

T400-Series Technical Note

Choosing Mouse Flowprobes

Nanoprobes versus V-Series Probes

CHOOSING A FLOWPROBE FOR SMALL VESSELS

Transonic® Nanoprobes and V-Series Probes produce repeatable, high resolution volumetric blood flow measurement data on vessels as small as 250 micron diameter (Fig. 1). Both styles are cited in the literature for flow measurement studies in the mouse.

PS-Series Nanoprobes

- Acute and chronic use Flowprobe (Fig. 1) may be configured for acute anesthetized studies or for chronic implantation with short cables and small connectors. The subjects can then be recovered and measurements taken while the animal is conscious over a period of days, weeks or months.
- Smaller Probe body: the Probe occupies minimal space in the surgical field and fits small anatomical spaces such as the mouse renal cavity.
- Measurements are less sensitive to vessel position within Probe lumen. The smaller rectangular lumen of Nanoprobes requires only general vessel position for proper ultrasonic illumination (Fig. 2). The vessel should fill 75% or more of the Probe lumen for best accuracy.
- Small amount of coupling gel needed to fill air space between the Probe and vessel
- Smaller measurement scale; more appropriate range for small vessel flow rates.
- Stainless steel handle is standard for acute use Probes (Fig. 1).
- Delicate construction.
- Can be difficult to place vessel within Probe lumen because the reflector is thicker than the metal V-Probe reflector.

V-Series Flowprobes

- Acute use only: supplied with stainless steel handle (non-handle versions may be custom ordered) (Fig. 1).
- Larger physical Probe size for small diameter vessel (Fig. 2); occupies more space in surgical field and requires a longer isolated vessel segment.
- Not a major problem on mouse carotid application because vessel is long and without branches.
- Is a problem on mouse renal artery where space is limited and the vessel has many small branches.
- Position sensitive; gives erroneous readings if used incorrectly. Vessel must be positioned in bottom of the V (Fig. 2) defined by the reflector even though the Probe lumen is much larger.
- Requires more coupling gel to fill up large air space.
- Rugged construction.
- Thin metal reflector: easier to place vessel within Probe.

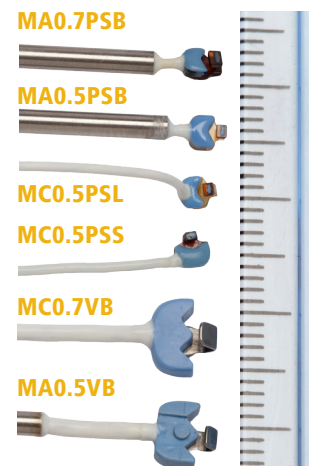
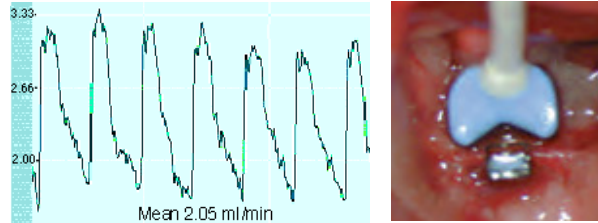
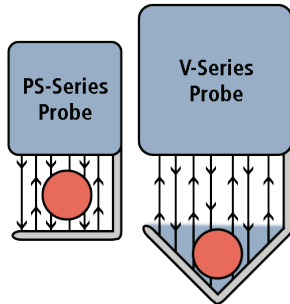


Fig. 1: Selection of Nanoprobes and V-Series Probes

Choosing Mouse Flowprobes Cont.

Nanoprobes versus V-Series Probes Cont.



0.5PSL Probe on Mouse Renal Artery with Flowtrace.

Courtesy of M.F. Callahan, Wake Forest University Health Sciences

Fig. 2: The full height of the PS-Series Probe's ultrasonic window has the same flow sensitivity, so that the vessel can be positioned any-where within the Probe. Only within the triangle (shaded) portion of the V will the V-Series Probe reach its full flow sensitivity.

Flowprobe Specifications For Mouse Applications

PROBE SIZE & SERIES	VESSEL OD		BIDIRECTIONAL FLOW OUTPUTS				ACCURACY SPECIFICATIONS			ULTRASOUND
	MA-ACUTE	MC-CHRONIC	RESOLUTION	LOW FLOW (¼ SCALE)	STANDARD FLOW	MAX FLOW (STD FLOW)	ZERO OFFSET	ABSOLUTE ACCURACY	RELATIVE ACCURACY	FREQUENCY
	mm	mm	ml/min	ml/min	ml/min	ml/min	ml/min	%	%	MHz
0.5PS	0.3 - 0.5	0.3 - 0.48	0.03	1.5	6	30	± 0.12	± 15	± 2	14.4
0.7PS	0.5 - 0.7	0.4 - 0.7	0.05	2.5	10	50	± 0.2	± 15	± 2	9.6
1.5PS	1.2 - 1.5	1.2 - 1.5	0.075	10	40	200	± 0.8	± 15	± 2	4.8
1PR	0.7 - 1.2	0.7 - 1.0	0.05	5	20	100	± 0.2	± 10	± 2	7.2
0.5V	0.25 - 0.5	Acute use only	0.05	2.5	10	50	± 0.25	± 15	± 3	7.2
0.7V	0.35 - 0.7		0.075	5.0	20	100	± 0.5	± 15	± 3	4.8



Transonic Systems Inc. is a global manufacturer of innovative biomedical measurement equipment. Founded in 1983, Transonic sells "gold standard" transit-time ultrasound flowmeters and monitors for surgical, hemodialysis, pediatric critical care, perfusion, interventional radiology and research applications. In addition, Transonic provides pressure and pressure volume systems, laser Doppler flowmeters and telemetry systems.

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