

MULTIPLE FISTULAS FOR THE STUDY OF DIGESTION

(UDC 612.3-084)

V. I. Galakhov and E. P. Orestov

Department of Human and Animal Anatomy and Physiology
(Head, Professor V. E. Robinson), Ryazansk Pedagogical Institute
(Presented by Active Member AMN SSSR A. V. Lebedinskii)

Translated from *Byulleten' Éksperimental'noi Biologii i Meditsiny*, Vol. 57, No. 6,
pp. 108-110, June, 1964

Original article submitted May 18, 1962

Recently methods have been developed which allow simultaneous observation on the operation of several digestive glands in a single normal animal [6,7,8].

To determine the neuro-humoral influences governing the pancreas and to establish the influences of various substances on the intestinal receptor apparatus, an animal must be used having a fistula of the pancreas and of one or two isolated loops of duodenum. It must also be arranged that in between experiments the pancreatic and intestinal juices should enter the digestive tract.

In the method we here describe the fistula tube (Fig. 1,a,1) is made of AKR-7 plastic. In the rim (9) of the body six holes are tapped, and threads are also cut in the ends of branches (2-7). The branches are screwed into the body of the fistula tube, and when necessary are replaced by plugs (Fig. 1, d).

The "core" (Fig.1,b) is turned out of stainless steel or plastic and is carefully lapped to the inner surface of the fistula tube. The lug (12) on the lower end of the "core" fits into a corresponding recess in the lower portion of the body of the fistula tube and fixes the "core" in a definite position.

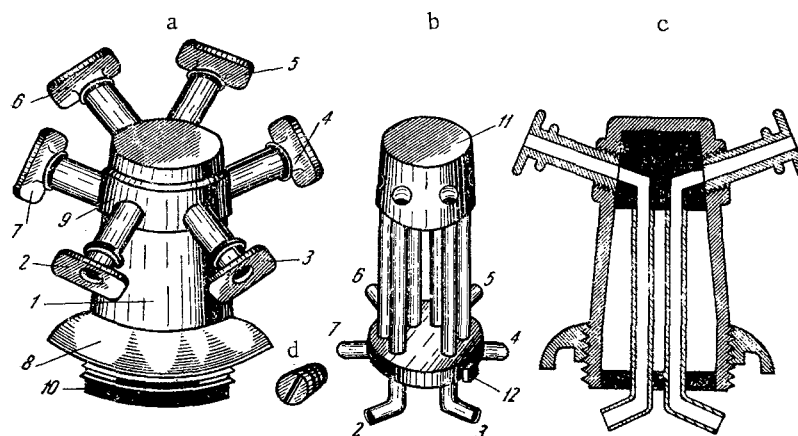


Fig. 1. Fistula tube of plastic AKR-7. a) General appearance; b) "core" of the tube; c) fistula tube with "core" inserted (in section); d) plug; 1) body of fistula tube; 2-7) branches of fistula tube (the same figures indicate the corresponding tubes of the "core"; 8) ring of fistula tube placed on surface of abdomen; 9) rim on body of fistula tube; 10) plug; 11) head of "core"; 12) projection of lowering of "core".

