

# ELECTROPLETHYSMOGRAPHIC METHOD OF RECORDING BLOOD PRESSURE IN LONG-TERM EXPERIMENTS

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UDC 612.14-08

A method of measuring the arterial pressure in rats during long-term experiments by means of a two-channel electroplethysmograph is described. It is based on the increase in volume of the tail as the pressure in the compression cuff falls. The curve reflecting the pressure level in the cuff is recorded simultaneously.

The chief disadvantage of existing plethysmographic methods of measuring the blood pressure (BP) is that in most of them the readings of the plethysmograph and manometer are obtained visually.

In order to record the systolic arterial pressure in animals by a plethysmographic method, the writers have developed a technique of recording the pressure on an electroplethysmograph, allowing the numerical readings of the mercury manometer to be recorded easily and rapidly. A two-channel electroplethysmograph manufactured at the experimental factory of the Leningrad branch of the All-Union Research Institute of Medical Instrumentation was used. One channel recorded the electrotensiogram: this is a cascade line suitable for obtaining readings of the mercury manometer. To obtain the electrotensiogram, a pressure transducer consisting of a mercury manometer with electrical contacts inserted into its glass tube was constructed. Each stage of the cascade line corresponds to 10 mm Hg. For convenience of reading, the 50, 100, 150, and 200 mm Hg marks are recorded as higher steps. The plethysmogram of the part of the body to be investigated is recorded on the other channel of the electroplethysmograph.



Fig. 1. Recording of blood pressure on electroplethysmograph with a paper winding speed of 2.5 mm/sec. Above—plethysmogram of albino rat's tail; below—electrotensiogram; greatest step corresponds to 100 mm Hg.

The method of investigation is as follows. The BP is determined in Kogan's chamber [3, 4] for immobilizing unanesthetized albino rats. The animal's tail is placed in a glass plethysmometer and, together with the glass receiver of the plethysmometer, is heated in a water bath at 39°C. The chamber of the plethysmometer receiver is connected by a rubber tube to the input of one channel of the electroplethysmograph. The second channel of the electroplethysmograph is connected to the pressure transducer. Air is pumped into the cuff applied above the plethysmometer to a pressure known to be higher than the systolic pressure in the artery to be investigated. When the air is then released from the cuff, at the moment when the pressure in it corresponds to the systolic BP, the tail begins to enlarge in volume [1, 2, 4, 5], and this is reflected by elevation of the plethysmographic curve. Comparison of this moment with the cascade line of readings of the mercury manometer (Fig. 1) gives the systolic BP with an accuracy of 1-2 mm Hg. The blood pressure in the

Department of Pharmacology, N. I. Pirogov Odessa Medical Institute. (Presented by Academician V. V. Parin.). Translated from *Byulleten' Éksperimental'noi Biologii i Meditsiny*, Vol. 72, No. 9, pp. 124-125, September, 1971. Original article submitted December 24, 1970.

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caudal artery of albino rats measured by the suggested method is  $105 \pm 15$  mm Hg.

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