

ELECTRON LUCENT STRUCTURES INDUCED BY CORONAVIRUSES

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Viral inclusion bodies have long been considered pathognomonic. Coronaviruses cause the formation of cytoplasmic inclusions consisting of densely staining particles contained within a granular matrix enclosed by a double membrane (1). During studies on the assembly of 229E in human embryonic lung fibroblasts roughly circular electron lucent structures with dense limiting membranes, sometimes empty but frequently containing net-like beaded strands, were seen in the cytoplasm of infected cells that differed from the previously described inclusions. These structures vary in size from 300-900nm in diameter (Fig. 1) and appear at approximately 6hr post-infection (PI), i.e. at a time when viral protein synthesis is initiated (2) and before the assembly of virions (3).

Similar structures were seen in suckling mouse brain infected with coronaviruses OC-43 (Fig. 2), OC-38, calf diarrhoea (Fig. 3) and mouse hepatitis. These structures were also seen in 3T3 cells infected with SK virus, a coronavirus isolated while working with multiple sclerosis autopsy brain tissue (4).

Formation of the electron lucent structures was not inhibited by incubation of the cells with an inhibitor of glycosylation (tunicamycin) or glycoprotein transport (monensin). The structures may correspond to the CPV-1 structures described by Grimley et al (5) for Semliki Forest virus infected cells.

Demonstration of such structures in infected tissues may

prove useful for the diagnosis of coronavirus infection.

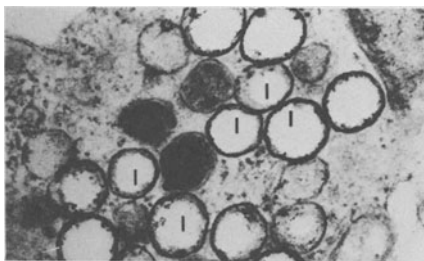


Figure 1: Electron micrograph of 229E infected cells. Virions located in lysosomes (L) are surrounded by numerous electron lucent structures (1) with dense limiting membranes.

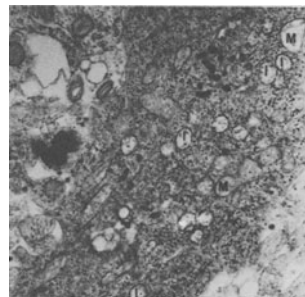


Figure 2: Suckling mouse brain infected with OC-43. Numerous electron lucent structures (1) are distributed throughout the cytoplasm and are easily differentiated from mitochondria (M).

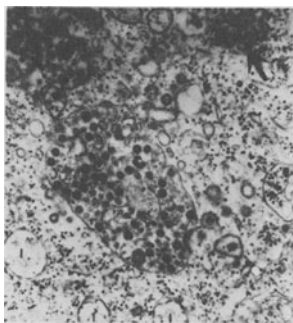


Figure 3: An electron micrograph of calf diarrhoea virus infected suckling mouse brain. Electron lucent structures (1) containing net-like beads can be seen. Arrow indicates the inclusion structures described by Oshiro *et al* (1).

REFERENCES

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