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**Is the porcine intestinal microvasculature not only permeable to nutrients but also to pathogens?**

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**Introduction**

*Salmonella* Typhimurium penetrates the gut-vascular barrier in mice, gaining access to the bloodstream and liver (Spadoni *et al*, 2015). Despite it is still unknown how *Salmonella* Typhimurium disrupts the endothelial barrier, it is known that Plasmalemma Vesicle Associated Protein-1 (PV1), a measure of the “leakiness” of the endothelial barrier, is upregulated in blood capillaries upon *Salmonella* Typhimurium infection (Spadoni *et al*, 2016). PV1 is a component of the diaphragms found in endothelial fenestrae, transendothelial channels and caveolae (Stan *et al*, 2012). As only sparse data is available on porcine intestinal endothelium, the aim of the present study was to evaluate its ultrastructure with a focus on fenestration.

**Material and Methods**

Samples of small intestine of 4 pigs (before and after weaning) were available from our tissue bank. They were collected upon euthanasia and routinely processed for transmission electron microscopy. Capillaries from villus lamina propria were evaluated for morphology and size, distribution and density of endothelial fenestrae in semithin and ultrathin sections using light and transmission electron microscopy.

**Results**

Endothelial cells of subepithelial capillaries were characterized by marked attenuation and extensive fenestration in regions adjacent to the intestinal epithelium. These attenuated areas were void of organelles, caveolae, vesicles, inclusions and filopodia. The diameter of the fenestrae was 66.4nm (standard deviation 9.3nm). The fenestral density was found to be 3.1 fenestrae per  $\mu\text{m}$  (standard deviation of 0.9). Thicker lateral and distal faces contained numerous organelles and filopodia and the nucleus was almost always positioned toward these sites.

**Discussion and Conclusion**

General morphology of the normal intestinal capillary endothelia and distribution as well as morphology of fenestrae was found to be comparable to literature reports (mouse intestine (Milici *et al*, 1985); pig uterine mucosa (Keys & King, 1988)). In further

studies, the influence of stress and pathogens, such as *Salmonella* Typhimurium, on ultrastructure and fenestrae of the gut-vascular barrier should be examined.

Experimental procedures approved by local state office of health and social affairs ‘Landesamt für Gesundheit und Soziales, Berlin’ (LaGeSo Reg. Nr. G0348/09).

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