a magnifier, appears to consist entirely of small yellow globules or particles contained in cellular membrane.

Around the outer surface of the corpus luteum, and completely investing it, there is a white layer varying in thickness, the outer part of which loses itself in the substance of the ovarium, of which it appears to form a part, and to be similar in structure, having the mouths of divided vessels distinctly perceptible, as in other parts of the substance of the ovarium. The inner portion of this white layer, which appears to be condensed stroma, is separable on the one hand from the corpus luteum, and on the other from the substance of the ovarium, so as to give the appearance of a distinct membrane, considerably exceeding in thickness both layers of the

Graafian vesicle. Plate VII. fig. 1 exhibits the colour and form of the corpus luteum when first cut open, with the Graafian vesicle in its centre.

The Graafian vesicle is also enclosed within the corpus luteum, in a specimen of Fallopian tube conception of six or seven weeks, in my collection.

In another specimen of more advanced tubal conception, the Graafian vesicle is likewise seen enclosed within the corpus luteum.

The same fact is fully as evident in the preparation of the gravid uterus of ten weeks, in my paper on the membranes of the human ovum in the 17th volume of the Transactions of the Society; and in several of the preparations of the gravid uterus in the Hunterian Museum, the Graafian vesicle is also contained within the corpus luteum, and forms its central cavity.

From these observations on the corpus luteum soon after impregnation, we may conclude that it is neither produced by a thickening of the inner layer of the Graafian vesicle, nor by a deposit of a new substance between its two coats, but that it is formed around the outer surface of both these coats of the Graafian vesicle, and that the stroma of the ovarium is in immediate contact with the external surface of the yellow matter.

As gestation advances, the deep yellow colour of the corpus luteum fades, and the Graafian vesicle in its centre contracts and assumes a peculiar white membranous appearance, with small bands passing outward through the substance of the yellow matter,

like the radii of a circle. See the drawing of a corpus luteum seven months after conception. (Fig. 3.)

The corpus luteum has almost completely disappeared, and the ovarium returned to its natural size about three months after parturition. A small depression on the surface, and a slender white line running into the substance of the ovarium, are all the traces of the corpus luteum which remain in an ovarium three months after delivery.

In the ovaria of women who have never been pregnant, yellow oval-shaped bodies are frequently found, which it is difficult to distinguish from true corpora lutea.

In the greater number of spurious corpora lutea, as Dr. Montgomery has observed, the appearances are produced by blood extravasated within the Graafian vesicles, which assumes a fawn hue as the colouring matter disappears by absorption, and undergoes various changes, similar to those which are observed to take place in coagula of blood formed in the cavities of veins from inflammation of the coats or mechanical obstruction. After a longer or shorter period, the blood is entirely removed, and the coats of the vesicle contract, and often assume a brown, yellow, or black colour. In these false corpora lutea, the yellow matter is contained within the Graafian vesicle, and does not form around it, as true corpora lutea are always observed to do.

In advanced life a thickening of the layers of the Graafian vesicle not unfrequently gives rise to appearances resembling corpora lutea. These, and all

other false corpora lutea, are generally found deeply imbedded in the substance of the ovarium, or, if they are near the surface, they are not actually in contact with the peritoneum, but have a small portion of stroma intervening. If there is a cicatrix over these, it has an irregular form, very unlike the small circular aperture always seen in the peritoneum covering the true corpus luteum. Besides, in true corpora lutea there are always bands running from the outer surface of the central capsule to the stroma, surrounding the yellow substance of the corpus luteum.

In the ovaria of women who have died during menstruation, appearances have also been observed, which might easily have been mistaken for true corpora lutea.

On the 18th of November 1832 I examined the uterus and the ovaria of a young woman who had died suddenly the preceding day, when the catamenia were flowing. Both ovaria were larger than usual, and the Fallopian tubes were red and turgid. The peritoneal coat of the left ovarium was perforated at that extremity nearest the uterus by a small circular opening, around which the surface of the ovarium was elevated, and of a bright red colour. When cut into, the substance of the ovarium around had a fawn colour.

On the 14th of January 1837, a woman thirty-seven years of age, who had long suffered from hysteria, died suddenly in St. George's Hospital, during menstruation. No morbid appearance was

found to account for her death. A small circular aperture was observed in the peritoneum of the left ovarium, near the point where the corpus fimbriatum is fixed to the extremity of the ovarium. This opening communicated with a cavity in the substance of the ovarium, which was surrounded with a soft yellow substance, of an oval shape. The distinctive characters of the true corpus luteum were wanting.

From all the observations hitherto made upon the true corpus luteum, we may conclude that it is never formed but as a consequence of impregnation. The yellow oval-shaped substances found in the ovaria of women who have never been pregnant, are produced by morbid states of the Graafian vesicles, and are essentially different in structure.

P.S. On the 27th of July 1839, a lady, 29 years of age, died in the second month of her first pregnancy ; and I inspected the body on the 29th, with Mr. Jorden of Lower Belgrave Street. The right ovarium contained the corpus luteum, from which there escaped about a small tea-spoonful of yellow serous fluid when it was cut open. On the 30th of July, I examined the ovarium and corpus luteum with Sir Astley Cooper and Mr. Wharton Jones, and the result is, that the correctness of the view which has been taken of the structure of the corpus luteum in this paper is now put wholly out of doubt. From the preparation of the part and the fac simile made of it by Mr. Jones, it is evident that no capsule surrounds the yellow matter, but that

the outer surface of the yellow matter is in immediate contact with the stroma, or proper tissue of the ovarium. It further clearly appears, that both the layers of the Graafian vesicle are within the yellow matter, that the innermost of these layers is smooth, and the outer layer rough and filamentous, and that processes are sent out from this exterior layer which penetrate the yellow matter to a considerable depth, and in some parts go quite through it to the stroma of the ovary. The peculiar convoluted appearance of the yellow matter is also distinctly seen. (See Pl. VII. fig. 2.)

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