THE INFILTRATION OF GOLGI BODIES AND MITOCHONDRIA FROM THE FOLLICULAR EPITHELIUM TO THE EGG.

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That the nutritive substances required for the growth of the oocyte have to be derived from the surrounding envelopes and transmitted through the egg-membranes is an obvious fact, and has been recognized as such for a long time.

It is only of late, however, that the transmission of some of the inclusions of the follicular cells to the oocyte has been recognized. Brambell (1925) described the infiltration of the Golgi bodies of the follicular cells to the egg periphery in the fowl; the apparatus, according to him, divides into two, one-half of which passes into the oocyte. Simultaneously, Bhattacharya (1925) described the passage of the Golgi bodies in some reptiles from the follicular cells to the fibrillar layer of the egg through channel-like passages in the zona radiata.

Since then the phenomenon has been found to occur in numerous animals whose oogenesis has been worked out in this laboratory. Bhattacharya, Das, and Dutta (1929) described it in the oocytes of several animals, e.g *Testudo graeca*, *Calotes versicolor*, *Columba intermedia*, *Rana tigrina*, etc. Not only are the Golgi elements transmitted from the follicular cells to the oocyte in these animals but the inclusions of the theca cells, likewise, pass into the follicle cells, to be transmitted later to the oocyte. In some animals, such as *Testudo* and *Kachuga*, the inclusions pass through canalicular passages of the zona radiata. In others, e.g. *Calotes and Uromastix* the large lumps of Golgi bodies pass in a haphazard manner through the zona pellucida to the egg.

P. R. Bhattacharya (1929) who investigated the oogenesis of fishes was able to observe a clear case of infiltration of the follicular Golgi bodies.

D. Narain observed signs of the infiltration of the follicular Golgi bodies in fishes (1930). Narain reported its occurrence also in Amphibia (1930).

In reptiles, the infiltration of the Golgi bodies has been described by D. R. Bhattacharya and K. B. Lal (1929), by P. R. Bhattacharya (1929), and Dutta and Asana (1928).

Das (1931) described the infiltration of the Golgi bodies from the follicular cells in three successive instalments in the pigeon. He also observed the infiltration of mitochondria.

In insects the phenomenon has been observed by Ranade (1930) and by Shyam Mohan Srivastava and Bhattacharya (1935). The latter have also observed the infiltration of the mitochondria.

Ikeda reports the infiltration of the Golgi elements as well as of mitochondria from the follicular cells to the oocyte in birds (1928).

Thus the infiltration of the cytoplasmic inclusions from the egg membranes has been observed in a fairly wide range of animals, and the process is remarkably prominent.

In a recent paper Gosta Jägersten has questioned the reality of the infiltration. In his opinion the observations of Brambell and Ikeda are incorrect, for it is difficult to determine by the study of sections on which side of a membrane a certain particle lies. As for the infiltration of the Golgi elements through the zona radiata as depicted by Bhattacharya (1925), and Bhattacharya and collaborators (1929), he thinks that the ' dust-like ' particles are not Golgi bodies. Jägersten does not seem to have taken pains to study the subject in detail. The methods of infiltration vary in different animals, and can only be studied by the use of specific methods.

In *Calotes*, for example, fairly big lumps of Golgi elements pass from the follicle cells to the egg, through the zona radiata (Bhattacharya, Das, and Dutta, 1929). There is, however, hardly any reason to doubt that the infiltering particles are anything else than the Golgi bodies.

Jägersten's basic assumption is that the Golgi elements are always scaly in structure, which is hardly correct, for the apparatus appears to be polymorphic and assumes diverse shapes. Its morphology varies according to the nature of the cell in which it is found. The infiltering granules are strictly like the ones found in the follicular cells and there is hardly any justification for the statement that they do not represent the Golgi elements.

Nusbaum-Hilarowicz (1917) observed the infiltration of the mitochondria from the nurse cells to the oocyte in *Dytiscus* and a similar phenomenon was also reported by Govaerts in Hymenoptera (1933). Bhandari and Nath described the infiltration of Golgi bodies from the nutritive chamber to the egg along the nutritive strands in *Dysdercus cingulatus* (1930).

Srivastava (1934) reported the infiltration of Golgi bodies and mitochondria from the nurse-cells into the oocytes in *Musca* and a similar phenomenon has been observed in *Appias* by Shyam Mohan Srivastava and Bhattacharya (1935).

We have no doubt that the phenomenon of the infiltration of the formed cytoplasmic granules from the nurse-cells and the follicular cells to the egg is strictly comparable for both types of cells which normally function in order to contribute to the growth and development of the oocyte. While much of the material transmitted through these cells must be of non-living fluid and granular nature, the passage of the cell organelles can no longer be doubted. This becomes specially significant in view of the fact that the cytoplasmic inclusions have been held responsible for the production of the reserve food subtances of the egg. Taking into consideration the nutritive function of the egg-membranes, as well as of the nurse-cells, the phenomenon of infiltration becomes easily understood, and can be expected to occur in all normal cases.

The object of writing this note is to lay emphasis on the fact that during the course of oogenesis the follicular cells contribute a definite quota of their cytoplasmic inclusions to the egg. This phenomenon has been observed in many classes of animals that have been investigated in this laboratory and there appears to be no doubt about the reality of the process and its nutritive function.

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