Your Complete Solution for Protein Purification

Avanti JXN Series High Performance Centrifuges

Purification is required to understand protein structure and function, and to develop effective therapeutics. Proteins can be isolated from tissue or, more often, by their overexpression in an organism like bacteria, yeast, or mammalian cells. Characteristics unique to each protein such as amino acid composition, size, shape, isoelectric point, and solubility are used to develop unique strategies for isolation of the protein of interest.

Centrifugation is a critical component of nearly all protein purification workflows. The ideal balance of capacity and *g*-force makes the Avanti JXN series centrifuges highly versatile workhorses for protein purification laboratories. Diverse and innovative rotor and labware portfolios facilitate execution of critical protein purification steps in a single instrument including:

- Cell pelleting
- Lysate clarification
- Precipitation
- Organelle isolation
- Concentration
- Buffer exchange

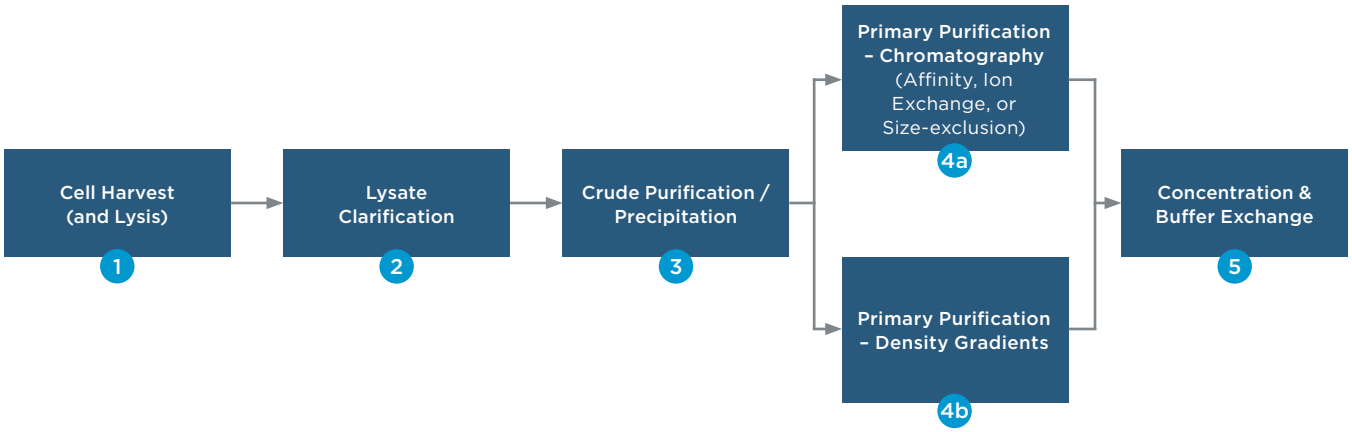
	Avanti JXN-26	Avanti JXN-30
		
Max RCF (x *g*)	81,770	108,860
Max RPM	26,000	30,000
Max Capacity (L)	6.0	4.0
Set Temperature Range (°C)	-10 to 40	-20 to 40

Capacity ⟷ ***g*-force**

BRILLIANCE *at every turn.*

LABRepCo | BECKMAN COULTER *Life Sciences*

Typical protein purification workflow



1. Cell Harvest

The first step of protein purification involves pelleting the culture from which the protein of interest is to be separated, for example bacterial, insect, or mammalian cells, tissues, etc.. Cell harvest generally requires low speed but high-volume rotors. The Avanti JXN Series has fixed-angle JLA-8.1000, JLA-9.1000, and JLA-12.500 rotors for volumes up to 6 liters. The JCF-Z continuous flow rotor can be used for even higher volumes of pelleting required in bioprocessing setup.

