

T400-Series Surgical Protocol

Rat Portal Vein: Chronic Blood Flow Measurement

APPLICATION BASICS

Site:	Portal vein
Species:	Rat
Body Weight:	270 grams
Duration:	Chronic
Vessel Diameter:	1.5 mm

PROBE

Size:	2 mm
Reflector:	JS
Connector:	4-pin
Cable Length:	13 cm
Catalog #:	MC-2PSB-JS-WC13-CM4S-GC

FLOWMETER

TS420 Perivascular Module

Flow Ranges Observed

Mean portal blood flow in a 270 gram rat is 20 ml per min. Flow may decrease markedly when the rat is sleeping or excited. A flow of 5 ml/min is not unusual.

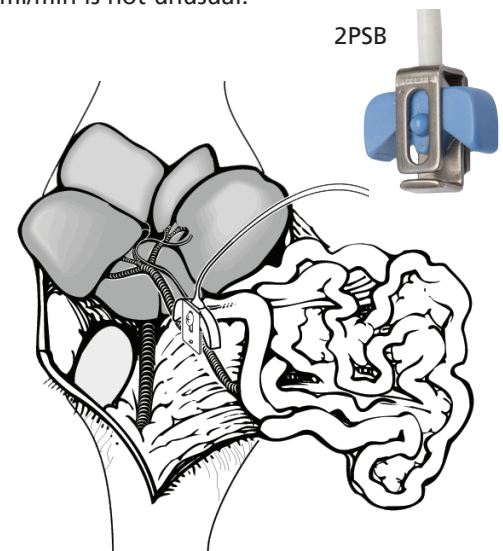


Fig. 1: Application of a transit-time ultrasound Flowprobe on the portal vein of a rat.

Application

The total flux of any metabolite can be estimated from the product of blood flow and the concentration of that metabolite in the blood. This technique has been used for measuring gastrointestinal fatty acid absorption. A similar technique was used to estimate the uptake of parasites.

Surgical Approach

Tank induction with ether or isoflurane is recommended. Place an anesthetized rat in ventral recumbency and make a small skin incision between the ears. Turn rat over and make a ventral midline abdominal skin incision. Using curved hemostats, create a subcutaneous tunnel from the abdominal incision to the cranial incision. Extend hemostats through the subcutaneous tunnel and firmly grasp the flow Probe. Pull the Probe through the subcutaneous tunnel, leaving the plug in the cranial incision and most of the cable in the subcutaneous tunnel.

Extend the abdominal incision through the linea alba into the abdominal cavity. Retract the lobes of the liver cranially to locate the splanchnic vessels. Gently separate the hepatic artery and the portal vein. Clean fat off portal vein for proper acoustic coupling. Place J shaped reflector of the Probe around the portal vein, close the slide cover. Position the Probe so that the cable is perpendicular to the portal vein and replace the hepatic lobes so that they cover the Probe (Fig. 1).

Since there is very little adjacent connective tissue, the Probe is not sutured. Probe position is maintained by the relative stability of the cranial abdominal organs. The Probe signal may be verified by filling the abdominal cavity with saline and connecting the Probe to a sterile extension cable. To maintain the perpendicular alignment between the portal vein and Probe cable, attach the cable of the Probe to the body wall with 4-0 suture. Close the body wall with a 4-0 simple continuous suture. The skin may be sutured or closed with wound clips. At the head, suture the CM4 connector to skin with a 2-0 suture and close the skin incision with a wound clip.

Rat Portal Vein: Chronic Blood Flow Measurement Cont.

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REFERENCES

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Ulrich PM, Tordoff MG, "Influence of Gastric Loads on Hepatic Portal Vein Blood Flow," Abstract for Eastern Psychological Association, Philadelphia, 1990

Transonic® video "Implanting the Transonic Flowprobe on the Portal Vein in the Rat."

For additional references, visit www.transonic.com



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