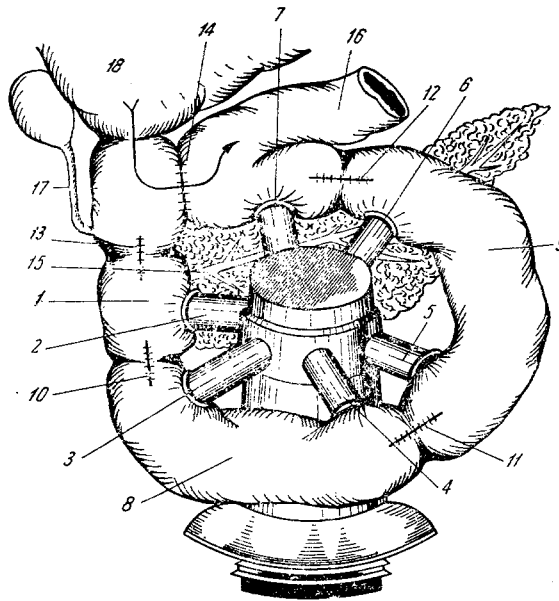


Fig. 2. Diagram of the arrangement of the branches of the fistula tube in isolated portions of the intestine. 1) Isolated sac of intestine for collection of pancreatic juice. The branches of the fistula tube are for collection of pancreatic juice (2), of juice from the cranial and caudal ends of the first isolated loop (3,4), of the cranial and caudal ends of the second isolated intestinal loop (5,6), and for reintroduction of pancreatic juice into the digestive tract (7); 8 and 9) first and second isolated loops of intestine; 10-13) points of separation of the intestine into compartments by partitions of mucous membrane; 14) enteroanastomosis; 15) main pancreatic duct; 16) intestine; 17) bile duct; 18) stomach.

To carry out an operation the normal procedure for formation of an isolated duodenal sac is followed [1,3,8], and two isolated intestinal loops are made by the Pavlov method by forming partitions made only out of mucous membrane [2,4,5,].

In between experiments the fistula tube was covered by a rubber plug (see Fig. 1,a,10). Intestinal juice from the isolated duodenal segment passes through one branch (Fig. 2,2) into the fistula tube, and intestinal juices from isolated loops pass into the same tube through branches 3-6. The juices enter the digestive canal through branch 7, enabling the normal digestive process to take place.

During the experiment the "core" is placed in the fistula tube (Fig. 1,c). The gastric juice from the isolated sac (1) passes along branch 2 and the lead-off tube of the "core" to flow to the outside. The juice is measured, and a sample is taken for analysis, and branch 7 leads the juice into the digestive tract through the corresponding branch of the "core" and branch 7. The fluids examined pass in and out through the remaining tubes 3-6 of the "core."

The method we have proposed has many advantages. Firstly, by means of only two fistula tubes the investigator gains access to the stomach, jejunum, and to two receptor fields of the duodenum, while at the same time he is able to obtain intestinal juice. Secondly, the presence of branches which screw in enable him to carry out several distinct operations. This is particularly important when the fistula tube is used for a combination of different operations on the same animal. Thirdly, over the whole of the operated region the intestine is not divided. This enables the serous and muscular layers to be preserved together with the nerves and nervous plexuses present in them.

The use of the method described greatly facilitates care of the animals. The belly and the legs are not wetted and therefore not attacked by the juices secreted. Dogs as a rule do not lose their appetite and completely recover their weight and health.

LITERATURE CITED

1. A. N. Bakuradze. Fiziol. zh. SSSR, No. 6, (1941), p. 791.
2. V. L. Gubar'. Fiziol. zh. SSSR, No. 4, (1955), p. 587.
3. D. S. Zhilov. In book: The Physiology of the Digestion of Farm Animals. [in Russian], Moscow, Leningrad, (1935), p. 143.
4. V. N. Zhulenko. Fiziol. zhurnal SSSR, No. 4, (1955), p. 586.
5. I. P. Pavlov. Complete Collected Works. [in Russian] Moscow, Leningrad, 2, book 2, 325 (1951), p. 308.
6. V. E. Robinson. Fiziol. Zh. SSSR, No. 1, (1954), p. 98.
7. V. E. Robinson and F. I. Mizgirev. Byull. Éksper. Biol., No. 6, (1958), p. 112.
8. O. B. Sobieva and V. E. Robinson. Fiziol. Zh. SSSR, No. 5, (1953), p. 629.

All abbreviations of periodicals in the above bibliography are letter-by-letter transliterations of the abbreviations as given in the original Russian journal. *Some or all of this periodical literature may well be available in English translation.* A complete list of the cover-to-cover English translations appears at the back of this issue.