DEVELOPMENT OF CHROMATOSOMES DURING EARLY EMBRYOGENESIS IN THE MEDAKA, *ORYZIAS LATIPES*

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Electron microscopy was used to observe the appearance of chromatophores and chromatosomes during development. The primary purpose was to determine the origin of chromatosomes and the process of chromatosome generation in early embryos. Melanosomes, leucosomes and pterinosomes were also compared. A summary of the results is reported. here.

1. The time of appearance of chromatosomes.

In medaka embryos, melanophores can first seen by light microscopy 130-140 hours after fertilization (stage 20, somite 25-26, 20°C). Melanosomes were observed in dermal tissue by electron microscopy 120 hours after fertilization (stage 25, somite 22-23, 20°C). It was 165-180 hours (stage 25) after fertilization that leucophores was first observed by light micro-

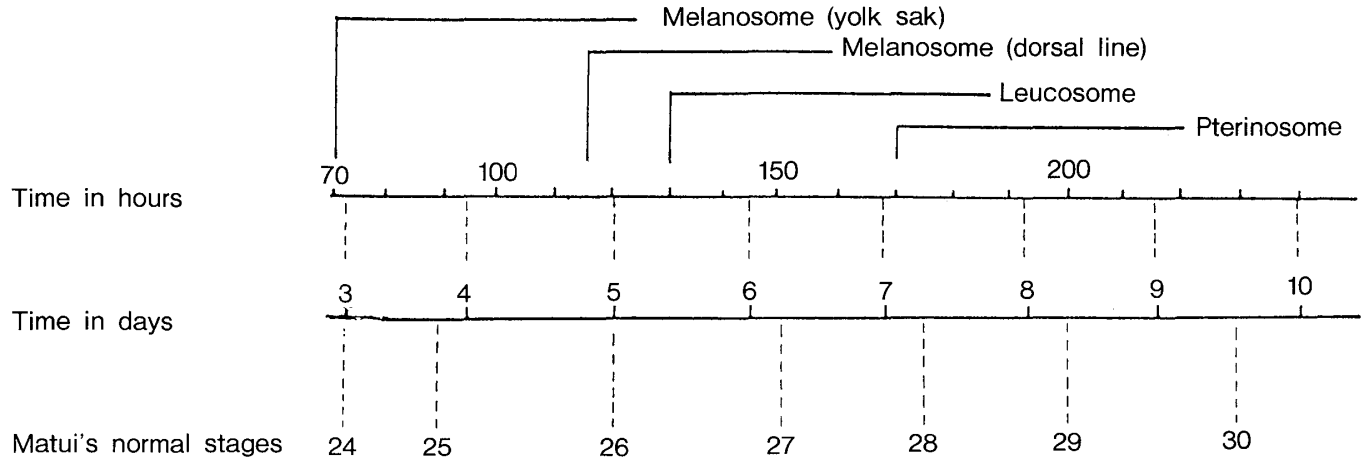

Fig. 1. Time required for the appearance of chromatosomes at 20°C in the medaka, *Oryzias latipes*.

