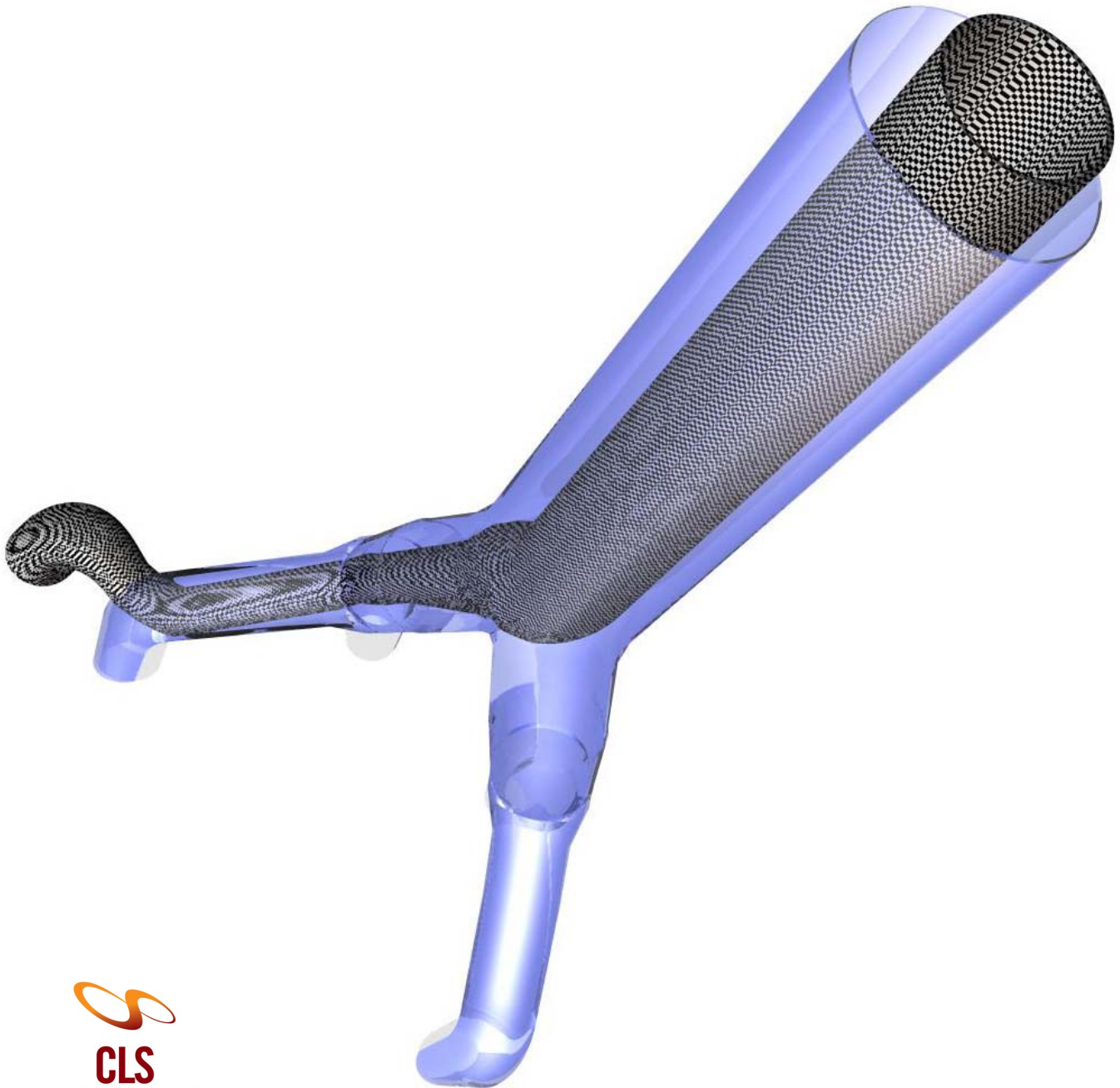


The *Venous smart canula*®

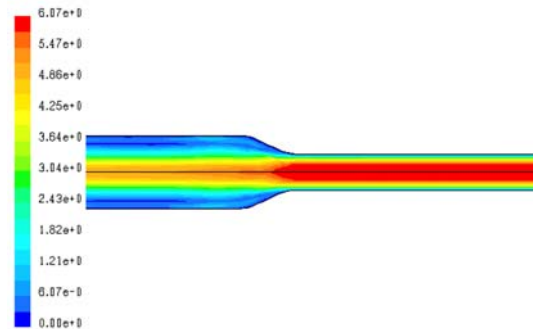
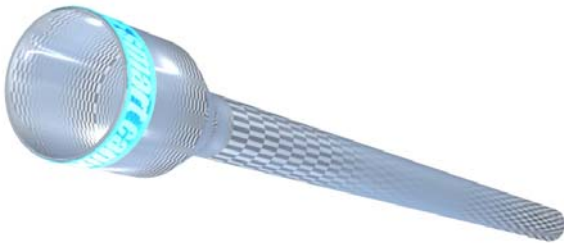
Next generation design for superior performance



