THE INITIAL BODY AND THE PLAQUE FORM IN THE 
CHLAMYDOZOOACEAE

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Examination with the light microscope and any of several differential stains has failed to resolve the exact significance of the so-called initial bodies and plaque forms which, together with the elementary bodies, represent stages in the developmental cycles of the Chlamydozoaceae (lymphogranuloma-psittacosis group of agents; Rake, 1947). Previous studies from this laboratory (Rake and Jones, 1942) suggested that the initial bodies, particularly of the agent of lymphogranuloma venereum, are in fact larger single forms of the agent and that they divide as such in the early stages of the developmental cycle, but it was not clear whether the whole unit is larger or whether one is dealing with a single elementary body enveloped in a wide mantle of "capsular" substance. It seemed clear from differential staining with Noble's stain that the later plaque forms represent, rather than single forms, colonies of elementary bodies embedded in a "capsular" matrix. The elementary bodies themselves stain red, while the "capsular" material is green.

THE INITIAL BODY

Recently doubt has been thrown on the very existence of these initial bodies (Kurotckin et al., 1947), and it has been suggested that they represent merely reaction products, perhaps of a lipid nature, developed as a result of the reaction of the yolk cells to the invasion of the infectious agent.

In the past year we have had occasion to take many electron micrographs of different species of Chlamydozoaceae, mostly of the agent of feline pneumonitis. The techniques used and part of the results of these studies have been published elsewhere (Rake et al., 1946; Hamre et al., 1947). As these reports have indicated, micrometric measurements of the diameters of the bodies seen and photographed with the electron microscope show, for the unshadowed bodies, a range of from 350 to 580 mμ with a mean of 455 mμ, and for the gold-shadowed bodies a range of from 303 to 728 mμ with a mean of 525 mμ. Approximately normal distribution curves were obtained in both series. However, it was noted (Rake et al., 1946) that occasional larger forms were seen, and an unshadowed body with a diameter of 770 mμ was recorded.

Since then this problem has been studied further. The 2,374 elementary bodies of the agent of feline pneumonitis available for measurement in all the micrographs taken of this agent have been scrutinized. A total of 5 unshadowed bodies (out of 501) and 8 gold-shadowed bodies (out of 1,873) gave measurements sufficiently far outside the previously recorded range as to seem significant.
Thus in the unshadowed group three measured 710 m\(\mu\), one 740 m\(\mu\), and one 770 m\(\mu\). In the shadowed group one measured 780 m\(\mu\), one 800 m\(\mu\), two 830 m\(\mu\), one 840 m\(\mu\), one 860 m\(\mu\), and two 920 m\(\mu\). Representative examples are shown in figure 1, nos. 1 to 4.

It is believed that these bodies lie so far on the high side of the range of size distribution of diameter, shown to be normal, as to be significant. They certainly would appear larger in the light microscope than the commonly accepted elementary bodies and would thus fill the criterion for initial bodies. It is true they are few in number—only 0.5 per cent in the present series—but this proportion is certainly of the same order of magnitude as the proportion of initial bodies making up the viral suspensions prior to drying them on the collodion membranes.

THE PLAQUE

As has been pointed out above, previous studies (Rake and Jones, 1942) had indicated that the so-called plaques represented colonies of elementary bodies embedded in a "capsular" matrix. Examination of the series of electron micrographs of the agent of feline pneumonitis showed groups of bodies which could be interpreted as colonies, since the close juxtaposition of the bodies and the molding together of their contiguous surfaces would favor such an hypothesis rather than one of secondary agglutination (figure 1, nos. 5 and 6). It is true that no surrounding "capsular" matrix was to be observed, but this is not surprising. As has been shown elsewhere (Rake and Jones, 1942), smear preparations even from yolk cells shown by section to be loaded with plaques never show any such plaques in an intact state, even with the light microscope, and fragmenting plaques are rare. If this is the case with the more gentle techniques involved in preparation for examination under the light microscope, the failure to demonstrate any intact "capsular" matrix in the present preparations is not surprising.

SUMMARY

Examination of electron micrographs of the agent of feline pneumonitis has demonstrated the existence of large bodies lying well outside the range of size found for the elementary bodies. Such large bodies form approximately 0.5 per cent of all bodies studied. They are believed to represent initial bodies. It is also possible to demonstrate closely packed groups of elementary bodies which are presumed to represent the colonies of elementary bodies usually found in sections of infected yolk sac embedded in a "capsular" matrix to form the

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No. 1. Elementary bodies and one initial body not shadowed with gold. 14,220 \(\times\).
No. 2. Elementary bodies and two initial bodies not shadowed with gold. 14,650 \(\times\).
No. 3. Elementary bodies and one initial body; gold-shadowed, 21.7 mg of gold, angle 11°32', 10-cm distance. 14,455 \(\times\).
No. 4. Replicate of one elementary and one initial body; gold-shadowed, 1.5 mg of gold, angle 15°26', 9-cm distance. 14,140 \(\times\).
No. 5. Small group of elementary bodies; gold-shadowed, 21.7 mg of gold, angle 11°32', 10-cm distance. 14,220 \(\times\).
No. 6. Two groups of virus particles; gold-shadowed, 25.2 mg of gold, angle 10°59', 10.5-cm distance. 14,500 \(\times\).
plaque. It is believed that the matrix itself is easily disintegrated and so disappears during preparation of the screens for the electron microscope, a thesis in accord with other observations.

REFERENCES


