



FRONTIER™ 5816&5816R

Multi-Pro Centrifuges



Powerful and Versatile High-throughput Centrifuges for Virtually Any Lab Application

Frontier 5816 and 5816R are designed for multipurpose use in various applications within research, industrial, and clinical laboratories. They can be combined with our range of rotors and accessories for customized use. The FC5816 and FC5816R are able to spin containers from 0.2 ml to 4 × 290 ml with swing-out and fixed angle rotors. They feature high-speed performance at maximum volume, automatic rotor identification, and multiple safety features. They can process large quantities and different sizes of blood collection tubes, conical cell culture tubes, plates, and various volumes and types of bottles.

Features:

- Thanks to its powerful motor, the FC5816 and FC5816R deliver precise separation results achieving values up to 16000 rpm and 21379/24326 G-force. This can be configured to fit workflow needs using a selection of rotors and accessories.
- The intuitive design of the centrifuges & accessories enable easy access to parameter settings, with the flexibility to change parameters during operation without the need to stop the machine. Features include automatic rotor recognition and backlit LCD.
- The performance of these centrifuges is propelled by German engineering, and high-quality components for reliable use. Rotor chamber constructed of chemical-resistant stainless steel to ensure durability in lab use.

FRONTIER™ 5816&5816R Multi-Pro Centrifuges

Maximum Application Flexibility

FC5816 and FC5816R centrifuges are designed for maximum application flexibility efficiently accommodate a wide variety of tubes and bottles, including microtubes, blood tubes, round bottom tubes, conical tubes, and microliter plates, ensuring versatile and reliable performance for diverse laboratory needs.

- Compatible with up to 12 optional rotors and 61 accessories
- Capacity of up to 6 x 250 ml with the ability to spin up to 56 blood tubes or 40 x 15 ml conical tubes and 16 x 50 ml conical tubes
- High-speed centrifugation (10000 rpm) from 0.2 ml up to 85 ml tubes
- FC5816R has refrigeration capabilities from 40 °C to -20 °C
 - R290, an environmentally friendly coolant, contributes to the eco-friendliness of refrigerated centrifuges by minimizing their environmental impact and supporting efforts to combat global warming
 - Pre-cool feature quickly lowers the temperature of rotor and chamber before a run

Intuitively Designed for Simple Operation

FC5816 and FC5816R were designed to make lab processes more efficient and easier, and includes many user-friendly features & software that allow for intuitive operation.

- Automatic rotor recognition (RFID) makes switching between applications extremely easy
- Simple one-hand operation enabled by the selection button/rotary knob combination – even when wearing gloves
- Large backlit LCD display shows centrifugation settings and real-time parameters on one interface
- Program storage up to 99 runs including parameter settings and rotor types

Solid Engineering Ensures Reliability

Manufactured with high-quality components for reliable use and German engineered for high performance.

- Maintenance-free induction motor provides maximum G-force of 21379 for FC5816 and 24326 for FC5816R
- Optimized airflow system to keep samples cool (FC5816)
- Chemical and corrosion-resistant stainless steel rotor chamber ensures durability in lab environments
- Self-diagnostic program to record usage and error history for easy maintenance and to minimize downtime

Safety Features for Increased Security

FC5816 and FC5816R centrifuges are equipped with protective features for redundancy in safety and reliable operation.

- Over-speed protection, immediately upon rotor insertion
- Active imbalance-detection with individual imbalance tolerances set for each rotor
- Motorized lid-locking system to protect operators from accidental injuries
- Sealed and TÜV certified rotors to safeguard operators from harmful aerosols



