

LYMPHOGRAPHIA

PRESENCE OF WEIBEL-PALADE BODIES IN LYMPHATIC ENDOTHELIUM OF THE CAT

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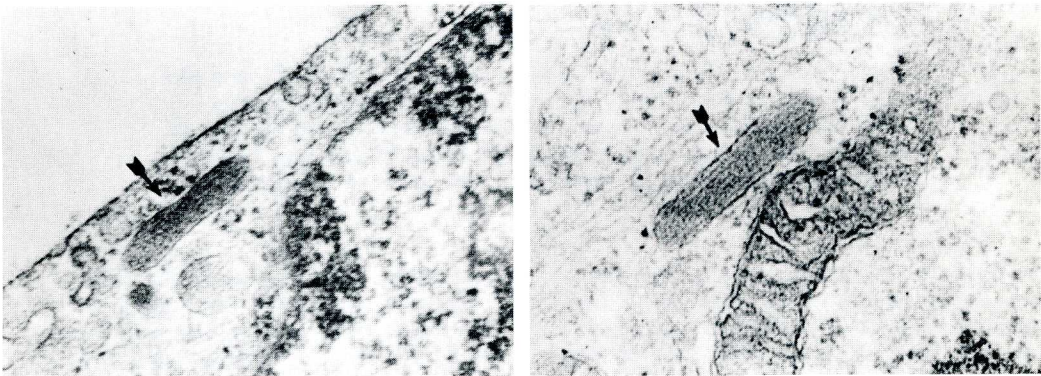


Fig. 1: Endothelial cell lining lymphatic vessel of a cat (left) and a cultured endothelial cell derived from human umbilical vein (right). The arrows point to Weibel-Palade bodies (WPB), elongated structures $0.1\ \mu\text{m}$ in diameter and up to $2\text{-}3\ \mu\text{m}$ in length with a unit membrane enclosing multiple tubular elements aligned parallel to the walls of the body. Note that WPB derived from lymphatic endothelium is indistinguishable from that of cultured venous endothelium.

COMMENT

The von Willebrand factor (vWF), a plasma protein (1), and the Weibel-Palade body (WPB), an ultrastructural cytoplasmic feature (2), are two distinctive markers virtually unique to the endothelial cell. The vWF is a glycoprotein of molecular weight of one to more than 14 million Daltons which is synthesized by the endothelial cell and the megakaryocyte. An association between the vWF and the WPB has been reported (3,4), and it has been suggested that the WPB functions in the synthesis of the vWF or in its packaging for release from the endothelium. The vWF antigen has been demon-

strated in lymphatic endothelium (5,6). Therefore, we examined ultrastructurally lymphatic vessels obtained from cats, some infected with *Brugia malayi* (7), for the presence of WPB's in lymphatic endothelial cells. Uptake of the dye Sky Blue and in some cats the presence of *Brugia* in the lumen, as previously described in this cat model (7), served as markers to distinguish lymphatic from blood vessels. WPB's present in the lymphatic endothelial cells of the cat were ultrastructurally indistinguishable from the WPB's that were present in endothelial cells of cat blood vessels and cultured endothelial cells derived from human umbilical vein (8) (Fig. 1).

REFERENCES

1. Jaffe, EA, LW Hoyer, RL Nachman: Synthesis of antihemophilic factor antigen by cultured human endothelial cells. *J. Immunol.* 52 (1973), 2757.
2. Weibel, ER, GE Palade: New cytoplasmic components in arterial endothelia. *J. Cell. Biol.* 23 (1964), 101.
3. Wagner, DD, JB Olmstead, VJ Marder: Immunolocalization of von Willebrand protein in Weibel-Palade bodies of human endothelial cells. *J. Cell. Biol.* 95117 (1982), 355.
4. Warhol, MJ, JM Sweet: The ultrastructural localization of von Willebrand factor in endothelial cells. *Am. J. Pathol.* 117 (1984), 310.
5. Johnston, MG, MA Walker: Lymphatic endothelial and smooth-muscle cells in tissue culture. *In Vitro* 20 (1984), 566.
6. Nagle, R, M Witte, C Witte, D Way: Factor VIII-associated antigen in canine lymphatic endothelium. *Lymphology* 18 (1985), 84.
7. Ewert, A, DS Folse: Animal model of human disease: Lymphatic filariasis. *Am. J. Pathol.* 115 (1984), 135.
8. Harrison, RL, PA McKee: Estrogen stimulates von Willebrand factor production by cultured endothelial cells. *Blood* 63 (1984), 657.

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