

ELECTRON MICROSCOPICAL STRUCTURE OF LYMPHATIC VALVE IN MOUSE

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ABSTRACT

From the E M study of lymphatic valve in mouse it was shown that:

The lymphatic valves consist of two cusps, each of which is covered by endothelium.

Along the free border of cups are found endothelial cells which have pseudopod like projections and abundant cytoplasmic filaments (tip-cells).

Vesicles occur in endothelial cells of both lymphatic vessels and their valves.

Basement membrane is more frequently observed in valves than in walls of lymphatic vessels.

Connective tissue in the cusps consists of collagenous fibrils, fine filaments and fibroblasts.

INTRODUCTION

The lymphatic valve is a fold of intima, with a little connective tissue at the base and is covered by endothelium on each side (Bloom & Fawcett 1968). Above the valves, the lymphatic vessel is expanded and the muscle in the middle coat is well developed. The valves are found in small lymphatics, as well as in large vessels (Bradbury, 1973).

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Few literature is available on the ultrastructure of lymphatic system. This paper is a trial to deal with a complete structure of the lymphatic valve.

MATERIAL AND METHODS

For this study, 10 adult male and female mice Mus musculus were used. The animals were dissected and sub peritoneal lymphatic vessels of large intestine were taken. The specimens were fixed for one hour at zero °C in 1% OsO_4 in veronal acetate buffer (Sojostrand, 1967). After fixation, the blocks were treated for two hours at room temperature with 0.5% uranyl acetate in veronal acetate buffer (Palade & Bruns 1968). The blocks were embedded in Epon 812 (Luft 1971). Thin sections stained with uranyl acetate (Watson 1978) and lead citrate (Reynolds 1983) were examined in HU HD Electron microscope.

RESULTS

The valves of lymphatic vessels are folds of endothelium and connective tissue extending into the lumen. The luminal surface of the valve cusps is covered by a single layer of endothelial cells and the interior (outer) is composed of thin connective tissue (Fig. 1).

The endothelial cells of the cusps are usually flat, with minimal thickness, the nuclei are elongated. The endothelium is smooth on the luminal surface. The basement membrane is thin (Fig. 2).

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The endothelial cells contain many organelles such as Golgi apparatus, mitochondria; rough endoplasmic reticulum also cytoplasmic filaments are abundant in the endothelial cells of the walls (Fig. 3).

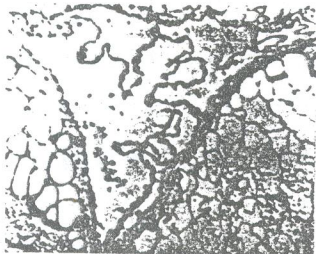
Tip cells are the endothelial cells, which have special characters that differ from other endothelial cells and are present along the free edge of the cusps (Fig. 4), and contain cytoplasmic filaments (Fig. 3, 5).

The basement membrane is more frequent in the valves than in the walls of large vessels..

The connective tissue of the cusps consists of collagenous fibrils, fine filaments and fibroblasts embedded in the ground substance. The collagenous fibrils are arranged in bundles, the fine filaments are not numerous, fibroblasts are encountered.

DISCUSSION

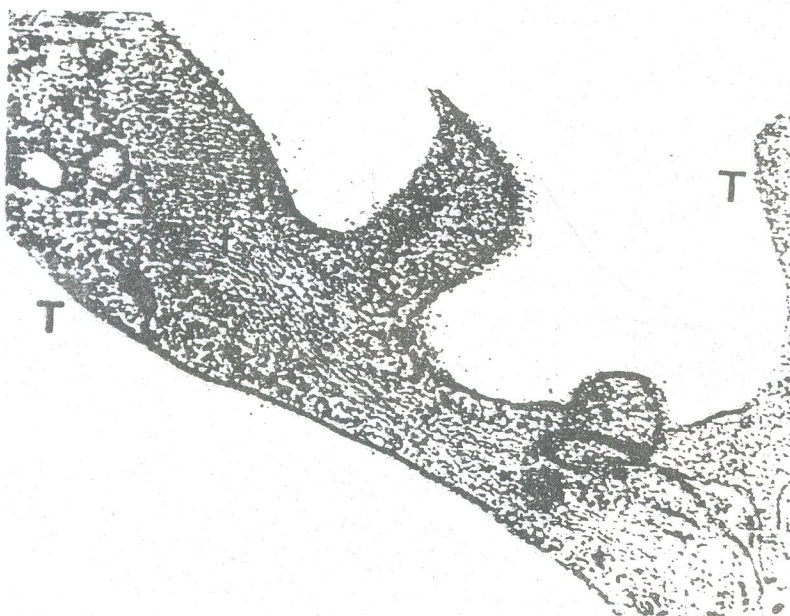
From the present study, it was shown that valve cusps are covered by a single layer of endothelial cells, with the so-called tip-cells at the free edge, and that the connective tissue is composed of collagenous fibrils, fine filaments and fibroblasts.