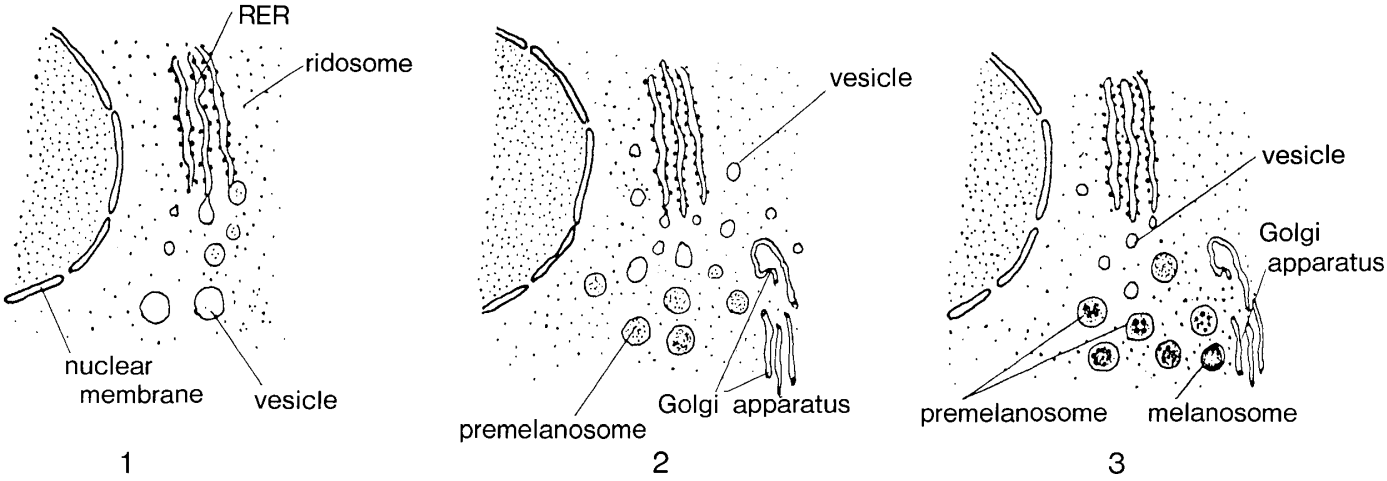

Fig. 2. A diagram illustrating the formative process of the melanosome in the early stage embryo.

scopy, but by electron microscopy, leucosomes were found in dermal tissues 135 to 150 hours after fertilization (stage 27-28). Xanthophores were not found by light microscopy until after hatching, but electron microscopy revealed the presence of pterinosomes and prepterinosomes 180-200 hours after fertilization. A summary of the times and the appearance of the three kinds of chromatosomes in the embryo is shown in Fig. 1.

2. The process of chromatosome generation in early embryos

Melanosomes: At stage 26, mesenchyme tissue differentiated into dermal tissue, epidermal and dermal tissues were distinguishable by the presence of basement membrane. When a mesenchyme cell differentiated into a dermal cell, rough endoplasmic reticulum (RER) was generated around the nucleus, while empty vesicles (0.1-0.3m in diameter) were generated at the end of the RER. Premelanosomes and melanosomes in various stages of maturity were observed around vesicles located far from the RER. Golgi apparatus always appeared where premelanosomes were found. These observations strongly indicate that RER participates in the generation of vesicles, while the Golgi apparatus is involved in melanin formation (Fig. 2).

Leucosomes: Between the nclear membrane and cytoplasm in mesenchyme cells of the embryo at stage 26 (135-150 hours after fertilization, 20°C), a crevice grew along the nuclear membrane and boundary layer, including the boundary plasma. This crevice had a wavy appearance, and a part of it assumed