FRONTIER™

5816&5816R

Multi-Pro Centrifuges

Specifications

Model		FC5816		FC5816R	
Order No.		230: 83041563	120V: 83041564	230V: 83041565	120V: 83041566
Speed Range		200 rpm – 15000 rpm; 10 rpm / increments Angle Rotor: 15000 rpm Swing out Rotor: 4500 rpm		200 rpm – 16000 rpm; 10 rpm / increments Angle Rotor: 16000 rpm Swing out Rotor: 4500 rpm	
Maximum RCF		21379 x g; 10 x g / increments Angle Rotor: 21379 x g Swing out Rotor: 3780 x g		24325 x g; 10 x g / increments Angle Rotor: 24325 x g Swing out Rotor: 3780 x g	
Maximum Capacity (Rotor)		the same values for FC 5816 and FC5816R - please merge cells		Angle Rotor: 6 x 250 ml Swing out: 4 x 290 ml	
Temperature Range		Air cooled		-20 °C to 40 °C, 1 °C / increments	
Refrigerant		N/A		R290 (Propane)	
Running Time		Quick Spin, 10 sec to 99 hr 59 min, or continuous			
Noise Level (depending on the rotor)		≤ 61 + 2 dB(A)		≤ 63 + 2 dB(A)	
Acc/Dec Levels		10/10			
Allowable Density at Maximum Speed		1.2 g/ml			
Allowable Kinetic Energy		34363 Nm		34363 Nm	
AC Power		230 V/50-60 Hz	120 V/50-60 Hz	230 V/50-60 Hz	120 V/50-60 Hz
Voltage Fluctuation		± 10%			
Current Consumption		2.4 A	4.2 A	3.7 A	7.8 A
Power Consumption		530 W	520 W	785 W	850 W
Dimensions (W x D x H)		438 x 537 x 354 mm		721 x 537 x 354 mm	
Net Weight (without rotor)		52 kg		77 kg	
Shipping Dimensions (W x D x H)		590 x 700 x 410 mm		820 x 650 x 460 mm	
Shipping Weight (without rotor)		77 kg		87 kg	
Ambient conditions (EN/IEC 61010-1)	Environment	For indoor use only			
	Altitude	Use up to an altitude of 2000 m			
	Ambient temperature	5 °C up to 35 °C			
	Max. relative humidity	Max. relative humidity 80 % for temperatures up to 31 °C, Decreasing linearly to 50 % relative humidity up to 35 °C.			
EMC		EN/IEC 61326-1 Class B emissions, Basic immunity FCC Class B emissions			
Not suitable for use in hazardous environments.					

Tube Type	Tubes Type	Tube diamentions	Number of tubes per centrifuge
	Microtubes	0.2 – 2.0 ml (Ø 6 – 11 × 38 mm)	44
	Blood Collection Tubes	1.8 – 5 ml (Ø 13 × 75 mm)	56
		4 – 7 ml (Ø 13 × 100 mm)	56
		6 – 10 ml (Ø 16 × 100 mm)	48
		15 ml (Ø 17 × 120 mm)	40
	Conical Tubes	50 ml (Ø 29 × 116 mm)	16
		175 ml (Ø 61 × 118 mm)	6
		225 ml (Ø 61 × 137 mm)	6

Tube Type	Tubes Type	Tube diamentions	Number of tubes per centrifuge
	Vials & Bottles	15 ml Round Bottom (Ø 17 × 120 mm)	30
		50 ml Round Bottom (Ø 29 × 116 mm)	12
		100 ml Round Bottom (Ø 44 × 100 mm)	4
		145 ml Flat Bottom (Ø 50 × 100 mm)	4
		250 ml Flat Bottom (Ø 62 × 122 mm)	6
		290 ml Flat Bottom (Ø 62 × 137 mm)	6

