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### SUBJECT OF INVESTIGATION

ELECTRON MICROSCOPE STUDY ON THE  
INFECTIOUS HEPATITIS,

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**Electron Microscope Study on the Infectious Hepatitis  
(First Quarterly Report)**

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Hepatic parenchymal cells of biopsy materials from a <sup>μ</sup>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<sub>11</sub>, or an electron microscope of the Japan Electron Laboratory Company, model JEM-T6 or JEM-6A.

**Results**

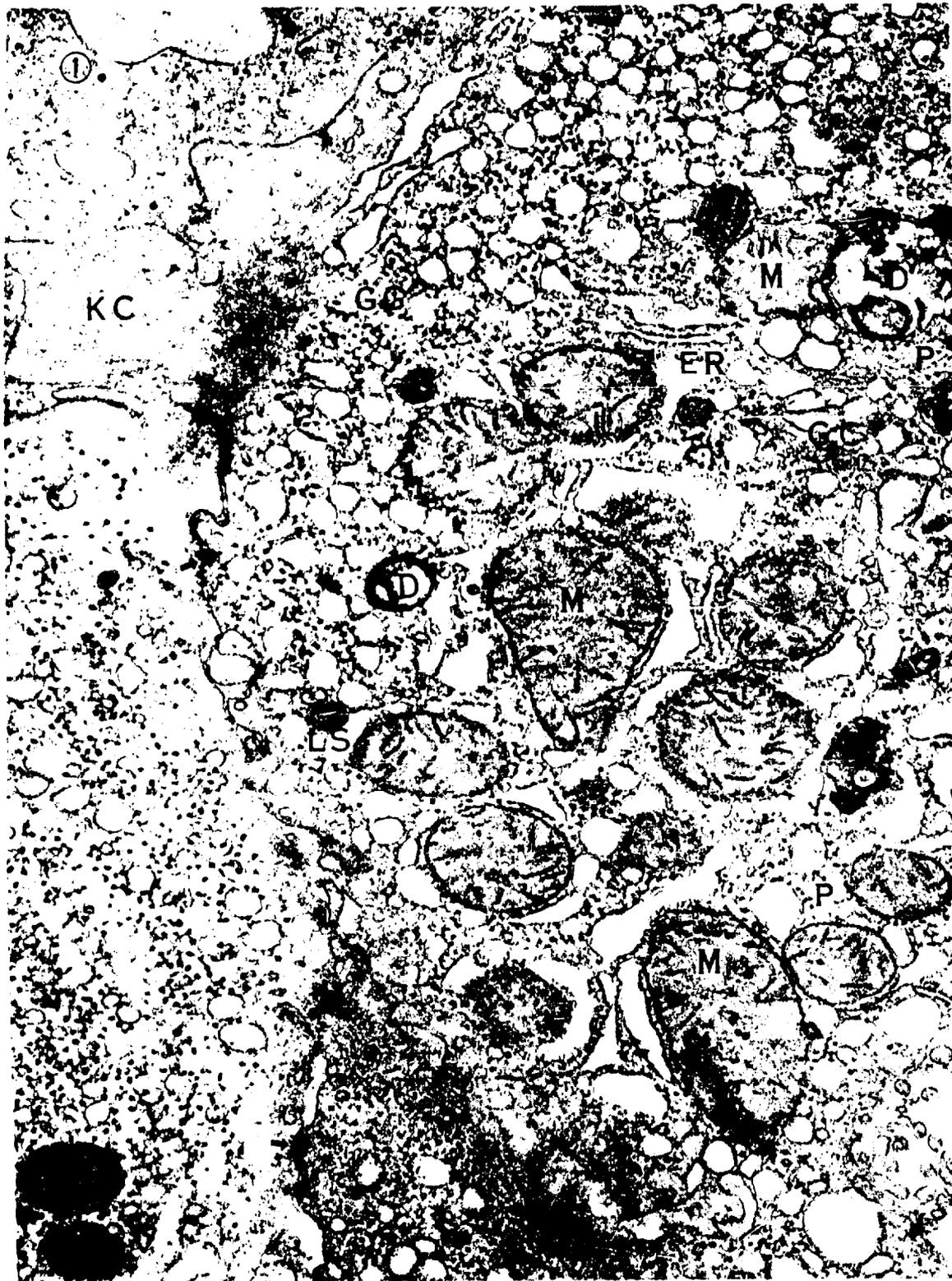
Three types of hepatic parenchymal cells are demonstrated in the present report: the first type of parenchymal cells is characterized by the distribution of glycogen granules about 45 m $\mu$  in diameter which are localized at the periphery of the cells (Fig. 1); the second type of the cells demonstrates 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 $\text{\AA}$  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  $\mu$  in diameter of vesicles are surrounded by dense granules about 45 m $\mu$  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).

