

Histochemical Identification of Monoamine in the Arterial Wall

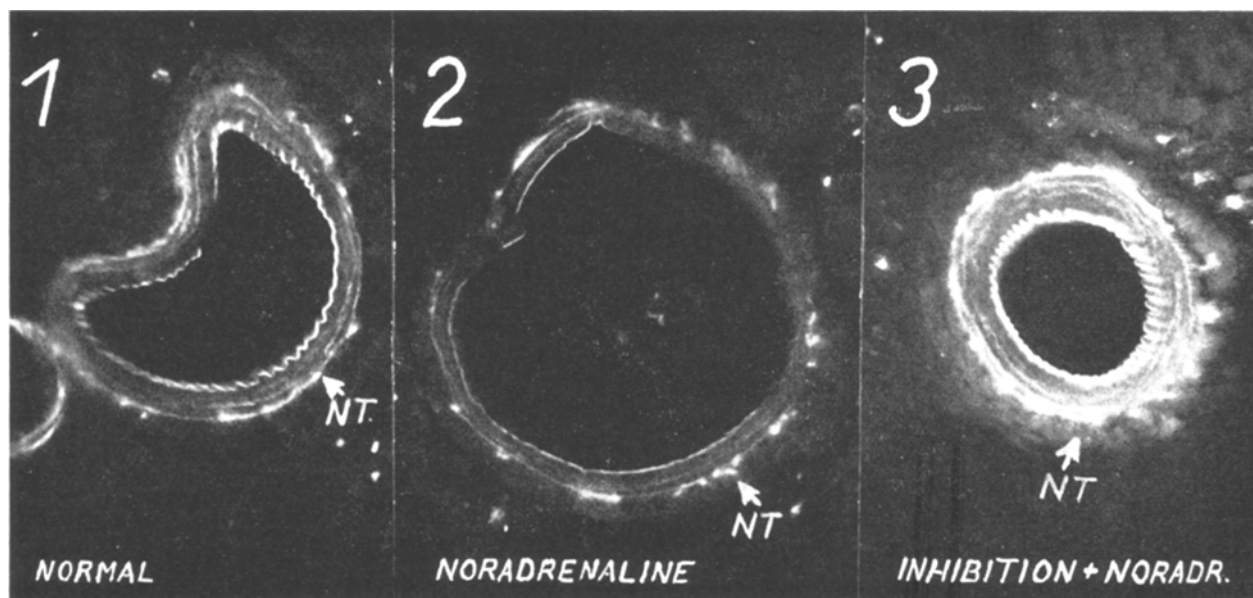
The recent findings with the electron microscope deny the existence of nerves in the media of arteries. The muscular layer of vessels is free of nerve endings and the terminals have been found only on the surface of media (APPENZELLER¹, BRETTSCHEIDER², BURNSTOCK et al.³, SAMARASINGHE⁴). The histochemical identification of monoamine by the fluorescent method, according to FALCK⁵, confirms the observation as well (CARLSSON et al.⁶, DOLEŽEL⁷, FUXE et al.^{8,9}). It may be assumed that the transmitter diffuses from nerve endings to the effector.

The monoamine diffusely dispersed in the media of the femoral artery in rats has been investigated histochemically according to the method mentioned.

The femoral artery of rats was quenched in situ in the fossa iliopectinea, then excised and treated according to FALCK⁵. The 30 μ m thick slides were compared photographically in the microscope. Because of the quick disappearance of the little amount of diffusely dispersed

material in concentrated UV light, the total illumination of each slide was made as short as possible – not exceeding 2 min. The photographic exposure was 15–30 sec.

3 groups of rats were examined. 1st group: normal rats; 2nd group: rats to which 5 γ -noradrenalin was administered intravenously just before the quenching; 3rd group: rats to which, besides the 5 γ -noradrenalin, 25 mg iproniazide (Marsilid Roche) and 40 mg pyrogallol were administered intraperitoneally 8 h before the quenching. In the second group, the monoamine nerve endings on the boundary between media and adventitia were not affected by the noradrenalin treatment. The dilation of the femoral artery was probably caused by the large increase of blood pressure, and could be regarded as a distension. In the third group, the degradation of monoamines brought about by both monoamine oxidase and catechol-*o*-methyltransferase was inhibited by large doses of Marsilid and pyrogallol. The artery reacts with constriction. The outlines of nerve terminals are indistinct. The fluorescent material penetrates diffusely through the whole arterial wall, especially through the media. This bears out the theory of the diffusion of the transmitter from the nerve ending to the effector¹⁰.



Transverse sections of femoral arteries of rats. 1st, normal; 2nd, after the noradrenalin treatment; 3rd, after the noradrenalin treatment with inhibition of monoamine oxidase and catechol-*o*-methyltransferase. NT, nerve terminals (transverse section).

¹ O. APPENZELLER, J. Anat. 98, 87 (1964).

² H. BRETTSCHEIDER, Verh. anat. Ges. Jena 113, 150 (1964).

³ G. BURNSTOCK and N. C. R. MERILLES, Proc. 2nd pharmacol. Meet., Praha, Vol. 6, 1 (1964).

⁴ D. D. SAMARASINGHE, J. Anat. 97, 311 (1963).

⁵ B. FALCK, Acta physiol. scand. 56, Suppl. 197 (1962).

⁶ A. CARLSSON, B. FALCK, and N. Å. HILLARP, Acta physiol. scand. 56, Suppl. 196 (1962).

⁷ S. DOLEŽEL, Folia morph., in press.

⁸ K. FUXE and G. SEDVALL, Acta physiol. scand. 61, 121 (1964).

⁹ K. FUXE and G. SEDVALL, Acta physiol. scand. 64, 75 (1965).

¹⁰ The author expresses his thanks to Prof. J. VAŠKŮ, head of the Institute of Experimental Pathology of the University of Brno, for lending much of the technical equipment necessary to this work.

Zusammenfassung. Mittels histochemischer Fluoreszenzmethode wurden Monoamine in der Wand der A. femoralis der Ratten untersucht. Nach Noradrenalin-zufuhr und Hemmung der Monoamineoxydase und Katechol-*o*-methyltransferase mit Pyrogallol und Marsilid zeigten sich die adrenergischen terminalen Nervenfasern an der Oberfläche der Media unscharf vergrößert und die ganze Arterienwand samt Media diffus mit Monoamin durchsetzt.

S. DOLEŽEL

Czechoslovak Academy of Sciences, Institute of Normal and Pathological Physiology, Department of Cardiovascular Physiology, Bratislava (Czechoslovakia), November 8, 1965.