FRONTIER™ 5816&5816R Multi-Pro Centrifuges

Accessories

	Order No.	30314820			
	Description	Rotor Swing out 4 × 290 ml ID			
	Compatible with	FC5816		FC5816R	
	Max. Speed	4500 rpm		4500 rpm	
	Max. RCF	3780 x g		3780 x g	
Accessories					
Order No.	Description	Vol./Tube	Diameter	Tube Type	No.of Tubes/Rotor
Round Bucket (can not be used with other accessories)					
83041037	Bucket 1 × 290 ml D62 mm FB, 2 pk	290 ml	62 mm	Flat Bottom	4
Accessories (used without bucket)					
30314901	Screw cap Rack of 250 ml Rotor, 2 pk	-	-	-	-
30314902	O-Ring for rotor 30314820, 10 pk	-	-	-	-
30314903	Rack 1 × 250 ml D62 mm FB, 2 pk	250 ml	62 mm	Flat Bottom	4
30314904	Rack 1 × 100 ml D41 mm RB, 2 pk	100 ml	41 mm	Round Bottom	4
30314907	Rack 1 × 50 ml D34 mm RB, 2 pk V2	50 ml	34 mm	Round Bottom	4
30314905	Rack 3 × 50 ml D29 mm RB, 2 pk	50 ml	29 mm	Round Bottom	12
30314906	Rack 3 × 50 ml D29 mm FA, 2 pk	50 ml	29 mm	Conical Bottom	12
30314908	Rack 2 × 50 ml D29 mm Rim, 2 pk	50 ml	29 mm	Skirted Conical Bottom	8
30314909	Rack 1 × 50 ml D29 mm Rim, 2 pk V2	50 ml	29 mm	Skirted Conical Bottom	4
30314910	Rack 5 × 25 ml D24.5 mm RB, 2 pk	25 ml	24.5 mm	Round Bottom	20
30314911	Rack 3 × 25 ml D24.5 mm Rim, 2 pk	25 ml	24.5 mm	Skirted Conical Bottom	12
83041032▲	Adapter 1 × 25 ml D29 mm FA, 2 pk	25 ml	29 mm	Conical Bottom	4
30314912	Rack 9 × 15 ml D17 mm RB, 2 pk	15 ml	17 mm	Round Bottom	36
30314913	Rack 7 × 15 ml D17 mm FA, 2 pk	15 ml	17 mm	Conical Bottom	28
30314914	Rack 7 × 15 ml D17 mm Rim, 2 pk	15 ml	17 mm	Skirted Conical Bottom	28
30314915	Rack 8 × 10 ml D16 mm RB, 2 pk	10 ml	16 mm	Round Bottom	32
30304367	Rack 8 × 4-10 ml D16 mm Vac/Sar, 2 pk	4-10 ml	16 mm	Vacutainer®/ Sarstedt	32
83041590*	Rack 9 × 8 ml D16 mm Vac, 2 pk	8 ml	16 mm	Vacutainer®	36
30314916	Rack 14 × 5-7 ml D13 mm RB, 2 pk	5-7 ml	13 mm	Round Bottom	56
30314917	Rack 10 × 1,6-7 ml D13 mm Vac/Sar, 2 pk	1.6-7 ml	13 mm	Vacutainer®/ Sarstedt	40
30304368**	Adapter 9 × 1.5/2.0 ml D11 mm, 2 pk	1.5/2.0 ml	11 mm	Microtube	36

▲ Only possible with Rack 30314906

*Only possible without screw cap

**Only possible with Rack 30314903

Cell Culture Package

Order No.	Description		
83041627	Package Cell Culture for Rotor 30314820		
Products Included in the Package			
Order No.	Description	Qty	Number of Tubes
30314820	Rotor Swing out 4x290ml ID	1	-
30314901	Screw Cap Rack of 250ml Rotor, 2 pk	2	-
30314906	Rack 3x50ml D29mm FA, 2 pk	2	12
30314913	Rack 7x15ml D17mm FA, 2 pk	2	28

FRONTIER™ 5816&5816R Multi-Pro Centrifuges

	Order No.	30314821	
	Description	Rotor Angle 6 × 250 ml FB ID	
	Compatible with	FC5816	FC5816R
	Max. Speed	8000 rpm	8000 rpm
	Max. RCF	10016 x g	10016 x g

Accessories

Order No.	Description	Vol./Tube	Diameter	Tube Type	No.of Tubes/Rotor
Without Adapter	Rotor Angle 6 × 250 ml FB ID	250 ml	62 mm	Flat Bottom	6
30559414	Adapter 1 × 175/225 ml D61 mm FA, 2 pk	175/225 ml	61 mm	Conical Bottom	6
30304373	Adapter 1 × 50 ml D29 mm RB, 2 pk	50 ml	29 mm	Round Bottom	6
30304374	Adapter 1 × 50 ml D30 mm FA, 2 pk	50 ml	30 mm	Conical Bottom	6
30304372	Adapter 2 × 30 ml D26 mm RB, 2 pk	30 ml	26 mm	Round Bottom	12
83041032▲	Adapter 1 × 25 ml D29 mm FA, 2 pk	25 ml	29 mm	Conical Bottom	6
30304371	Adapter 4 × 15 ml D17 mm FA, 2 pk	15 ml	17 mm	Conical Bottom	24
30304370	Adapter 5 × 10 ml D16 mm RB, 2 pk	10 ml	16 mm	Round Bottom	30
30304369	Adapter 8 × 1.5/2.0 ml D11 mm, 2 pk	1.5/2.0 ml	11 mm	Microtube	48
30559412	Adapter 15 × 1.5/2.0 ml D11 mm MTB, 2 pk	1.5/2.0 ml	11 mm	Microtube	90