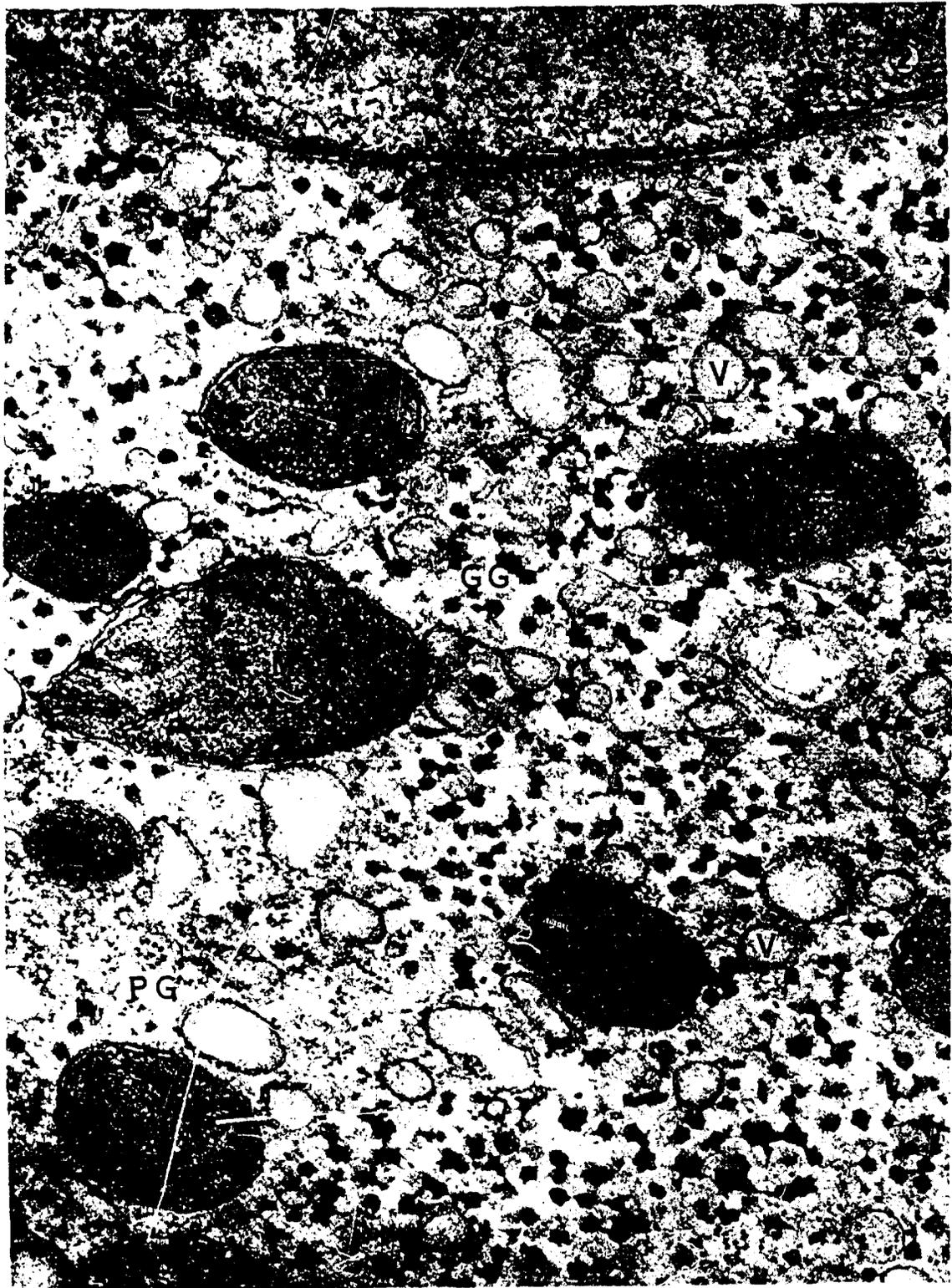
The third type of the cells is, furthermore, divided into two groups: one is composed of a considerable number of cell organelles; the other is scanty of cell organelles. A small area of the cytoplasm of parenchymal cell surrounded by the plasma membrane is filled with a considerable number of cell organelles which consist of mitochondria, vesicles and RNP granules attached to the vesicles or isolated in the cytoplasmic matrix. Dense particles 190-290  $\text{\AA}$  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 270A 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.  $\times 22,500$ .



(G. Yasuzumi : Electron Microscope Study on the Infectious Hepatitis)

Fig. 2. Electron micrograph of part of a hepatic parenchymal cell in a 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. Homogeneously 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.  $\times 45,000$ .



(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 A in diameter.  $\times 42,000$ .



(G. Yasuzami : Electron Microscope Study on the Infectious Hepatitis)