

# METHOD OF MEASURING THE ARTERIAL PRESSURE IN CHRONIC EXPERIMENTS ON RATS

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A modification of a mercury-rubber sensor for converting pulsations of the caudal artery of a rat into electrical pulses is suggested. The sensor was used to measure the arterial pressure of unanesthetized rats.

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At the suggestion of Academician A. P. Nikolaev, Academy of Medical Sciences of the USSR, a new method of measuring the arterial pressure in the rat's tail has been developed.

It is based on the principle of conversion of mechanical pulsations in the blood vessels into electrical oscillations. The apparatus for measuring the arterial pressure in rats (Fig. 1) consists of: 1) a sensor unit designed by N. S. Sukachev; 2) a Wheatstone bridge with variable resistors for regulating the sensitivity of the instrument; 3) amplifier; 4) cuff; and 5) the recording apparatus.

The sensor unit consists of a rubber capillary tube 0.05 mm in diameter and 24 mm long, filled with mercury and closed at both ends by platinum electrodes converting the mechanical pulsation of the vessels into electrical oscillations. The sensor unit is applied to the rat's tail and secured by adhesive tape. When the rubber tube is stretched, the column of mercury is lengthened, the cross section is reduced and the resistance is increased. The sensor is connected into one arm of the Wheatstone bridge A-B (Fig. 1). A battery (KBS, Saturn, Krona, etc.) is connected across the diagonal C-D, and a variable resistor to balance the bridge into the arm B-D. A galvanometer (G) is connected across the diagonal A-B. When the rubber tube is stretched, the bridge becomes unbalanced, as shown by deflection of the galvanometer pointer. The imbalance voltage is fed from the diagonal A-B through an amplifier to the recording instrument. The chamber used for fixing the rat is identical in design with others used for this purpose.

The cuff consists of two layers: an inner (thin rubber) and an outer (rubberized cloth). A rubber tube connected to a Riva-Rocci apparatus is glued between the layers. Pulsation of the artery can be seen visually on an oscilloscope screen.

The arterial pressure in the caudal artery of a rat is measured as follows. The animal is lightly anesthetized with hexobarbital and fixed in a frame. The cuff is wrapped around the tail and connected to the

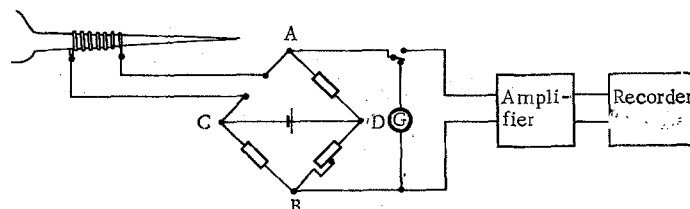


Fig. 1. Scheme of apparatus for recording pressure in the caudal artery of a rat.

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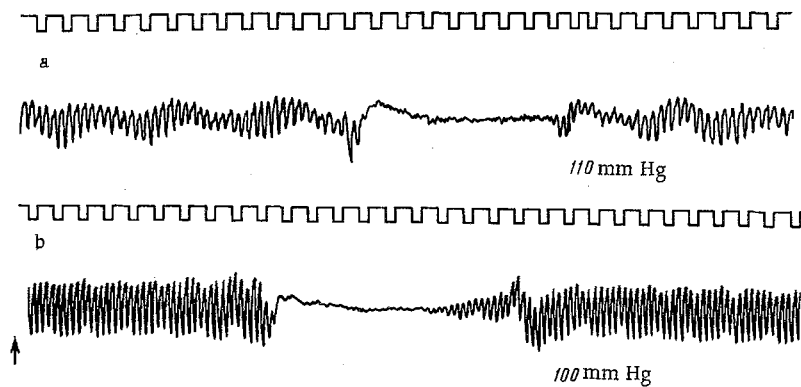


Fig. 2. Record of pressure in caudal artery of a rat.

Riva-Rocci apparatus. The sensor is applied below the cuff. When definite pulsation of the artery is present, air is blown into the cuff until the pulsations cease. Air is then gradually released from the cuff until the pulsations reappear. This corresponds to the level of the systolic arterial pressure. According to observations made with the instrument the mean arterial pressure of healthy rats is 90-100 mm Hg. Curves showing the pressure in the caudal artery of a rat are given in Fig. 2.