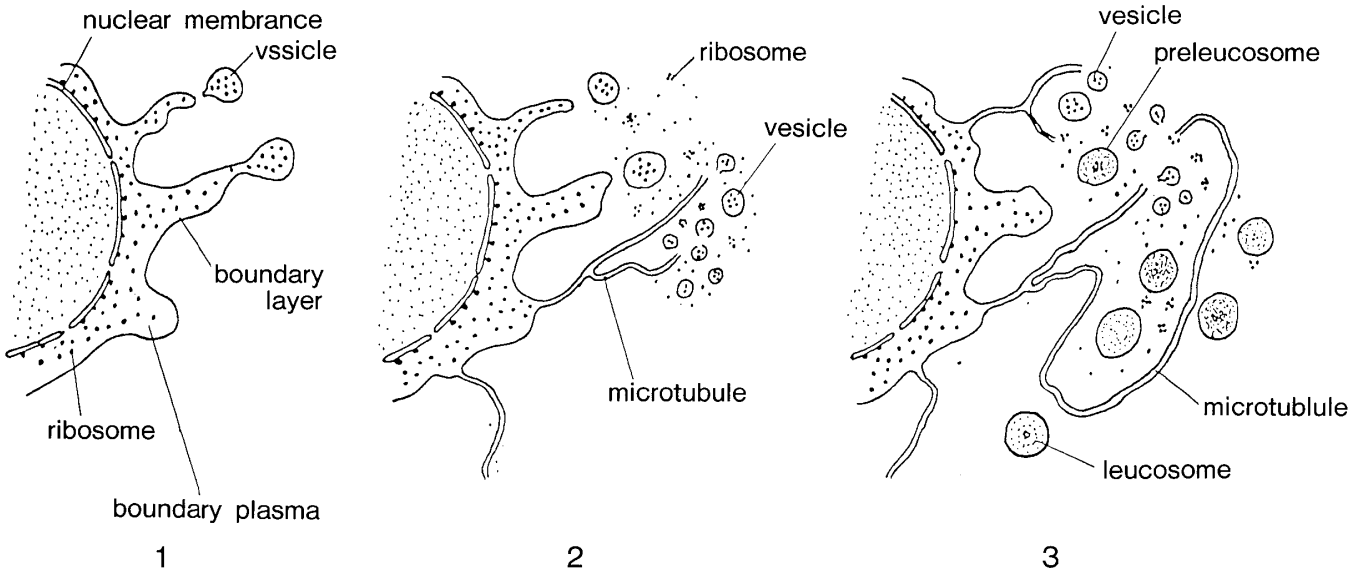

Fig. 3. A diagram illustrating the formative process of the leucosome in the early stage embryo.

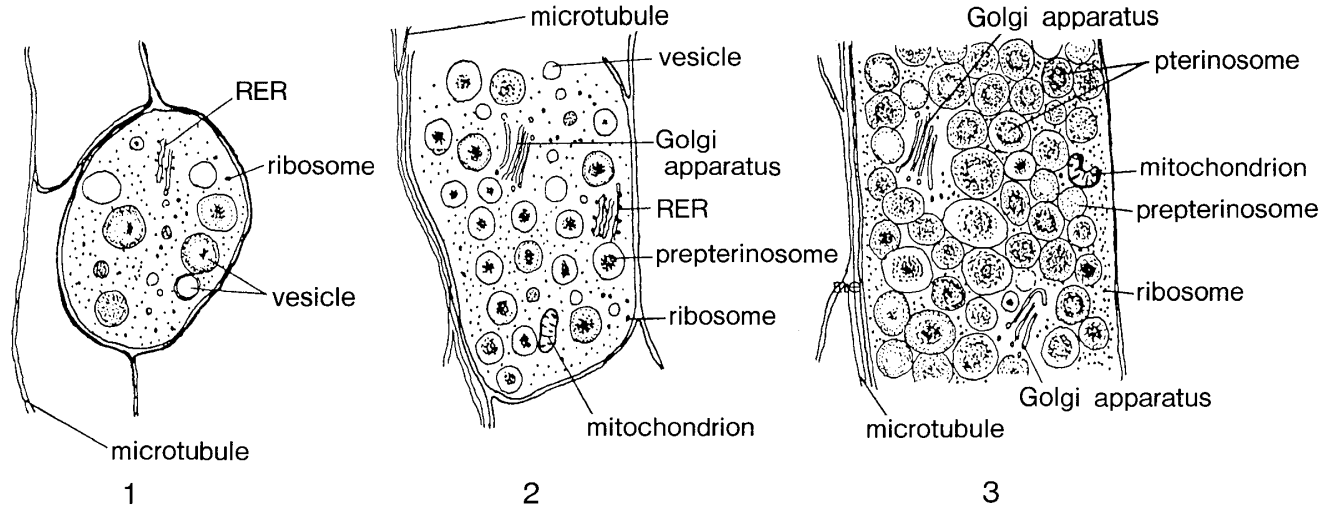

Fig. 4. A diagram illustrating the formative process of the pterinosome in the early stage embryo.

the shape of a tube, which later changed into a microtubule. The end of the microtubule became narrow, and formed vesicles (0.2-0.8μ in diameter). Later, a part of boundary layer became constricted and formed vesicles. Near the end of microtubules, preleucosomes multiplied but appearance of the leucosomes seemed delayed relative to the formation of melanosomes (Fig. 3).

Pterinosomes: Chromatoblasts of indefinite shape appeared in a circle or bell shape under the besement membrane of the embryo at stage 28. The smallest double membraned chromatoblasts were about 3μ in diameter and contained 20 to 40 vesicles. As the chromatoblasts became larger, the number of visicles increased, while at the same time prepterinosomes in various stages were observed. In the stage from prepterinosome to pterinosome, Golgi apparatus were found inside the chromatoblasts whereas microtubules were outside (Fig. 4).

Chromatosomes originating from the same small mesenchyme cell have different characteristics at the time of appearance of this structure from the standpoint of a genetic analysis of embryology.