▲Only possible with Adapter 30304374

	Order No.	30314828	
	Description	Rotor Swing out 4 × 250 ml ID	
	Compatible with	FC5816	FC5816R
	Max. Speed	4500 rpm	4500 rpm
	Max. RCF	3735 x g	3735 x g

Accessories

Order No.	Description	Vol./Tube	Diameter	Tube Type	No.of Tubes/Rotor
83041039	Rack 1 × 250 ml D62 mm FB, 2 pk	250 ml	62 mm	Flat Bottom	4
30304375	Rack 4 × 50 ml D29 mm FA, 2 pk	50 ml	29 mm	Conical Bottom	16
83041032▲	Adapter 1 × 25 ml D29 mm FA, 2 pk	25 ml	29 mm	Conical Bottom	6
30314583	Rack 10 × 15 ml D17 mm FA, 2 pk	15 ml	17 mm	Conical Bottom	40
30314585	Rack 12 × 4-10 ml D16 mm Vac/Sar, 2 pk	4-10 ml	16 mm	Vacutainer®/Sarstedt	48
83041592	Rack 6 × 8 ml D16 mm Vac, 2 pk	8 ml	16 mm	Vacutainer®	24
30314584	Rack 14 × 5-7 ml D13 mm Vac/Sar, 2 pk	5-7 ml	13 mm	Vacutainer®/Sarstedt	56
83041038	Rack 18 × 1.1-5 ml D11 mm Sar, 2 pk	1.1-5 ml	11 mm	Sarstedt	72

▲Only possible with Adapter 30304375

FRONTIER™ 5816&5816R Multi-Pro Centrifuges

	Order No.	30314826			
	Description	Rotor Angle 6 × 85 ml RB ID			
	Compatible with	FC5816		FC5816R	
	Max. Speed	11000 rpm		13000 rpm	
	Max. RCF	15555 x g		21726 x g	
Accessories					
Order No.	Description	Vol./Tube	Diameter	Tube Type	No.of Tubes/Rotor
Without Adapter	Rotor Angle 6 × 85 ml RB ID	85 ml	38 mm	Round Bottom	6
30314895	Adapter 1 × 50 ml D29 mm RB, 2 pk V1	50 ml	29 mm	Round Bottom	6
30314896	Adapter 1 × 50 ml D29 mm FA, 2 pk	50 ml	29 mm	Conical Bottom	6
30314894	Adapter 1 × 30 ml D25 mm RB, 2 pk	30 ml	25 mm	Round Bottom	6
83041032▲	Adapter 1 × 25 ml D29 mm FA, 2 pk	25 ml	29 mm	Conical Bottom	6
30314899	Adapter 1 × 16 ml D18 mm RB, 2 pk	16 ml	18 mm	Round Bottom	6
30314897	Adapter 1 × 15 ml D17 mm FA, 2 pk	15 ml	17 mm	Conical Bottom	6
30314898	Adapter 2 × 15 ml D17 mm RB, 2 pk	15 ml	17 mm	Round Bottom	12
30314893	Adapter 1 × 15 ml D17 mm RB, 2 pk	15 ml	17 mm	Round Bottom	6

▲Only possible with Adapter 30314896

	Order No.	30314829			
	Description	Rotor Angle 10 × 50 ml FA ID			
	Compatible with	FC5816		FC5816R	
	Max. Speed	9000 rpm		10500 rpm	
	Max. RCF	11771 x g		16022 x g	
Accessories					
Order No.	Description	Vol./Tube	Diameter	Tube Type	No.of Tubes/Rotor
Without Adapter	Rotor Angle 10 × 50 ml FA ID	50 ml	29 mm	Conical Bottom	10
83041032	Adapter 1 × 25 ml D29 mm FA, 2 pk	25 ml	29 mm	Conical Bottom	10
30472300	Adapter 1 × 15 ml D17 mm RB, 2 pk V1	15 ml	17 mm	Round Bottom	10
30472307	Adapter 1 × 15 ml D17 mm FA, 2 pk V1	15 ml	17 mm	Conical Bottom	10
30130889▲	Adapter 1 × 7 ml D13 mm RB/Vac/Sar, 2 pk	7 ml	13 mm	Round Bottom/Vacutainer®/Sarstedt	10
30130890▲	Adapter 1 × 5 ml D13 mm RB/Vac/Sar, 2 pk	5 ml	13 mm	Round Bottom/Vacutainer®/Sarstedt	10
30130886▲	Adapter 1 × 1.5/2.0 ml D11 mm, 6 pk	1.5/2.0 ml	11 mm	Microtube	10

