Letters to the Editor

Umbilical Arteries in Smoking and Nonsmoking Mothers

It would be interesting to know if Drs. Asmussen and Kjeldsen made quantitative studies of the appearance of the luminal surface of the endothelial cells in their electron micrographs of the umbilical arteries of children of smoking and nonsmoking mothers. One is impressed by seeing what they call cytoplasmic blebs on transmission electron micrographs from both sets of arteries (see their Figs. 2 and 5). Comparable extensive fine folding of the plasma membrane of some endothelial cells has been pointed out previously (Caro et al., In Fluid Dynamic Aspects of Arterial Disease: Proceedings of a Specialists Meeting sponsored by NSF and The Ohio State University, Columbus, Ohio, 1974, pp 58-62) on transmission and scanning electron micrographs of excised carotid arteries from normal dogs when the arteries are fixed at relaxed length and zero transmural pressure. This folding is generally absent when the vessels are fixed at in vivo length and physiological transmural pressure. Furthermore, some investigators would question whether the large spaces seen between the endothelial cells are open clefts or simply arise as the result of corrugation of the wall. These points strengthen the case for making ultrastructural studies on vessels at physiological length and transmural pressure.

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Reply to the Above Letter

In our report “The Intimal Ultrastructure of Human Umbilical Arteries: Observations from Newborn Children of Smoking and Nonsmoking Mothers” (Circ Res 36:579-589, 1975), Dr. Kjeldsen and I presented only qualitative studies. Quantitative studies were not undertaken because we do not find them to be of any value in ultrastructural research. Regarding Dr. Caro’s comment on pressure in arteries, the umbilical artery is characterized by an especially low pressure (< 50 mm Hg). In our study, we used a perfusion fixation at low pressure. Moreover, it is not “folding” of the plasma membrane but “studding” or “blebbing” of the membrane that is visualized on the scanning electron micrograph (Fig. 4).

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