FRED™ X™
Flow Diverter Stent

INTRODUCING THE X FACTOR

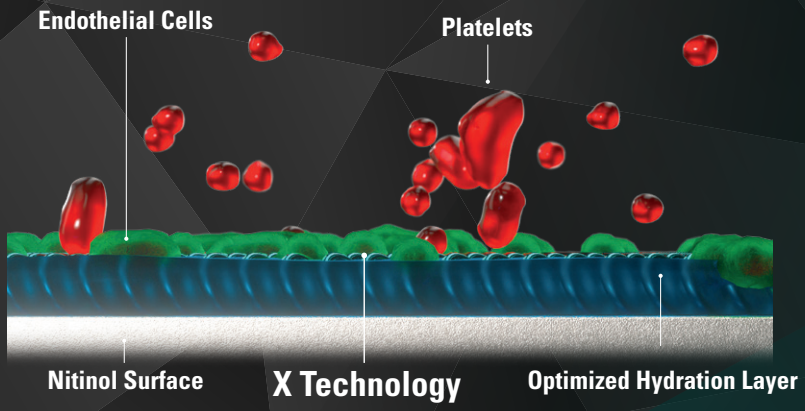
THE FRED X SURFACE MODIFIED FLOW DIVERTER WITH X TECHNOLOGY

MicroVention™
TERUMO

The Next Advancement
in Flow Diversion Technology

The FRED X device builds upon the **precise, predictable placement** and **immediate opening** of the FRED device[1].

Now with nanoscale X Technology* surface modification formed with a covalent bond



X Technology creates an optimized, protective hydration layer around FRED X that reduces platelet adhesion but allows for endothelial cell attachment and growth[2,3].

*X Technology is a proprietary polymer surface treatment derived from over 30 years of research and clinical use at Terumo.

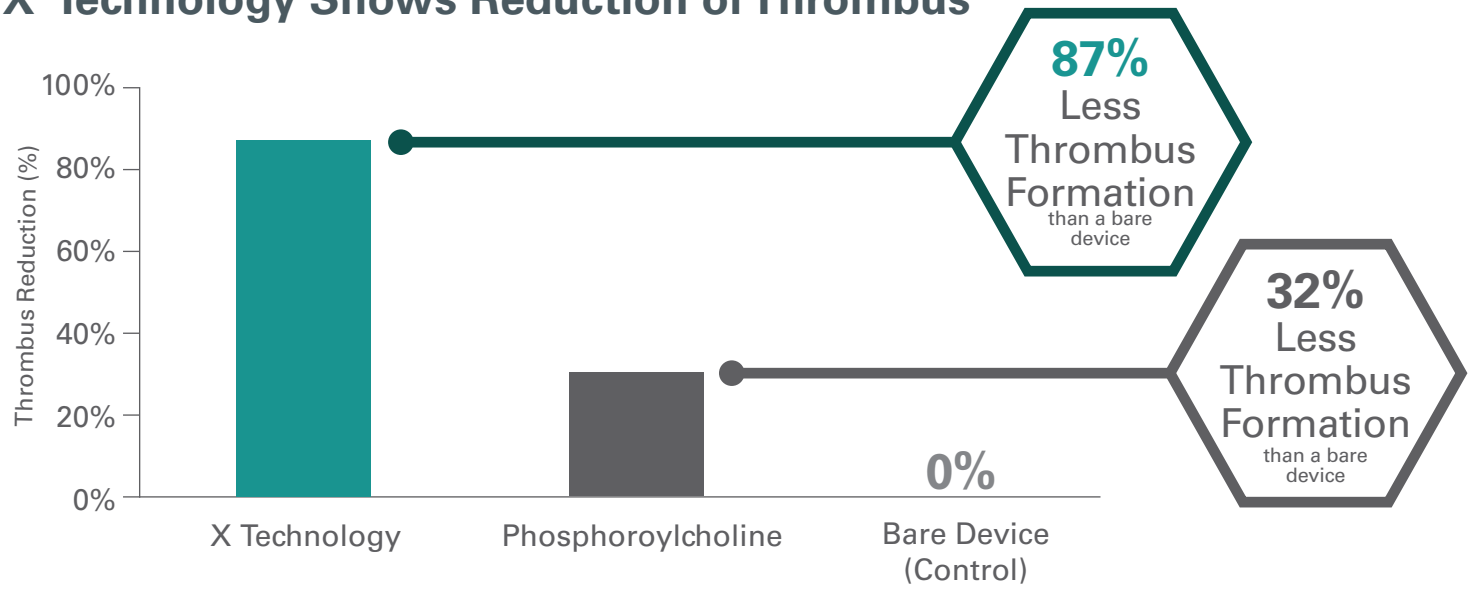
Why X Technology?

Before selecting X Technology, MicroVention's engineers conducted extensive in-vitro testing of FRED devices treated with various surface modifications.