▲Only possible with Adapter 30472300

	Order No.	30314832			
	Description	Rotor Angle 30 × 15 ml RB/FA ID			
	Compatible with	FC5816		FC5816R	
	Max. Speed	4500 rpm		4500 rpm	
	Max. RCF	2830/2467 x g		2830/2467 x g	
Accessories					
Order No.	Description	Vol./Tube	Diameter	Tube Type	No.of Tubes/Rotor
Without Adapter	Rotor Angle 30 × 15 ml RB/FA ID	15 ml	17 mm	Round Bottom/Conical Bottom	30
30130889	Adapter 1 × 7 ml D13 mm RB/Vac/Sar, 2 pk	7 ml	13 mm	Round Bottom/Vacutainer®/Sarstedt	30
30130890	Adapter 1 × 5 ml D13 mm RB/Vac/Sar, 2 pk	5 ml	13 mm	Round Bottom/Vacutainer®/Sarstedt	30
30130886	Adapter 1 × 1.5/2.0 ml D11 mm, 6 pk	1.5/2.0 ml	11 mm	Microtube	30

FRONTIER™ 5816&5816R Multi-Pro Centrifuges

	Order No.	30314824			
	Description	Rotor Swing out 2 x 3 MTP w/bucket ID			
	Compatible with	FC5816		FC5816R	
	Max. Speed	4500 rpm		4500 rpm	
	Max. RCF	2716 x g		2716 x g	
Accessories					
Order No.	Description	Vol./Tube	Diameter	Tube Type	No.of Tubes/Rotor
MTP Bucket and accessories					
Without Adapter	Rotor Swing out 2 x 3 MTP w/bucket ID	-	-	-	-
30314890	Bucket 3 x MTP, 2 pk	-	-	MTP	6
30314891	Adapter 48 x 1.5/2.0 ml D11 mm, 2 pk	1.5/2.0 ml	11 mm	Microtube	96

	Order No.	30314827			
	Description	Rotor Angle 4 × 85 ml RB ID Hi			
	Compatible with	FC5816		FC5816R	
	Max. Speed	12000 rpm		12000 rpm	
	Max. RCF	14809 x g		14809 x g	
Accessories					
Order No.	Description	Vol./Tube	Diameter	Tube Type	No.of Tubes/Rotor
Without Adapter	Rotor Angle 4 × 85 ml RB ID Hi	85 ml	38 mm	Round Bottom	4
30314895	Adapter 1 × 50 ml D29 mm RB, 2 pk V1	50 ml	29 mm	Round Bottom	4
30314896*	Adapter 1 × 50 ml D29 mm FA, 2 pk	50 ml	29 mm	Conical Bottom	4
30314894	Adapter 1 × 30 ml D25 mm RB, 2 pk	30 ml	25 mm	Round Bottom	4
30314899	Adapter 1 × 16 ml D18 mm RB, 2 pk	16 ml	18 mm	Round Bottom	4
30314897*	Adapter 1 × 15 ml D17 mm FA, 2 pk	15 ml	17 mm	Conical Bottom	4
30314898	Adapter 2 × 15 ml D17 mm RB, 2 pk	15 ml	17 mm	Round Bottom	8
30314893	Adapter 1 × 15 ml D17 mm RB, 2 pk	15 ml	17 mm	Round Bottom	4

