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SUBJECT OF INVESTIGATION

ELECTRON MICROSCOPE STUDY ON THE

INFECTIOUS HEPATITIS,

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RESPONSIBLE INVESTIGATOR

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Electron Microscope Study on the Infectious Hepatitis
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Hepatic parenchymal cells of biopsy materials from an infectious hepatitis have been studied with an
electron microscope with special attention focused on dense particles appearing in the cytoplasm.

Materials and Methods

The material was obtained by biopsy from a 53-year-old female with chronic infectious hepatitis.
Blocks ca. 1 mm in thickness of liver were fixed for 30 minutes in 1% osmium tetroxide adjusted with
veronal-acetate buffer to pH 7.4. The specimen was dehydrated in a series of increasing concentrations
of alcohol, and embedded in a mixture of methyl and n-butyl methacrylates, or in Epon 812. Sections
were cut on a Porter-Blum microtome equipped with glass knives; sections were mounted on copper
grids coated with formvar. They were stained with lead hydroxide or uranyl acetate, and a thin coat
of carbon evaporated onto them. They were examined in an Akashi electron microscope, model TRS-
50E, or an electron microscope of the Japan Electron Laboratory Company, model JEM-T6 or JEM-6A.

Results

Three types of hepatic parenchymal cells are demonstrated in the present report: the first type of
parenchymal cells is characterized by the distribution of glycogen granules about 45 m/ in diameter which
are localized at the periphery of the cells (Fig. 1); the second type of the cells demonstrates that glycogen
granules appear throughout the cytoplasmic matrix (Fig. 2); the third type is represented by the lack of
glycogen granules (Fig. 3).

In the area of the first type cell where glycogen granules are not found, degenerated substances in
irregular shapes and particles about 270 A in diameter, less dense than the glycogen granules, appear
isolated or in small clusters. At the periphery of the cell, numerous circular profiles 0.17-0.27 m in dia-
meter of vesicles are surrounded by dense granules about 45 m/ in diameter (Fig. 1).

The second type of the cell shows clear cut mitochondria which are filled up with homogeneous
matrix, and surrounded by a clear double-layered limiting membrane. They have only a few cristae
and dense granules. The cytoplasmic matrix has no any particles, except for dense glycogen granules
and Palade RNP granules (Fig. 2).

The third type of the cells is, furthermore, divided into two groups: one is composed of a consider-
able number of cell organelles; the other is scanty of cell organelles. A small area of the cytoplasm of
parenchymal cell surrounded by the plasma membrane is filled with a considerable number of cell orga-
nelles which consist of mitochondria, vesicles and RNP granules attached to the vesicles or isolated in
the cytoplasmic matrix. Dense particles 190-290 A in diameter have been observed in the area where
neither RNP granules nor glycogen granules have been found (Fig. 3).
Fig. 1. Electron micrograph of hepatic parenchymal cells in a low magnification. At the periphery of the cell, numerous circular profiles of vesicles are surrounded by dense glycogen granules (GG). In the area where no glycogen granules are found, particles (P) about 270Å in diameter, less dense than the glycogen granules, appear isolated or in small clusters. Rough-surfaced endoplasmic reticulum (ER), mitochondria (M) and Golgi complex (GC) are identified in the cytoplasm. Lysosomes (LS) of different sizes are found in a small number. Cell membranes in zig-zag form are clearly visible. Desmosomes can be seen at the points marked by the arrows. D points to degenerated substances. At the upper left corner the Kupffer’s cell (KC) is visible. At the lower right corner a bile canaliculus can be seen. x 22,500.
(G. Yasuzumi: Electron Microscope Study on the Infectious Hepatitis)
Fig. 2. Electron micrograph of a hepatic parenchymal cell in high magnification. At the upper side a double-layered nuclear envelope (NE) is clearly visible. Numerous, dense glycogen granules (GG) are found in the cytoplasmic matrix. Mitochondria (M) surrounded by a double-layered limiting membrane are filled with homogeneous matrix, being provided with a few cristae and dense granules. Homogenously dense bodies, lysosomes (LS), are limited by an apparently single-layered membrane. Palade RNP granules (PG) are visible attached to vesicles or isolated in the cytoplasmic matrix. Agranular vesicles (V) are also visible. x45,000.
(G. Yasuzumi: Electron Microscope Study on the Infectious Hepatitis)
Fig. 3 demonstrates a complex structure of hepatic parenchymal cells of chronic infectious hepatitis. A small area surrounded by the plasma membrane (PM) is filled with a considerable number of cell organelles which consist of mitochondria (M) of different sizes, vesicles (V) of varying shape and size, and RNP granules attached to the vesicles or isolated in the cytoplasmic matrix. At the left side of the figure, the cell of low density contains vesicles (V), mitochondria (M) and dense particles (arrows) 190-290 Å in diameter. × 42,000.