X Technology demonstrated:

- Greater thrombus reduction than other leading polymer surface treatments
- Endothelial cell growth and attachment

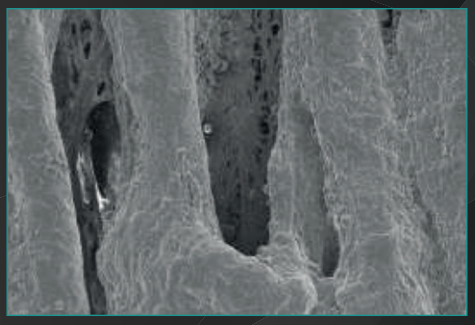
X Technology Shows Reduction of Thrombus[1]



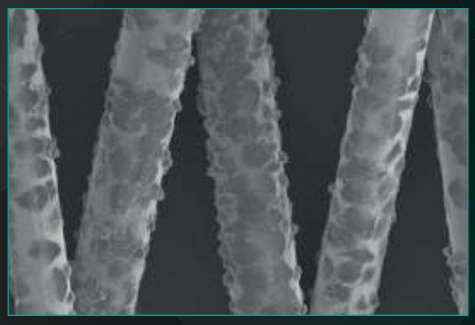
Results of in-vitro blood loop testing performed at MicroVention of various polymer surface treatments on FRED devices.

FRED X Reduces Material Thrombogenicity

Scanning electron microscope (SEM) imaging from in-vitro testing shows a reduction of thrombus formation on the FRED X device, compared to a bare device and a Pipeline Shield* device[1].



Bare Device



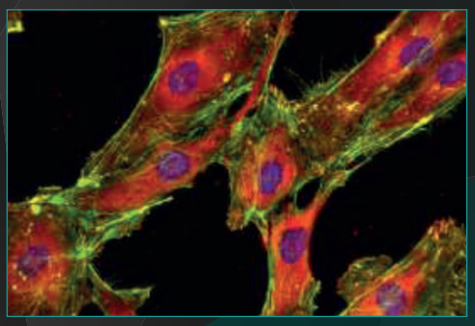
Pipeline Shield

FRED X

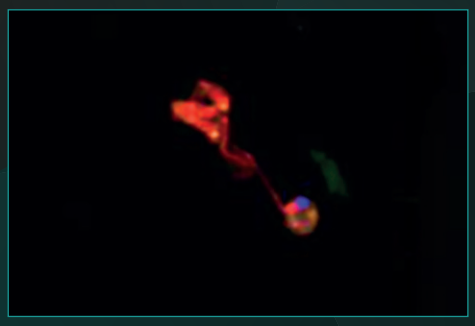
SEM images from in-vitro testing at MicroVention.
*Pipeline™ Flex Embolization Device with Shield Technology™ is a product of Medtronic

FRED X Maintains Natural Vessel Healing

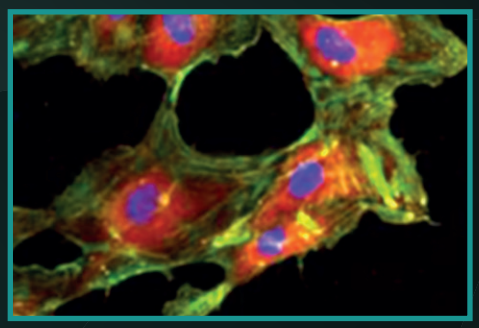
In-vitro cell culture testing demonstrated that X Technology maintained comparable endothelial cell growth to that of a bare device, while other polymers showed little signs of cell growth[1,4].