*Only without rotor lid

	Order No.	30314831			
	Description	Rotor Angle 6 × 50 ml RB ID Hi			
	Compatible with	FC5816		FC5816R	
	Max. Speed	13000 rpm		13000 rpm	
	Max. RCF	15869 x g		15869 x g	
Accessories					
Order No.	Description	Vol./Tube	Diameter	Tube Type	No.of Tubes/Rotor
Without Adapter	Rotor Angle 6 × 50 ml RB ID Hi	50 ml	29 mm	Round Bottom	6
30130891	Adapter 1 × 30 ml D26 mm, 2 pk	30 ml	26 mm	Round Bottom	6
30130892	Adapter 1 × 16 ml D18 mm, 2 pk	16 ml	18 mm	Round Bottom	6
30314892	Adapter 1 × 15 ml D17.5mm FA, 2 pk	15 ml	17.5 mm	Conical Bottom	6
30130893	Adapter 1 × 15 ml D17 mm, 2 pk	15 ml	17 mm	Round Bottom	6

FRONTIER™ 5816&5816R Multi-Pro Centrifuges

	Order No.	30314833			
	Description	Rotor Angle 20 × 10 ml RB ID Hi			
	Compatible with	FC5816		FC5816R	
	Max. Speed	12000 rpm		12000 rpm	
	Max. RCF	15775 x g		15775 x g	

Accessories

Order No.	Description	Vol./Tube	Diameter	Tube Type	No.of Tubes/Rotor
Without Adapter	Rotor Angle 20 × 10 ml RB ID Hi	10 ml	16 mm	Round Bottom	20

	Order No.	30372718			
	Description	RRotor Angle 44 × 1.5/2.0 ml ID V1			
	Compatible with	FC5816		FC5816R	
	Max. Speed	15000 rpm		16000 rpm	
	Max. RCF	21127/21379 x g		24038/24325 x g	

Accessories

Order No.	Description	Vol./Tube	Diameter	Tube Type	No.of Tubes/Rotor
Without Adapter	Rotor Angle 44 × 1.5/2.0 ml ID V1	1.5/2.0 ml	11 mm	Microtube	44
30130885	Adapter 1 × 0.5 ml D8 mm, 6 pk	0.5 ml	8 mm	Microtube	44
30130884	Adapter 1 × 0.2/0.4 ml D6 mm, 6 pk	0.2/0.4 ml	6 mm	Microtube	44

	Order No.	83041238			
	Description	Rotor Angle 24 × 1.5/2.0 ml ID BIOSEALS V1			
	Compatible with	FC5816		FC5816R	
	Max. Speed	15000 rpm		16000 rpm	
	Max. RCF	21379 x g		24325 x g	

Accessories

Order No.	Description	Vol./Tube	Diameter	Tube Type	No.of Tubes/Rotor
Without Adapter	Rotor Angle 24 × 1.5/2.0 ml ID BIOSEALS V1	1.5/2.0 ml	11 mm	Microtube	30
30130885	Adapter 1 × 0.5 ml D8 mm, 6 pk	0.5 ml	8 mm	Microtube	30
30130884	Adapter 1 × 0.2/0.4 ml D6 mm, 6 pk	0.2/0.4 ml	6 mm	Microtube	30

Shortcut list:

ID – auto rotor identification
FA – Conical bottom / Falcon®

Hi – version with higher speed
FB – Flat bottom

Vac – Vacutainer®
RB – Round bottom

Sar – Sarstedt
Rim – Skirted conical bottom

FRONTIER™ 5816&5816R *Multi-Pro Centrifuges*

Other Standard Features and Equipment

Microprocessor control, Imbalance switch-off, Audible signal at the end of each run with melody options, Emergency release, 99 memory sets, Ten acceleration and ten deceleration rates, Pre-selection of running time from 10 sec to 99 hr 59 min or continuous, Quick spin for short runs.

Compliance

See Declaration of Conformity available CE Declarations | OHAUS

*Intended Use

This centrifuge and its accessories are an in vitro diagnostic medical device within the meaning of the In Vitro Diagnostic Medical Devices Regulation (EU) 2017/746. This centrifuge is intended for the separation of mixtures of substances of different densities, in particular for the preparation and processing of samples from the human body in the context of an in vitro diagnostic application, in order to enable the intended use of the in vitro diagnostic medical device.

These centrifuges are intended exclusively for use in closed rooms under supervision and for operation by trained specialist personnel.

Only the rotors and cups and other accessories specified in the instructions for use may be used. Any other use or use beyond this is considered improper use. We are not liable for any resulting damage. The contents of the operating instructions must be observed.

Contraindication

This centrifuge and its accessories are intended exclusively for the above-mentioned purpose and must not be used to determine any measured values. After centrifugation, no components of human origin may be implanted or administered back into the body.