

was tolerated by the mice in much higher concentrations than epinephrin.

During vasoconstrictor action the capillaries in the islands were distinguished as thin, grey channels lying between interlacing cords of cells; the islands became lusterless and their outlines grew indistinct.

The results of the studies with epinephrin and pituitrin indicate that the circulation in the islands of Langerhans is probably regulated by changes in the afferent arterioles or the small arteries in response to physiological stimuli. This may constitute the mechanism by which the supply of insulin to the circulation is controlled. In diabetes the amount of insulin available to the body may be curtailed by vasomotor disturbances in the arterioles and small arteries without demonstrable lesions in the islands.

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Cytological Changes in the Definitive Ova of the White Rat.

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It has been noted in atretic follicles of ovaries of a number of different mammals that the oocytes appear to be going through a process closely resembling normal development. It appears to be a matter of interpretation, after a review of the literature from 1884-1930, as to whether this process is the beginning of parthenogenetic cleavage or whether it is only degenerative fragmentation.

Segmented ovarian ova appeared in every stage of the oestrous cycle of the white rat. They were more numerous in pregnant rats which were at the fifth and eighteenth day of their gestation period. This observation agrees with that of Evans and Swezy.¹ The small size of the follicle and of the segmented egg within, in comparison with the normal follicle and egg is striking. The abnormal follicles were in every case below the surface of the ovary, and in nearly every case they were adjacent to larger normal follicles, or to ovarian corpora. Swezy² found very few follicles developing from the germinal epithelium bounding follicles or corpora, due she believed, to the

¹ Swezy, O., and Evans, H., *Science*, 1929, cxxi, 46.

² Swezy, O., *J. Morph.*, 1929, xlviii, 445.

tension exerted by the expanding body beneath. As the normal follicle enlarges it pushes out in lobules and due to these outpushings on the part of the normal follicle normal growth and development is denied the smaller adjacent follicles. As pressure is increased upon a follicle there is a corresponding increase in pressure upon the ovum within. It seems probable that this increase in pressure has some effect upon the initiation of the development of the egg.

In 39 of the 42 cases studied the segmented ova had a constant diameter of either 0.0428 mm. or 0.0570 mm. Kirkham and Burr³ gave the diameter of the living unsegmented egg as of 0.079 mm. It is evident from this that when the egg is prevented by the surrounding pressure from growing larger than 0.0570 mm., development is started.

The egg is located deep within the ovary and in most cases is prevented from reaching the surface by an intermediary normal follicle, which in turn as it grows, exerts a pressure upon its neighbor. As a result of this increase in pressure it appears that the egg follows the path of least resistance and starts to divide. It would logically follow that if the pressure on the egg increases, the "blastomeres" would eventually separate. This is exactly the result as seen in the number of eggs studied. If, however, this pressure upon the egg is not increased by the surrounding "agent," the tendency for the egg would be to continue dividing without a complete separation of the constituent blastomeres in the mother liquor of the follicle.

The question arises as to whether the egg divides in normal cleavage stages or whether it is degenerative fragmentation. One would naturally expect in the circumscribed area of an ovarian follicle that the embryonic development would be very defective, especially in the presence of an abnormal pressure upon the egg. In the 60 eggs studied which showed segmentation, division seemed to be more or less regular. The 2, 3, 4, and 8-cell stages indicate a decided tendency towards normal development. What occurs after the 8-cell stage is uncertain, but from my own material I believe that degenerative fragmentation is at work. No traces of further embryonic development as found in the guinea pig by Loeb⁴ could be found in any of my material.

As a result of this study of some 60 segmented ovarian ova and of the follicle surrounding each, it is shown that normal growth and development were denied them due to the presence of intermediary

³ Kirkham, W. B., and Burr, H. S., *Am. J. Anat.*, 1913, xv, 291.

⁴ Loeb, L., *PROC. SOC. EXP. BIOL. AND MED.*, 1930, xxvii, 413.

follicles, atretic follicles or of corpora lutea. Further, this condition causes an increase in pressure upon the follicle, as a result of which there is a corresponding increase in pressure upon the egg. Since this condition has been found in each of the 60 eggs studied, it is concluded that this increase in pressure plays some part in the initiation of development of the ovarian ova as found in the white rat.

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Factors Determining the Ergosterol Content of Fungi.

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Since 1927 this laboratory has been engaged in the development of high-yielding ergosterol sources. The fungi being characterized by a relatively large ergosterol content, numerous representative species were investigated and the factors influencing the elaboration of ergosterol determined.

We used 25 true yeasts, 4 pseudo yeasts, 18 molds, 3 mushrooms, and 2 bacteria. We found that the inherent ergosterol producing capacities of the different species vary enormously, and that by manipulating the cultural conditions these capacities may be attained or repressed.

The bacteria, bovine and human types of *Mycobacterium tuberculosis*, showed no ergosterol by spectrographic assay (cf. Prickett, Massengale, and Cox¹). Also Anderson and Chargaff² found no cholesterol or any substance giving sterol color reactions in the unsaponifiable matter from a human type of *M. tuberculosis*. Apparently this is the first one of the fungi in which no ergosterol has been found; the absence of ergosterol is all the more surprising when the high lipid content of this organism is considered. Of the other fungi the yeasts showed the widest variation. *Saccharomyces logos* contained but a trace, while *S. carlsbergensis* developed 2.4% of ergosterol. Spectrographic analyses and actual extractions of the more promising molds—representatives of the *Mucors*, *Penicillia*, and *Aspergilli*—and also the pseudo yeasts and mushrooms, gave values between the extremes of the yeasts. It is interesting to note

¹ Prickett, P. S., Massengale, O. N., and Cox, W. M., Jr., *J. Bact.*, 1930, xix, 8.

² Anderson, R. J., and Chargaff, E., *J. Biol. Chem.*, 1929, lxxxiv, 703.