

# T400-Series Surgical Protocol

## Rat Femoral Artery: Acute Blood Flow Measurement

### APPLICATION BASICS

Site:	Femoral artery
Species:	Rat
Body Weight:	200 - 400 grams
Duration:	Acute
Vessel Diameter:	
	0.7 - 0.9 mm proximal to epigastric
	0.5 - 0.6 mm distal to epigastric

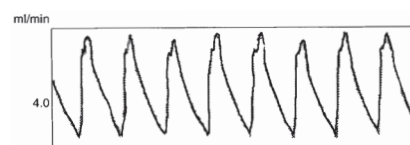
### PROBE

Size:	0.7 or 1 mm
Reflector:	J
Connector:	CRA10: 10-pin
Cable Length:	60 cm
Catalog #:	MA-0.7PSB MA-1PRB

### FLOWMETER

TS420 Perivascular Module

### Flow Ranges Observed



Flow trace courtesy of T.L. Smith, Wake Forest University School of Medicine, Winston Salem, NC.

### Application

The femoral artery is a convenient site for the blood flow measurement in basic hemodynamic research as it is relatively accessible and does not require highly invasive surgery. Since access does not require opening the abdomen or the thorax, there are fewer complications from hypothermia and shock. This site is also relatively free of adipose fat.

### Surgical Approach

Anaesthetize the rat with ketamine/xylamine solution (0.09 ml solution / 100 gm body weight IM thigh). Use a heating pad or heat lamp to avoid hypothermia which will reduce flow. A 0.5 ml bolus of saline placed subcutaneously every half hour is also recommended.

**Note:** The femoral artery tapers from 0.9 mm diameter at the iliac artery to 0.5 mm distal to the epigastric branch. Flowprobe size will depend on the chosen measurement site.

Place the rat in dorsal recumbency and visually identify the femoral vessels on the medial thigh. They should be readily visible through the shaved and prepared skin. Gently stretch the skin caudally, make a 1.5 cm incision adjacent to the femoral vessels, and release the skin so that it slides back over the vessels.

*(Continued on next side.)*

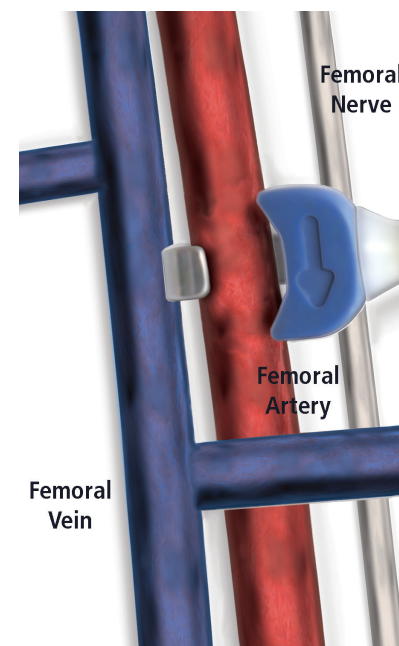


Fig. 1: Site of femoral artery in relation to femoral vein and femoral nerve.

## Rat Femoral Artery: Acute Blood Flow Measurement Cont.

### Surgical Approach cont.

When the combined femoral artery, vein and nerve are exposed, carefully separate the vessels from the surrounding fascia. First pass a small curved needle completely under the vascular bundle and back out the other side, then use a fine pair of curved forceps to tease away the fascial layers. Continue this process until the vascular bundle is completely undermined and freely movable.

Separation of the vessels is often the most difficult step of the procedure. One technique is to take a pair of forceps with a very blunt tip and repeatedly open and close them in a direction parallel to the vessels. Try to make a small gap between the vessels. The vein may be identified by alternately applying pressure proximally and distally to distend and collapse the vein. When the femoral artery is isolated, place the Flowprobe around the artery. Use a micromanipulator to stabilize the Probe position on the vessel.

Remove the plunger of a 30 cc syringe and load the syringe with Surgilube gel, taking care to prevent the formation of air bubbles. Place a flexible 20 gauge catheter on the tip of the syringe. Insert the catheter through the Probe's acoustic window adjacent to the artery and deposit the gel while withdrawing the syringe. The gel acts as an acoustic couplant and must replace the air space. Select the test mode on the Meter to verify that signal amplitude is close to 1 Volt. A low signal or an acoustic error can usually be traced to an insufficient amount of Surgilube gel or to an air bubble.

### REFERENCES

Shimura H et al, "A New Simultaneous Method for Measuring the Blood Flow in Small Experimental Animals Using the Transit-Time Ultrasonic Volume Flowmeter," Jap J of Pharmacol 1986; 40(Suppl): 101P.

Hoffman A et al, "Endothelin Induces An Initial Increase in Cardiac Output Associated with Selective Vasodilation in Rats," Life Sciences 1989; 5(3): 249-255.

Wachter C et al, "Visceral Vasodilatation and Somatic Vasoconstriction Evoked by Acid Challenge of the Rat Gastric Mucosa: Diversity of Mechanisms," J Physiol 1995; 486(2) 505-516.

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