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INCLUSIVE DATES 1 November 1960 TO 31 January 1961

SUBJECT OF INVESTIGATION

STUDIES ON THE MECHANISM OF
CELL DAMAGES IN LIVER AND
KIDNEY CELLS AND IN HEART
MUSCLE FIBERS AS REVEALED
BY ELECTRON MICROSCOPY.

RESPONSIBLE INVESTIGATOR

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First Quarterly Report

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1. The purpose of the investigation:

In this research project we would like to study electron microscopically and histochemically the changes of cell organelles in case of various cell damages caused by various noxa, the mechanism of toxic effects of which are known or yet unknown, such as chemicals, cyto-organotoxin bacterial toxin, etc. The results which will be obtained will help much in clarifying the mechanism of cell degenerations (cloudy swelling, hydropic degeneration, fatty metamorphosis, necrobiosis, necrosis, etc.) and finally may contribute in preventing such damages.

2. The preliminary experiments already done:

Re-evaluation of so-called freezing-thawing method.

Material: Needle biopsy materials of human kidney.

Results: It was revealed that in paraffin sections of this method the acid and alkaline phosphatase, ATP-ase and carbonic dehydrogenase could be demonstrated in such a way as in so-called original methods by frozen section. The demonstration of succinic dehydrogenase was unsuccessful. Furthermore, usual stains such as HE, Masson trichrome, periodic acid Methenamine silver, elastic fiber stain, etc. all show good results as in ordinary prepared paraffine sections.

Attempt to find good cytotoxins: Evaluation of nephrotoxin:

Results obtained are summarized as follows:

Light microscopical and electron microscopical examination of the early stage of nephrotoxin nephritis revealed changes in basement membrane of the glomerulus as its initial change. We are tempted to conclude that the cytotoxin must be made by the material which are

composed of cells only and free of any other tissue component such as vessels and stroma. Various kinds of ascites tumor seem to be the best for examination of cytotoxic effects on cells. The normal structure and changes by irradiation have been already studied in our department and this will help much in further studies along this line.

3. Experiments now in progress:

a) Yellow Phosphor intoxication:

Purpose: To clarify the mechanism and types of fatty degeneration.
Organs to be examined: Liver and other organs.

b) Carbon Tetrachloride: Same as a).

c) Effects of anoxia in liver cells: By ligation of vessels running to the liver and producing congestion. Observation of anoxic changes and other changes caused by congestion in liver cells.

d) Histochemical studies of needle biopsy materials of human kidney in various renal diseases.