# ABSTRACT

**Ultrastructural Changes in Aortic Endothelium of Rat (*Rattus norvegicus*) as Animal Model of Cirrhosis after Induced with Endotoxin.**

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The aim of this study is to understand and visualize ultrastructural changes in aortic endothelium of rats, as animal model of cirrhosis after induction with endotoxin.

Twenty five male *Rattus norvegicus* strain Wistar were used as experimental model of cirrhosis by Bile Duct Ligation (BDL) technique. Three weeks after BDL, all cirrhosis experimental models were induced with a single intra venous injection of *Eschericia coli* endotoxin (3mg/kg body weight in 1ml sterile saline; L-2880, Sigma Chemical Company), except of those five control rats that induced with sterile saline at the same volume only.

Aorta of control rats group were excised at 6 hours after induction with sterile saline, whereas the other four groups were done at 6, 12, 18 and 24 hours after induction with endotoxin. Ultrastructural changes in endothelial cell were observed by Transmission Electron Microscopy (TEM).

There was no ultrastructural changes were observed in endothelial cell in group of the control group. However, at 6, 12 and 18 hours after the induction of endotoxin, some endothelial ultrastructural changes were obvious in the treatment groups which were worst by time. The morphologic changes included cell swelling, discontinuation of plasma and organelle membranes, vacuolation of cytoplasma which were varied in number and size. Based on the ultrastructural changes, it was concluded that the endothelial cell damages were characteristics of a cell necrosis.

Ultrastructural changes of endothelial cell that observed at at 24 hours after induction of endotoxin, characterized the condition of cells that undergone apoptosis. By TEM, it was obvious that the endothelial cell is smaller in size, rounder and oval shape, with a denser cytoplasm and with several chromatin condensation, although there are still plasma membranes intact during apoptosis.

Ultrastructural changes of endothelial cell might be caused by one or more of the following biochemical processes : *Adenosine Triphosphat* (ATP) depletion, oxygen and oxygen derived free radicals, intracellular calcium and loss of calcium homeostasis, defect in membranes permeability and irreversible mitochondrial damage. Mitochondrial damage can also be associated with leakage of cytochrome C in to the cytoplasma that can trigger apoptotic death pathway.

Keywords : Cirrhosis, endotoxaemia, cellular injury, necrosis, apoptosis.