

Fine Structure of the Germ Disk in the Theridiid Spider, *Achaearanea tepidariorum* (C. Koch)

Hirohumi SUZUKI and Akio KONDO

Department of Biology, Faculty of Science, Toho University, 2-1, Miyama 2 chome, Funabashi-shi, Chiba 274, Japan

According to Montgomery (1909) in *Achaearanea tepidariorum* (C. Koch) (Theridiidae), the most blastoderm cells converge to the germ disk area and few cells remain on the area where the germ disk is not formed, and some characteristic types of the germ disk formation in spider embryos are known. In the present, the study of fine structure of spider embryos is not sufficient yet. In the present study, TEM observation of the germ disk formation is carried out in *Achaearanea tepidariorum*.

At 25°C, the eggs developed into the blastulae at 16 hours after oviposition, and then 6 hours later the germ disk was formed. The eggs were fixed in 2% paraformaldehyde and 2.5% glutaraldehyde solution in 0.1M phosphate buffer, pH 7.4. After rinsing, the samples were postfixed in 2% osmic acid in the same buffer. They were dehydrated in ethanol series, transferred to propylene oxide, and embedded in Quetol -812. Ultrathin sections stained with uranyl acetate and lead citrate were examined under HITACHI HU-12A electron microscope.

Figure 1 shows the germ disk of *Achaearanea tepidariorum* which was composed of spherical cells, about 20 μm in diameter. The germ disk cells scarcely had large yolk granules. Cytoplasm of these cells was rich in fatty granules which had matrix of a medium electron density. Smooth-surfaced endoplasmic reticula were often found enclosing fatty granules, and no rough-surfaced endoplasmic reticula were observed. Mitochondria had high electron dense matrix, and the cristae were found faintly. Typical Golgi bodies were very rare. Fine yolk granules, lysosomes, vesicles and glycogen granules were observed generally. Between germ disk cells, desmosome-like structures were observed at the peripheral region (Fig. 2).

The egg region except the germ disk was occupied by the flat cells. These cells were about 80 μm in length, about 20 μm in thickness at the central part, but often less than 0.5 μm near the peripheral one, and they possessed several large yolk granules (Fig. 3). As to the cytoplasmic inclusions of the flat cells, there were no apparent differences comparing with those of the germ disk cells. Desmosome-like structures were also observed between the flat cells (Fig. 4).

In the inner part of the germ disk or embryo, several large yolk granules were packed by the cell membrane with various organelles and glycogen granules (Fig. 5). In the present study, we could not decide whether these structures including large yolk granules were yolk cells or not, because the observation of yolk cells is not carried out yet.

The germ disk stage in *Achaearanea tepidariorum* is similar to that in lycosid spiders (Kondo, 1969, 1970), with the exception of large yolk granules in the flat cells lying the peripheral part of the egg.

References

- Kondo, A. (1969) *Sci. Rep. Tokyo Kyoiku Daigaku, Sec.B*, **14**, 47-67.
- Kondo, A. (1970) *Jpn. J. Devel. Biol.*, **24**, 20-21.
- Montgomery, T. H. (1909) *J. Morphol.*, **20**, 297-352.

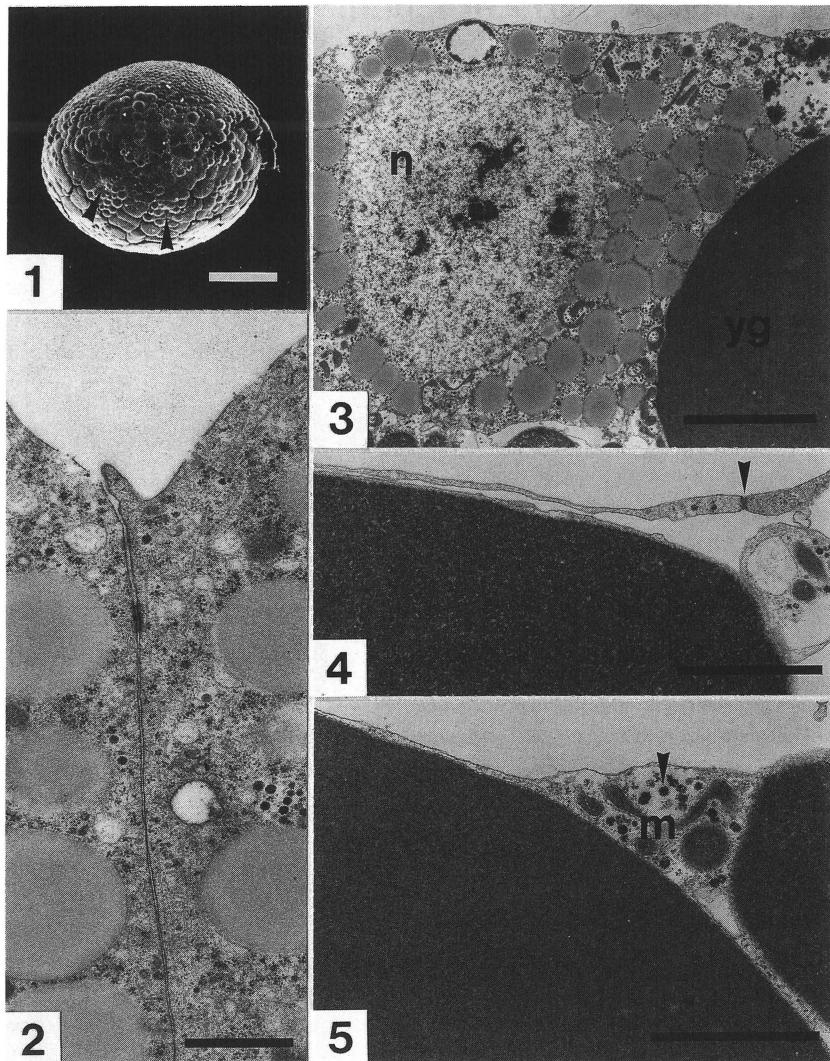


Fig. 1 The embryo at germ disk stage in *Achaearanea tepidariorum*. Scale = $100\mu\text{m}$. Arrowhead: remaining cell.
 Fig. 2 Desmosome-like structure between germ disk cells. Scale= $1\mu\text{m}$.
 Fig. 3 Remaining cell. Scale= $5\mu\text{m}$. n: nucleus, yg: yolk granule.
 Fig. 4 The peripheral part of the remaining cells. Scale = $2\mu\text{m}$. Arrowhead: desmosome-like structure.
 Fig. 5 Large yolk granules packed by cell membrane. Scale = $2\mu\text{m}$. Arrowhead: glycogen granule, m: mitochondria.