

AstutePlus[®] Antithrombogenic Surface Active Therapeutic

AstutePlus[®] is an Advanced Antithrombogenic Surface Active Therapeutic that is a zero-leaching, permanently effective technology. It reduces thrombus formation, prevents fibrin sheath formation as well as minimises the need for anticoagulation therapy.

What is AstutePlus[®]?

AstutePlus[®] Advanced Antithrombogenic is the only zero-leaching, permanently effective Surface Active Therapeutic designed for long-term blood-contacting medical devices. The active surface remains bound to the device, ensuring sustained activity for decades while avoiding any systemic effects in the patient.

AstutePlus[®] combines both active and passive components to provide a multi-faceted antithrombogenic solution. Active agents work with passive elements to block the blood cascade, deactivate platelets and hinder the deposition and adhesion of blood components and proteins on the device surface. This reduces thrombus formation and prevents fibrin sheath development, ensuring the implant remains shielded and protected for the patient's lifetime.

"Fibrin sheath formation is a major issue for patients. It often requires invasive procedures, including catheter replacement and sheath disruption or snaring. These interventions can be uncomfortable and time-consuming for patients and may only temporarily solve the issue. There is a real need for solutions such as AstutePlus that prevent sheath formation, since there are currently no effective prophylactic therapies."

**Dr. Brian Rifkin, MD of Hattiesburg
Clinic Nephrology**

Clinical Features



**Prevents 99%
of Thrombosis**



**Prevents
Fibrin
Sheath**



**Mimics
Endothelial
Tissue**



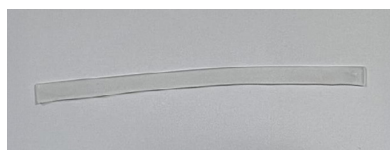
**Permanently
Effective**



Zero Leaching



No Particulates

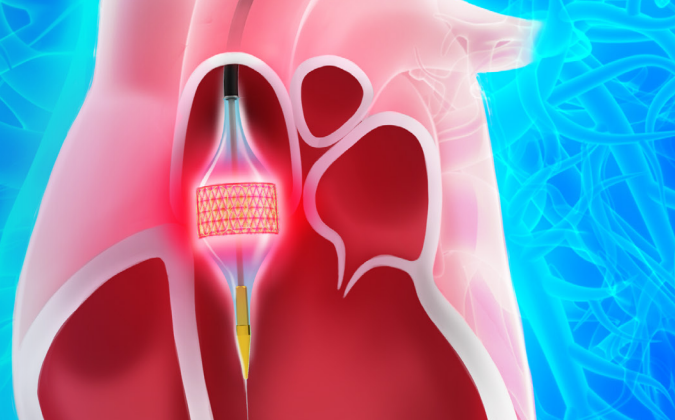


Coated

**Images of Blood Coated and Uncoated
Surfaces Exposed to Fibrin Sheath After
10 Years Accelerated Aging**



Uncoated



AstutePlus[®] has advantages for not only patients but also clinicians.

People living with a long-term implant have less danger of thrombus or fibrin sheaths forming, or of blood coagulating on the surface of the device. This in turn enhances safety and means the patient has a better quality of life, with no side-effects and minimal likelihood of the device needing to be surgically removed or replaced. The benefits seen by doctors are that the implant can remain in place for decades with optimal performance and less chance of infection. This reduces the overall clinical and economic burden of device implantation and management.

Biocompatibility Evaluation

AstutePlus[®] is an Advanced Antithrombogenic Surface Active Therapeutic derived from our proven technology platform, used for over 30 years on FDA-approved and CE-approved medical devices without rejection or recall. It has been successfully tested to ISO biocompatibility standards, including:



Antithrombogenic Coating Technologies: Comparison

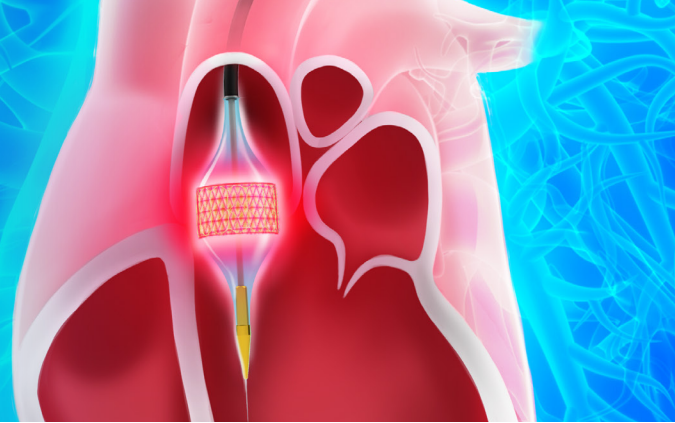
Technology Type	Fibrin Sheath Evidence	Sustained Efficacy	Notes
Astute Plus [®] / Palindrome [™] H	Dialysis CVC data: ↓ platelets (-60%), ↓ thrombus (-82%), coating intact 720h	Covalent, non-eluting	Market-validated benchmark
End-point Heparin	General thromboresistance; no dialysis-CVC data	Covalent, non-eluting	Proven, but dialysis gap
Albumin-Heparin	CPB/vascular evidence only	Covalent, non-eluting	Not dialysis-specific
Polyamine-Heparin	AT activity; no dialysis-CVC data	Covalent, non-eluting	Strong lab data
Eluting/Ionic Heparin	Short-term only	Days-weeks	Systemic exposure risks

Clear Strength
Partial / Mixed
Limitation

AstutePlus

Advanced Antithrombogenic

BioInteractions Surface Active System



Clinical Applications

AstutePlus® can be safely applied on to a wide range of medical device substrates, including polymers (e.g. polycarbonate and polyurethane), metals (e.g. nitinol and stainless steel), and woven or non-woven fabrics. It is compatible with diverse geometries and sizes from small implants with an inner diameter of less than 5 microns to large systems exceeding 20 metres in length.

Clinical Areas



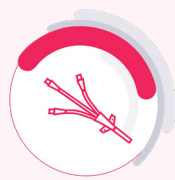
Neurovascular



Renal Care



Cardiovascular
Products



Vascular Access



Cardiopulmonary



Cardiac Rhythm

Various Substrates We Coat

Hardest	PTFE or Teflon (Polytetrafluoroethylen Polytetrafluoroethylene). Polymer used for sheaths.	ePTFE (expanded polytetrafluoroethylene). Used for stent coverings, vascular grafts, heart valves, surgical meshes	Pebax® (thermoplastic elastomer (TPE). Elastomer
	PEEK (Polyether Ether Ketone). Polymer	UHMWPE (Ultra High Molecular Weight Polyethylene). Polymer.	
	Titanium . Polished Metal	Stainless Steel (chromium, nickel, and molybdenum). Polished Metal alloy	
	Nitinol (nickel-titanium). Polished Metal alloy		
	Silicone (polydimethylsiloxane). Polymer	Silicone rubber. Elastomer	Nylon (Polyamide). Polymer
	PP (Polypropylene). Polymer used for catheters, thin films	PVC (Polyvinyl chloride). Polymer	TPU (thermoplastic polyurethane). Elastomer
	PET (polyethylene terephthalate). Polymer sheets	PP (polypropylene), PET (polyester), and PE (polyethylene). Non-woven fabric (sutures, face masks, textiles)	Latex (natural rubber). Elastomer
	SEBS poly(styrene-block-ethylene /butylene-blockstyrene). Polymer	SEPS poly(styrene-block-ethylene /propylene-blockstyrene). Polymer	PET (polyethylene terephthalate). Fibres are spun and then woven Polyester fabric. Woven fabric
			Wood (biopolymer)
			PE (Polyethylene). Polymer.
Easiest			Cellulose Fibres (biopolymer)
			PC (Polycarbonate). Polymer
			Cotton (biopolymer)
			PMP (Polymethylpentene). Hollow polymer fibres