

APPARATUS FOR LYMPH NODE PERFUSION

Yu. I. Borodin

Department of Normal Anatomy of Novosibirsk Medical Institute

(Presented by Active Member AMN SSSR V. N. Ternovskii)

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In connection with the study of the numerous functions of the lymphatic system, an investigation of the carrying capacity of the lymph node (its transport function) in various physiological and pathological conditions is of great interest.

A valuable method of studying the functions of the lymph node is the perfusion of it with particular fluids. This method was used in the studies of Drinker and Yoffey [2], and also by V. N. Chernigovskii and his colleagues. Chernigovskii has made extensive use of this method in his investigations.

Our aim was to design a lymph node perfusion apparatus which could be used for a quantitative determination of the transport function of the lymph node.

For an assessment of the transport function of the lymph node the volume of liquid flowing into the node and out of it in unit time must be determined. Calculation of this volume merely requires an investigation of the rate of flow of the liquid in graduated glass tubes connected with the afferent and efferent lymph vessels. If the rate of travel of air bubbles in these tubes and the diameter of the tubes are known, it is easy to determine the volume of liquid passing through the tube in unit time into the node or out of the node. Changes in the flow into the node and out of it indicate the changes in the transport function of the node in the particular experimental conditions.

Proceeding from this principle, we set up a special apparatus for lymph node perfusion. This apparatus has been used for perfusion of the lymph nodes of dogs, cats, and rabbits in our investigations [1], and also in research by our colleagues in the Department of Normal Anatomy of Novosibirsk Medical Institute [3].

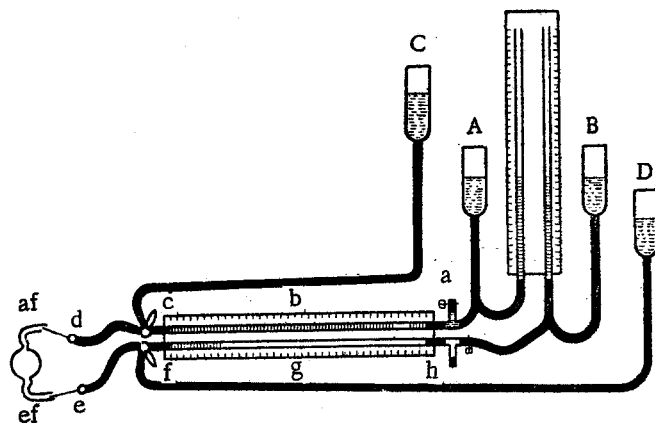
The arrangement of the apparatus is as follows (see Figure).

From an ampoule A mounted at a preset height, the perfusion liquid passes through a system of rubber tubes to the needle d, inserted in the afferent lymph vessel af.

The volume of liquid flowing into the node is determined from the rate of travel of an air bubble from right to left in the graduated glass tube b. As soon as the air bubble reaches the end of the scale, liquid from ampoule C, placed higher than ampoule A, is admitted into tube b by a turn of the three-way stopcock c. The air bubble is driven back to the start of the scale and observations can then continue. Thus, by manipulation of stopcock c the experiment can be continued for as long as necessary.

After passing through the lymph node the liquid (physiological saline in our experiments) flows through the needle e inserted in the efferent vessel ef and then into the graduated tube g. The air in the latter is displaced from left to right by the liquid. When the whole tube is filled the excess liquid can be run off into ampoule D by a turn of the three-way stopcock f. For this purpose ampoule D must be brought below the level of tube g.

The blind branches a and h serve for the admission or removal of air from the system, and when necessary they can be closed with clamps.



Apparatus for lymph node perfusion. Description in text.

The described system can also be used for the simultaneous perfusion of two lymph nodes. In this case the liquid from ampoule A is fed into one node, and that from ampoule B is fed into the other. In this case needles d and e are inserted in the afferent vessels and the efferent vessels are transected. With this experimental set-up only the volume of liquid flowing into the node can be determined.

The metal three-way stopcocks c and f were copied from Val'dman's apparatus for measurement of venous pressure.

SUMMARY

An apparatus was designed to investigate the transport function of lymph nodes in experimental conditions. This apparatus has made it possible to determine the volume of fluid entering and escaping from the lymph node per unit of time. Altered transport function of the node in various experimental conditions may be assessed by the changes in these values.

LITERATURE CITED

1. Yu. I. Borodin, in: Problems of Morphology [in Russian] (Novosibirsk, 1958) p. 107.
2. C. K. Drinker and J. M. Yoffey, Lymphatics, Lymph, and Lymphoid Tissue (Cambridge, 1941).