Bare Device



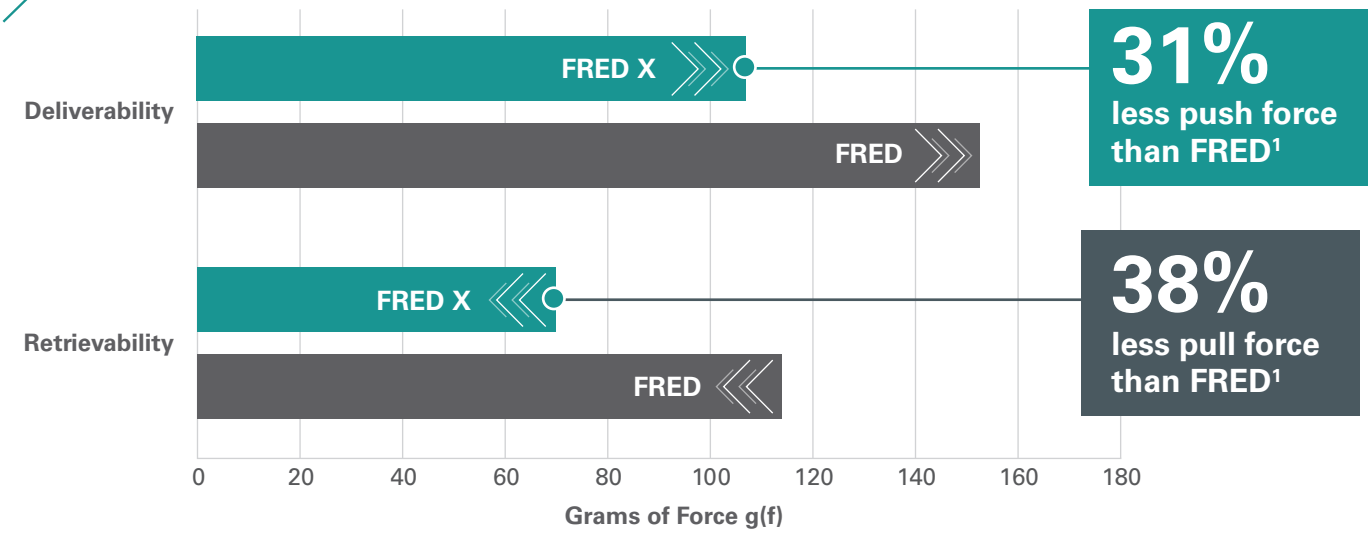
Phosphorylcholine



X Technology

Cell culture images from in-vitro testing at MicroVention.

FRED X Provides Easier Tracking



Results of in-vitro trackability testing performed at MicroVention.

The FRED X portfolio features a wide range of sizes with the only 5.5 mm diameter devices available in the U.S. and the only FDA approved 0.021" delivery system.

PRODUCT CODE	DEVICE SIZE (mm) Diameter x Total/ Working Length	
21 SYSTEM		
FREDX2513	2.5 x 13 / 8	2.5 mm
FREDX2518	2.5 x 18 / 13	
FREDX2525	2.5 x 25 / 20	
FREDX2530	2.5 x 30 / 26	
FREDX3013	3.0 x 13 / 9	3.0 mm
FREDX3019	3.0 x 19 / 14	
FREDX3027	3.0 x 27 / 21	
FREDX3032	3.0 x 32 / 27	

PRODUCT CODE	DEVICE SIZE (mm) Diameter x Total/ Working Length	
27 SYSTEM		
FREDX3513	3.5 x 13 / 7	3.5 mm
FREDX3517	3.5 x 17 / 11	
FREDX3522	3.5 x 22 / 16	
FREDX3531	3.5 x 31 / 24	
FREDX3540	3.5 x 40 / 36	
FREDX4013	4.0 x 13 / 7	4.0 mm
FREDX4018	4.0 x 18 / 12	
FREDX4023	4.0 x 23 / 17	
FREDX4032	4.0 x 32 / 26	
FREDX4044	4.0 x 44 / 38	

PRODUCT CODE	DEVICE SIZE (mm) Diameter x Total/ Working Length	
27 SYSTEM		
FREDX4515	4.5 x 15 / 8	4.5 mm
FREDX4520	4.5 x 20 / 13	
FREDX4525	4.5 x 25 / 18	
FREDX4534	4.5 x 34 / 28	
FREDX4545	4.5 x 45 / 39	
FREDX5015	5.0 x 15 / 9	5.0 mm
FREDX5021	5.0 x 21 / 14	
FREDX5026	5.0 x 26 / 19	
FREDX5036	5.0 x 36 / 29	
FREDX5522	5.5 x 22 / 14	5.5 mm
FREDX5532	5.5 x 32 / 26	

For more information, contact your local MicroVention sales representative or visit **www.fred-x.com**

**Data is derived from in vivo and ex vitro testing and may not be representative of clinical performance.

1. Data on file at MicroVention.
2. Tanaka M et al. Design of biocompatible and biodegradable polymers based on intermediate water concept. Polymer Journal. 2015;47:114-121.
3. Tanaka M et al. Blood compatible aspects of poly(2-methoxyethylacrylate) (PMEA) – relationship between protein adsorption and platelet adhesion on PMEA surface. Biomaterials. 2000;21:1471-1481.
4. Sato, C., Aoki, M. & Tanaka, M. Blood-compatible poly(2-methoxyethyl acrylate) for the adhesion and proliferation of endothelialand smooth muscle cells. Colloids and Surfaces B: Biointerfaces145, 586–596 (2016).

FRED™ X System Product Indications, USA:
The Flow Re-Direction Endoluminal Device (FRED) System is indicated for use in the internal carotid artery from the petrous segment to the terminus for the endovascular treatment of adult patients (22 years of age or older) with wide-necked (neck width ≥ 4 mm or dome-to-neck ratio < 2) saccular or fusiform intracranial aneurysms arising from a parent vessel with a diameter ≥ 2.0 mm and ≤ 5.0 mm.

Contraindications:
Patients with known hypersensitivity to nickel-titanium
Patients in whom angiography demonstrated inappropriate anatomy that does not permit passage or deployment of the FRED X System
Patients in whom anticoagulant, antiplatelet therapy or thrombolytic drugs are contraindicated

For complete indications, contraindications, potential complications, warnings, precautions, and instructions, see instructions for use (IFU provided in the device).

For Professional Use Only
RX Only: Federal (FDA) law restricts this device to sale by or on the order of a physician.

MicroVention™ TERUMO

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