(Fig.I)

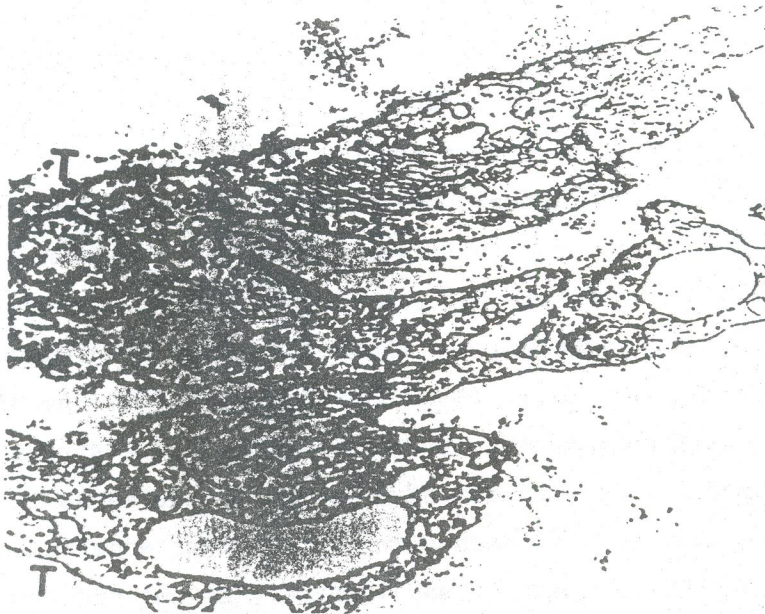


(Fig.2)



(Fig.3)

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(Fig . 4)



(Fig.5)

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The tip-cells contain numerous filaments in their cytoplasm even in their projections. Hama (1978) recorded the presence of filaments in the endothelial cells and stated that these filaments may be myofilaments and may be responsible for contractibility in amphibian blood capillaries. Odland (1971) suggested that the filaments probably represent tonofilaments that strengthen the cells and make it adaptable to shearing forces. Cecio (1987) stated that cytofilaments may confer a higher elasticity to these cells i.e strength, elasticity and contractility have to be considered as functions of cytoplasmic filaments in the valvular endothelium. Recently, Kriz & Dietrich (1989) stated that the endothelial cells of lymphatic valves contain numerous cytoplasmic filaments. Bloom & Fawcett (1968) stated that the valve of the vein in man contains a network of elastic fibres but no smooth muscle cells. Mitomo et al. (1989) stated that, by E M, the mitral valve contains no muscular component, but tricuspid valve is muscular in origin. Cehmke (1988) reported the presence of smooth muscle cells in the valves of lymphatic vessels in human. On the other hand, Cliff (1989) noted that connective tissue in lymphatic valves of bat wing is composed of fibrillar material and may be collagenous fibrils, while Dietric (1976) stated that the valves of cat contain few collagenous fibrils and fibroblasts which are infrequent. In the present study, the cusps contain neither smooth muscle cells nor elastic fibres. Mislin (1981)

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stated that mesenteric lymphatic walls at the base of the valve do not possess smooth muscle cells. Schipp (1985) supported this view, but Kato (1986) demonstrated that smooth muscle cells exist at the base of lymphatic valves in the lung. In the present investigation, smooth muscle cells are observed occasionally in the wall of lymphatic vessels at the base of a valve. Thus, there is no consistency in the presence of smooth muscle cells in this location. Bloom & Fawcett (1968) stated that the valves of the lymphatic vessels always occur in pairs placed on opposite sides of the vessel, but according to Mayerson (1982), the valves are usually tricuspid. Odland (1971) reported that the valves in man have one to five cusps. In the present study, the valve have two cusps.

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تركيب الصمام الليمفاوى فى الفأر الأبيض الصغير بواسطة المجهر الالكترونى

اسامه أحمد شرف الدين
كلية العلوم - جامعة الأزهر

- من دراسة الصمام الليمفاوى بواسطة المجهر الالكترونى تبين الآتى:
- يتكون الصمام الليمفاوى من قرنين يبطن كل منهما من الداخل بواسطة طلائية بسيطة.
- على طول حافة القرنين توجد خلايا طلائية لها امتدادات شبيهة بالاقطام الكاذبة وهذه الخلايا ممثلة بالخيوط السيتوبلازمية.
- توجد حويصلات صغيرة فى الخلايا الطلائية فى كل من الأوعية الليمفاوية وصماماتها.
- يلاحظ الغشاء القاعى بوضوح فى الصمام الليمفاوى.
- النسيج الضام فى قرنى الصمام الليمفاوى يتكون من ألياف كلاجينية وألياف دقيقة وخلايا ليفية.