

EFFECT OF LEUCOTRIENE E₄ ON THE ULTRASTRUCTURE OF THE TERMINAL MUCOSAL VESSELS OF THE GUT

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Leucotrienes (LT) are derivatives of arachidonic acid and Leucotriene E₄ (LTE₄) is a representative for the group of peptidoleucotrienes (LTC₄, LTD₄, LTE₄) which are also known as the slow-reacting substance of anaphylaxy (SRS-A). It is shown that peptidoleucotrienes have similar properties to that of histamine. LT are much more powerful and LTE₄ is most stable derivative of this group. We aim at evaluating LTE₄ effect on gut microvascular vessel ultrastructure. Four mature Wistar male rats are used. After phenobarbital anaesthesia LTE₄ (Merk Frost, Canada) is injected into a ligated segment of the stomach and large intestine for 4 min (5 µg/ml, dissolved in saline). The tissue is processed for routine TEM. Three controls are used and a corresponding volume of saline is introduced into the isolated segments. Observation is made by Option EM Turbo electron microscope. As a basic effect of LTE₄ we followed well-developed

morphological signs of contraction in all segments of the microvascular system of the gastric and colonic mucosa. Preterminal arterioles with a well-developed inner elastic membrane are heavily contracted. Their lumen is narrowed and deformed, the elastic membrane shows numerous deep curves. Endothelial cells (EC) are deeply invaginated into the lumen. There are numerous bulgings of the nuclear region of the EC. The nuclei are largely deformed and

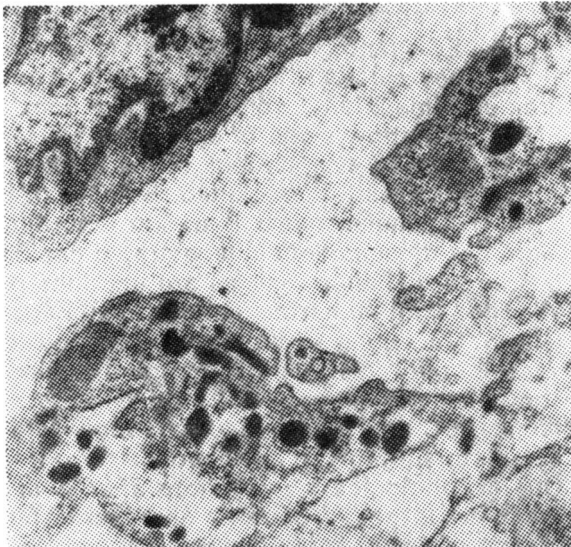


Fig. 1. Destructions of EC and numerous WPB in arterioles. x 50000



Fig. 2. Numerous evaginations of EC and many large-diameter vesicles in a collecting venule. x 50000

their inner membrane shows deep invaginations. The perinuclear spaces are considerably wide. The peripheral zones of EC at the regions of the interendothelial junctions are very thin. Basal protrusions of these zones penetrate into the pinches of the undulated elastic lamina. The EC matrix is darker compared to controls and in cells a destruction is observed as optically empty spaces. WPB are numerous in all EC (Fig. 1). Terminal arterioles show ir-

regular EC lining, which form numerous luminal and basal protrusions. They are also very high and show enhanced vesiculation with greater dimensions, some of which look like vacuoles. Vascular SMCs also show signs of contraction: irregular cellular shape and numerous side-evaginations of the nucleus. True capillary lumen is narrowed or almost occluded. Bulging of nuclear zone is also evident, the cellular matrix is darker. Micropinocytotic vesiculation is high. It is most evident in fenestrated capillaries. In the latter numerous large diameter vesicles are encountered. Postcapillary vessels are filled with numerous luminal evaginations with varying size and length. Collecting venules are also contracted. Compared to other vessels, their vesicles are the most numerous (Fig. 2). Our results show that the effect of LTE_4 is similar to that of serotonin and histamine. EC as a whole react uniformly to a variety of vasoactive inflammatory agents. It corresponds to pharmacological experiments. Our morphological observations after local application of LTE_4 show that there is most probably a decrease in blood circulation and an increase of vascular resistance. This and the enhanced postcapillary vessel vesiculation could lead to a substantial permeability increase.