JLA-8.1000* (363688)	JLA-9.1000 (366754)	JLA-12.500 (C55767)	JCF-Z Large Core (357521)
			
6 x 1000 mL	4 x 1000 mL	6 x 500 mL	1,250 mL
15,970 x *g*	16,780 x *g*	26,890 x *g*	39,870 x *g*
2,482 k-Factor	*2,540 k-Factor*	*2,363 k-Factor*	

2. Lysate Clarification

After the cells have been pelleted and lysed, the second important step in protein purification is efficient separation of protein from non-protein contaminants and cellular debris. High speeds and medium-volume rotors are used for this step. Various rotors including the JLA-12.500, JLA-16.250, JA-17, and JA-18 can all spin faster than 25,000 x *g* and are suitable for this step. The smaller your target protein/protein complex is, the faster you can spin during lysate clarification without worrying about your protein pelleting with the subcellular debris.

JLA-12.500 (C55767)	JLA-16.250 (363934)	JA-17 (369691)	JA-18 (369679)
			
6 x 500 mL	6 x 250 mL	14 x 50 mL	10 x 100 mL
26,890 x *g*	38,400 x *g*	39,800 x *g*	47,900 x *g*
2,363 k-Factor	*1,090 k-Factor*	*690 k-Factor*	*566 k-Factor*

3. Crude Purification/Precipitation

Precipitation using reagents like ammonium sulfate and polyethylene glycol can help to recover the target protein from a bulk extract. The separation of these precipitates requires medium speeds and medium-volume rotors. Rotors such as the JLA-12.500, JLA-16.250, and JA-18 provide the right combination of speed and capacity for pelleting protein precipitates.

JLA-12.500 (C55767)	JLA-16.250 (363934)	JA-18 (369679)
		
6 x 500 mL	6 x 250 mL	10 x 100 mL
26,890 x *g*	38,420 x *g*	47,900 x *g*
2,363 k-Factor	*1,090 k-Factor*	*566 k-Factor*

4a. Primary Purification - Chromatography

Primary purification of target protein is usually based on various chromatographic principles including affinity, ion exchange, hydrophobic interaction, and size exclusion. High-throughput 96-well kits are perfect for screening chromatographic conditions and micro and minicentrifuge spin columns can rapidly purify small quantities of recombinant proteins. The JA-20.1, JA-18.1, and JS-5.3 rotors are excellent for low-volume and/or high-throughput applications.

JA-20.1 (342095)	JA-18.1 (347824)	JS-5.3 (368690)*
		
32 x 15 mL	24 x 1.8 mL	24 microplates, 8 deep-well plates, or 4 square-well plates
51,500 x *g* / *371 k-Factor* (Outer Row) 43,900 x *g* / *465 k-Factor* (Inner Row)	42,100 x *g* / *156 k-Factor*	6,870 x *g* / *7,730 k-Factor*

4b. Primary Purification – Density Gradients

High resolution density gradients are used for subcellular fractionation when the target protein is found in a specific organelle such as the mitochondria or nucleus. Although density gradients are usually associated with ultracentrifugation, similar experiments are possible in the Avanti JXN-30. The JS-24.15 and JS-24.38 rotors can be used for both rate zonal, as well as isopycnic density gradients, while the JA-30.50 Ti is a fixed angle solution for density gradient separations.

JS-24.15 (362396)	JS-24.38 (360743)	JA-30.50 Ti (363420)
		
6 x 15 mL	6 x 38.5 mL	8 x 50 mL
110,510 x *g*	103,860 x *g*	108,860 x *g*
376 k-Factor	*334 k-Factor*	*280 k-Factor*

5. Concentration & Buffer Exchange

For any biochemical or biophysical application, the right buffer and concentration of purified protein are a must. There are various filter-based spin columns available which are used for buffer exchange as well as protein concentration. The JS-4.3 and JS-5.3 have multiple adapters available for these columns that allow processing of samples ranging from 50 µL to 60 mL.

JS-4.3 (362734)*	JS-5.3 (368690)*
	
104 x 1.5 mL tubes, 56 x 15 mL conical tubes, 16 x 50 mL conical tubes or 4 x 250 mL bottles	24 microplates, 8 deep-well plates, 4 square-well plates or 72 x 15 mL conical tubes, 28 x 50 mL conical tubes and 4 x 250 mL bottles
4,220 x *g*	6,870 x *g*
11,800 k-Factor	*7,730 k-Factor*

*Can only be used in the JXN-26

For Beckman Coulter's worldwide office locations and phone numbers, please visit Contact Us at beckman.com

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