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II. Wissenschaftliche Mittheilungen.

1. The Genesis of the Egg in Triton.

By Mr. Tomotaro Iwakawa, Tokio, Japan.

The following contains the more important results of my study on the origin and growth of the egg of *Triton pyrrogaster* Boje.

The wall of the ovary consists of three layers, an external germinal epithelium, an inner lining epithelium, and a middle layer of connective tissue, or stroma.

In surface views, the size of the cells of the germinal epithelium appears to vary from place to place, being smaller in those areas where germ-cells are in process of formation than elsewhere. That the cells of these areas appear smaller than the rest, in surface views, is explained wholly, or partially, by the fact that they are more crowded and have greater depth. This condition is brought about by the multiplication of the cells of the germinal epithelium, in limited, or scattered patches. These patches correspond, in whole or in part, with the »cell-islands« of Waldeyer.

My study corroborates the generally received theory of the origin of the egg from the germinal epithelium, but has led me to results which are new in regard to the mode of origin.

I have not been able to bring my observations into harmony with the theory of Nussbaum, according to which all the ova are derived from »Geschlechtszellen«, independently of the germinal epithelium; nor have I succeeded in finding any evidence of the view recently put forward by Valaoritis, who refers the origin of the ova to white blood-corpuseles.

As to the mode of origin, my observations appear to warrant the following statements.

It is in the crowded areas (»cell-islands«) that we meet with what I have called germ-cells, which lie at first in the germinal epithelium, and are plainly a part of it. That the germ-cells lie in, and yet differ from, the ordinary cells of the germinal epithelium, is a fact which, by itself, might be interpreted in favour of Nussbaum's theory. But these germ-cells arise from the ordinary cells of the epithelium.

During the winter months epithelial cells were found whose nuclei were in process of division, and others in which the division was already completed. In cells having two nuclei, these nuclei were sometimes alike, and like the nuclei seen in other epithelial cells; while in other cases one nucleus differed in one or more particulars from the twin nucleus. In such cases, one nucleus always retained the aspect (treated in nitrate of silver) of the ordinary epithelial nucleus, while the other varied from this in being larger, more nearly spherical, more coarsely granular, and darker. The latter becomes the nucleus of a primary germ-cell, which appears to be formed within the parent cell, and to get liberated from it by out-growing it. As the nucleus enlarges, an envelope of protoplasm, derived from that of the parent cell, becomes marked off, but without the formation of any distinct membrane. The germ-cell grows larger, tends more and more to expand beyond the limits of the original cell, begins to jut a little under a neighbouring cell, and sinking deeper, finally becomes an independent cell, surrounded on all sides with epithelial cells, which have no definite arrangement.

In regard to the origin of the follicular epithelium, I have obtained no decisive results; but what I have seen seems to me to favour the opinion that it is formed directly from the epithelial cells which cluster around the germ-cell. In this case, the germ-cell would represent the primordial ovum.

The first plain indication of the presence of yolk-spherules appears about the time the egg has attained a diameter of 0,25 mm. The protoplasm has become somewhat clouded with very minute granules; and scattered patches, consisting of larger or smaller aggregations of small

yolk-spherules, are seen on one side of the ovum, lying near the periphery. These deutoplasmic masses, as they increase in size, do not at first blend with one another, but preserve their individuality until the ovum, having attained a diameter of about 1 mm, has become almost completely filled with yolk-spherules. The yolk-spherules have an endogenous origin.

The vitelline membrane arises from a thin superficial layer of protoplasm.

The germinal dots, a little before the ovum attains a diameter of 1 mm, begin to move towards the centre of the germinal vesicle, and at the same time undergo repeated divisions. There is thus formed a mass of small nucleoli, or fragments of such, in the centre of the germinal vesicle. Later stages have not been completely made out.

2. The Structure of the Ovary, and the Origin of the Eggs and the Egg-strings in *Nepheles*.

By Mr. J. Jijima, Tokio, Japan.

The following is an epitomized account of the results of a study on the genesis of the egg in *Nepheles*¹.

The ovary-wall consists of two layers, an external cell-and-muscle layer (Tunica propria), and a lining epithelium.

The proper tunica may be said to be composed of the following 4 strata, beginning with the external one.

1) The circular muscle-fibres, which, running transversely, completely encircle the ovarial tube, frequently anastomosing with one another, and thus forming a muscular net-work.

2) A stratum composed of rather loosely packed cells and a net-work of vaso-fibrous tissue (Lankester), together with a few longitudinal muscle-fibres which run along the outer, or what I have called, on account of its being thickened, the rachal side of the tube.

3) The semi-circular muscle-fibres, disposed in two longitudinal series, one of which occupies the dorsal half of the tube, the other the ventral half. The extremities of these fibres are placed in the rachal and mediad lines of the tube. Except at the end of the tubes, where they assume a longitudinal direction, these fibres have a general transverse direction. They represent curves of double curvature; first they have the curvature of one half of the tube; and secondly, a curvature facing anteriorly, which is formed by the bending

¹ These observations were made in the University of Tokio.

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