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Structure and Function of Placenta and Corpus Luteum in Viviparous Snakes.

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The discovery of primitive placentæ and well-defined corpora lutea in the viviparous snake *Storeria* by the writer has prompted a preliminary survey of these structures in other live-bearing snakes. Further, an attempt has been made to ascertain the function of the corpus luteum. Of special interest is the possibility of homologizing the structure and function of these organs with those of the mammal and of determining their rôle in reptilian gestation.

Although placentation in the lizards and snakes^{1, 2, 3} and corpora lutea in lizards^{4, 5} have been described for certain European and Australian forms, they are now recorded for the first time in our North American reptiles. In certain species of the genera *Storeria*, *Potamophis*, and *Thamnophis*, a yolk-sac placenta exists during the earlier stages of pregnancy; it is more developed in the first 2 of these genera. "Implantation" is brought about by a constriction of the extremely thin, transparent uterus between each embryo giving the gravid uterine horn the appearance of a linked sausage. On the ventral side of the uterus which encases the large yolk-sac, is an elliptical, creamy-white area which marks the extent of the yolk-sac placenta. In this region both uterine epithelium and the opposing ectodermal chorion of the foetus have given rise to very large columnar cells which cytologically suggest an active exchange of substances. The modified maternal and foetal tissues of this circumscribed area lie in close contact with each other and correspond to similar yolk-sac placentæ described by Weekes³ for Australian reptiles. Beyond this area the chorio-allantoic and the uterine wall are highly vascularized. In the genus *Storeria* the uterine epithelium is partly eroded, allowing the maternal capillaries to make direct contact with the chorio-allantoic membrane. This may be regarded as a very primitive beginning of an allanto-placenta.

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¹ Giacomini, E., *Arch. Ital. Biol.*, 1891, **16**, 332.

² Flynn, T. T., *Rec. Austr. Mus.*, 1923, **14**, 72.

³ Weekes, H. C., *Proc. Zool. Soc. London*, 1935, 625.

⁴ Hett, J., *Z. mikr. anat. Forsch.*, 1924, **1**, 41.

⁵ Weekes, H. C., *Proc. Linn. Soc. N. S. Wales*, 1934, **59**, 380.

Of interest in connection with the placentation and great vascularity of the pregnant uterus is the occurrence of corpora lutea of the ovary. So far they have been found in seven viviparous species of the genera *Storeria*, *Potamophis*, *Thamnophis*, and *Natrix*.⁶ Their occurrence in 2 South American snakes has just been recorded.⁷ An examination of the structure of the follicle shows that at ovulation the granulosa layer apparently becomes detached from the theca, but remains inside the collapsed follicle and soon proliferates and re-establishes its connection with the theca interna. The luteal tissue which is apparently derived entirely from the granulosa layer, fills almost completely the remaining follicular cavity. The theca interna displays a great activity during the early formation of the corpus luteum and supplies supporting fibers, capillaries and blood vessels. These penetrate into the luteal tissue and become very prominent toward the end of gestation. The completely differentiated organ is strikingly similar to that of the mammal. Its structure is maintained throughout most of pregnancy and slowly disintegrates after parturition. The period of gestation varies with the species from about 2 to 3 months and longer.

The finding of corpora lutea during gestation suggested this organ might be responsible for the maintenance of intrauterine embryos. Consequently a series of snakes (*Thamnophis* and *Natrix*) were castrated during early pregnancy. Seventeen were completely and 3 unilaterally castrated. Of those completely castrated 6 were injected with a mixture of progesterone and theelin. Autopsies at intervals up to 25 days after the operation in each series revealed living young. However, preliminary work during the previous summer showed that abortion followed complete castration in 2 out of 6 cases. These latter findings are in better agreement with those of Clausen,⁸ who reports that after castration the embryos either die or are absorbed during early and middle pregnancy. In view of this controversial evidence, further work is needed before final conclusions can be drawn on the function of the corpus luteum in reptiles.

⁶ Rahn, H., *Anat. Rec.*, 1938, **72**, Suppl., 55.

⁷ Fraenkel, L., and Martin, T., *C. E. Soc. Biol.*, 1938, **127**, 466.

⁸ Clausen, H. J., *Anat. Rec.*, 1935, **64**, Suppl., 88.