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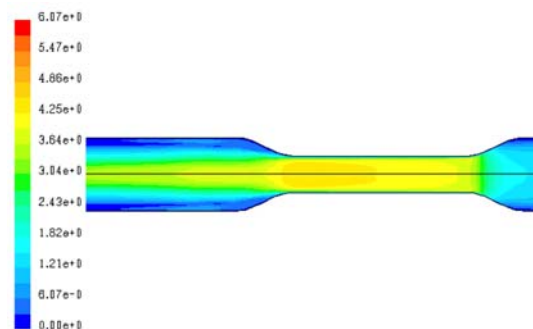
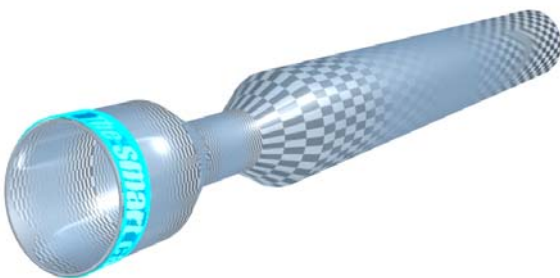
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The *smart canula*® is collapsed over a mandrel prior to insertion and re-expanded in situ: un-matched blood flow, much smaller access aperture, and less trauma result !



The *smart canula*® can be stretched over a mandrel and collapsed prior to intra-vascular insertion. In its "low-profile" configuration, the *smart canula*® is slid over a guide wire and positioned within the target vessel.

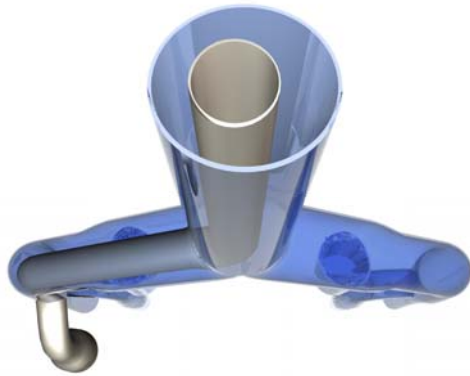
Mathematical simulation of velocity contours for a 18F standard percutaneous venous cannula with a flow of 4 l/min by computational fluid dynamics (CFD) : The pressure drop is too high and accounts for 140 mmHg !



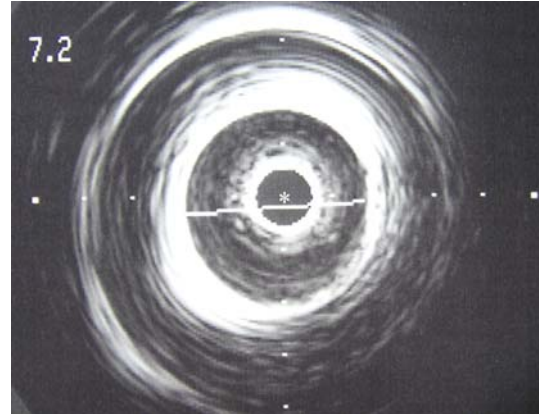
Once in position, the guide wire and the mandrel are removed. Due to its memory, the *smart canula*® expands and provides an unsurpassed lumen. Simple traction is enough to reduce the diameter and removal.

For the same 18F access aperture and flow, CFD shows for an expanding design of the *Venous smart canula*® significantly lower velocity contours. Pressure drop in this setting accounts only for 49 mmHg or 65% less !

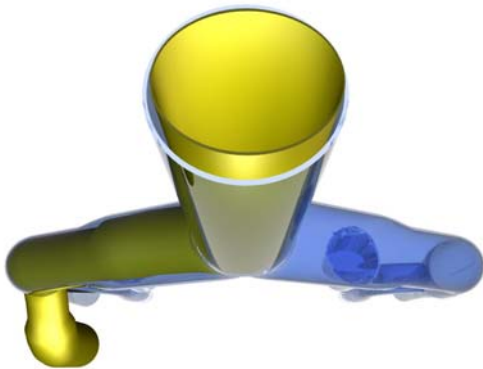
Access to the vascular system is a key issue for cardio-plummonary bypass, and other types of extra-corporeal circulation. Traditionally, cannulae are selected with an outer diameter somewhat smaller than the inner diameter of the vessel selected for access. This approach severely limits flow if there is a large difference between the cannula size and the target vessel size (v. cava or right atrium). The *smart canula*® principle based on "collapsed cannula insertion and expansion in situ" overcomes such limitations and provides unmatched blood flow.



