

A Rapid Safe Technique for Repeated Blood Collection from Small Laboratory Animals. The Farmer's Wife Method* (32640)

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The difficulties in obtaining adequate volumes of blood for serial analysis often restricts design of experiments using rats, mice and guinea pigs.

Heart puncture (1,2) usually done under general anesthesia, is time consuming, and unless the operator has considerable technical skill many animals are lost.

Puncture of the ophthalmic venous plexus (3) is accomplished with less hazard to the animal but only a small quantity of blood is usually obtained, and a good deal of practice is needed to acquire facility.

Griffith and Farris (4) report up to 1.5 ml of blood can be collected from the rat by incising the tail vein. Lehnert (5) advocates clipping the toenail of guinea pigs and reports up to 4 ml of blood can be obtained from a large animal. These techniques are simple and safe but the volume of blood is sometimes inadequate.

We wish to describe a method of bleeding small animals from the tail or toenail where-

by we are able to obtain generous volumes of blood easily, quickly, and without risk to the animal. Success depends on gentle handling and adequate warming of the animals prior to bleeding rather than on technical skill.

Methods. The animals in a metal transport cage containing wooden shavings are placed into a warming incubator for a few minutes until the temperature within the cage is approximately 40°C (Fig. 1). The animals are removed from the incubator and transferred to an appropriate holder. In the case of the rat 2–3 mm of the distal part of the tail is cleanly amputated with a sharp pair of scissors. The tail is held gently at its base with the operator's thumb and index finger to occlude the large lateral veins (Fig. 2). Bleeding is very brisk and 3.5–4 ml of arterialized blood can be collected in 20–30 sec. Under ideal conditions 25–30 rats can be bled in less than 1 hour. If plasma or cells are desired anticoagulants can be added to

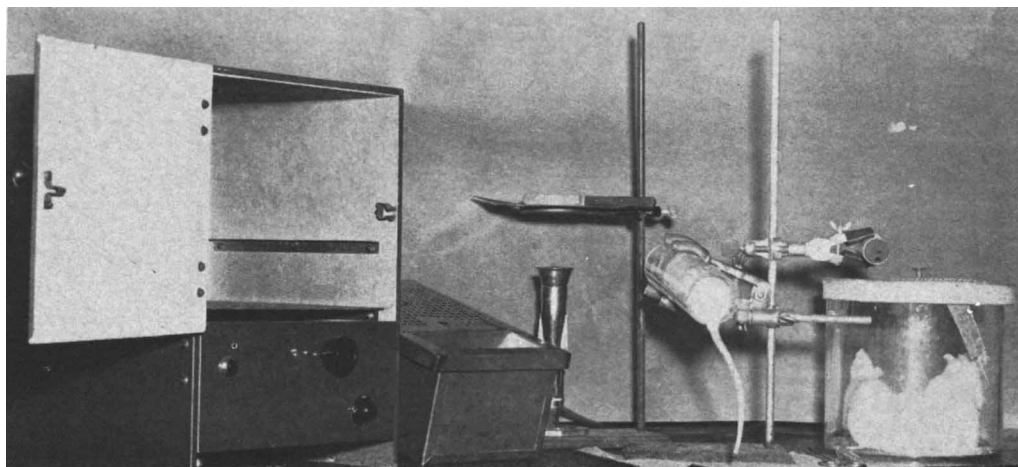


FIG. 1. The animals are placed in the metal transport cage, warmed in the incubator, and then transferred to the holder for bleeding.

* Supported by a United States Public Health Service Grant AI-144-6756; and a grant from the American Thoracic Society.

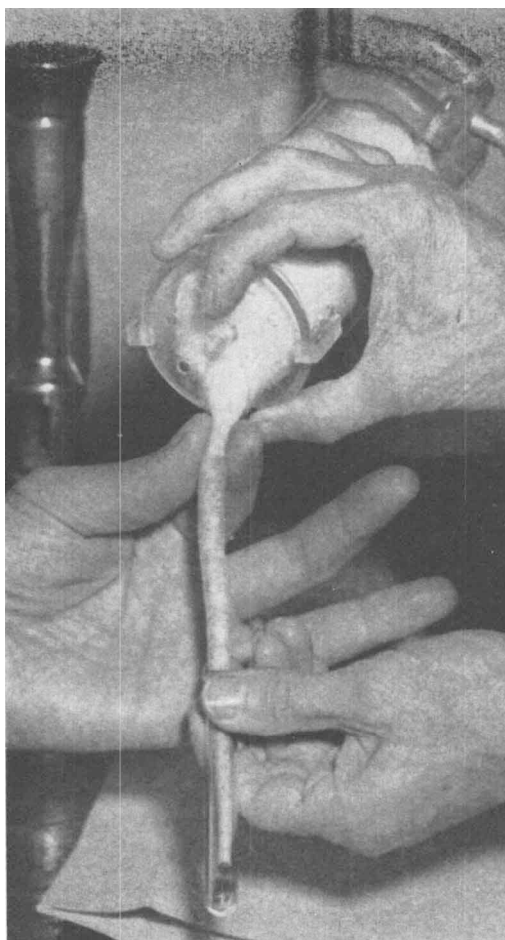


FIG. 2. After the tail is clipped the lateral veins are gently compressed, and blood is collected into test tubes.

the collecting tube. We have found it necessary to cauterize the cut surface of the tail with a hot spatula or glass rod to prevent oozing or unnecessary bleeding. Collection should be limited to approximately 3.5–4 ml at each bleeding of 200–250 gm rats. With this volume loss of the animals is rare, and though these animals appear to be in mild shock after the bleeding they recover in 20–30 min.

Mice are bled in a similar fashion by warming and tail amputation. Their small size (20–35 gm) limits the volume of blood to 0.5

ml. In mice the first amputation of the tail is done not at the distal end but at the junction of the middle and distal thirds. We have found it convenient to use graduated plastic tubes for collection because if more than 0.4–0.5 ml is removed some of the animals die of shock.

Guinea pigs are bled by clipping a toenail as described by Lehnert (5). The incubator needs to be at a higher temperature than for rats. Warming at 40–45°C for 10–15 min prior to bleeding facilitates collection and up to 1–2 ml of blood can be obtained in 3–4 minutes from a 250–300 gm animal. Hemostasis is best accomplished with a bandage.

Gentle handling of the animals is essential. If they become excited the volume of the bleeding is considerably reduced. When large volumes of blood are taken the animals can be bled as often as every 3 days over a prolonged period, and daily for shorter periods. The limiting factor seems to be the time needed to restore blood volume. Animals will die of shock if large bleedings are repeated too soon.

Summary. Difficulties in obtaining adequate volumes of blood for serial analysis often restrict the design of experiments using small animals. The techniques of bleeding rats and mice from the tail and guinea pigs from the toenail can be improved by warming the animals. Prior warming in an incubator at 40–45°C and gentle handling allow repeated collection of generous quantities of blood quickly.

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Received July 24, 1967. P.S.E.B.M., 1968, Vol. 127.