Schematic cranio-caudal view of the inferior vena cava, the iliac and the femoral veins. At the target level, which is defined as the position providing optimal drainage (i.e. vena cava or right atrium), standard cannulae use only a small fraction of the available cross sectional area.



In vivo assessment of a standard cannula within the inferior vena cava by intra-vascular ultrasound (IVUS*). The luminal diameter of the standard cannula measures 7.2 mm. The cross-sectional area accounts for 40.7 mm² (a fraction of the vein).



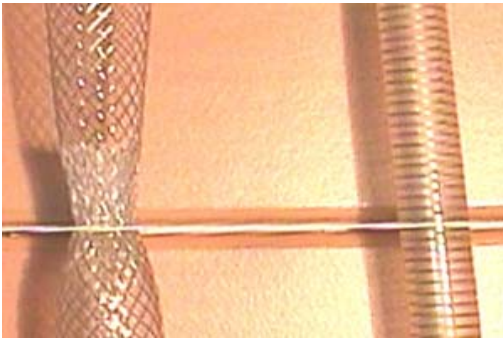
The diameter of a self-expanding *smart canula*® within the vena cava is not limited by the diameter of the access vessel. As a result, blood drainage is superior and a pump or vacuum is not necessary for augmentation of venous return.



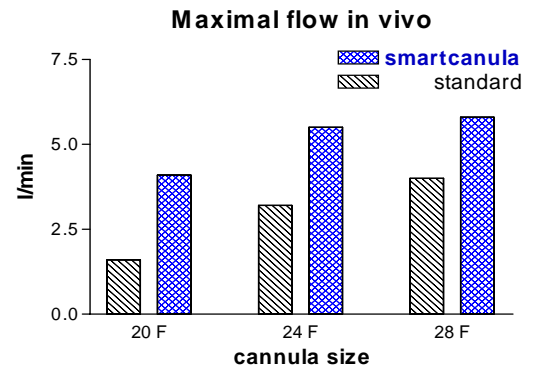
The *Venous smart canula*® in vivo as seen by IVUS* (same vena cava as shown above). The lumen of the *smart canula*® is 10 mm and the cross-sectional area accounts for 78.5 mm² or almost the double!

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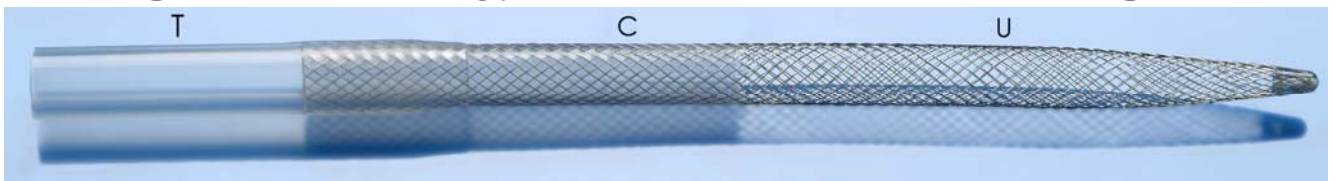


smart canula® and a standard cannula



Flow as a function of access aperture

Ordering information for typical *Venous smart canula*® configurations*



Catalog Numbers	Connecting Diameter	Guide-wire	Tubing Length	Covered Length	Uncovered Length	Diameter/Size Collapsed /Expanded		Intra-vascular Maximal length	Total Length
	Inch	Inch	mm	mm	mm	F	F	mm	mm
V 3/8 36 260 S	3/8	.035	100	80	80	<18	36	160	260
V 3/8 36 340 S	3/8	.035	100	80	160	<18	36	240	340
V 3/8 36 430 S	3/8	.035	100	80	250	<18	36	330	430
V 3/8 36 530 S	3/8	.035	100	80	350	<18	36	430	530
V 3/8 36 630 S	3/8	.035	100	80	450	<18	36	530	630
V 3/8 45 340 S	3/8	.035	100	80	160	<18	45	240	340
V 3/8 45 430 S	3/8	.035	100	80	250	<18	45	330	430
V 3/8 45 530 S	3/8	.035	100	80	350	<18	45	430	530
V 3/8 45 630 S	3/8	.035	100	80	450	<18	45	530	630

For more information, contact your local *smart canula*® sales representative

*ordering numbers include smartcanula® specific mandrel for collapsed insertion

device specifications may change at any time without prior notice



Patents US 6,626859, WO 015273, EP 1248571



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