

AAVidity™ Loose Resin

1. Product Description

AAVidity™ is a novel affinity resin designed to transform the purification of Adeno-Associated Viral vectors (AAVs) for gene therapy. The AAVidity™ peptide ligand selectively targets AAVs of all clinically-relevant serotypes (1 – 9 and rh.10) and isolates them from HEK293 and Sf9 cell lysates, returning high product yield, purity, and transduction activity.

Key features of the AAVidity™ include:

- High serotype-agnostic binding capacity ($> 5 \cdot 10^{13}$ vp/mL at 3 min residence time)
- Mild elution conditions
- > 250 -fold reduction of host cell proteins
- Elution of “full” AAVs upon linear gradient elution with $MgCl_2$
- Minimum resin lifetime > 20 cycles

Parameter	Values
Matrix	Polymethyl methacrylate beads (65 μ m)
Ligand	AAVidity™ peptide
Binding capacity	$> 5 \cdot 10^{13}$ vp per mL of resin
Mechanical stability	Up to 10 MPa
Storage conditions	20% v/v ethanol (aq), store at 2–8°C.

Tangential flow filtration (TFF) conditions for all AAV serotypes, but AAV9

Conduct tangential flow filtration (TFF) of the clarified lysate against 5 Diavolumes of:

10 mM Bis-Tris buffer, 20 mM NaCl, 0.01% v/v Pluronic F68, pH 7.0	AAV serotypes 2, 3, 6, 9, and rh.10
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50 mM Acetate buffer, 2 mM $MgCl_2$, 0.01% v/v Pluronic F68, pH 5.0 (Acetate Buffer: mix <i>either</i> 2.762 g of sodium acetate anhydrous <i>or</i> 4.581 g of sodium acetate trihydrate <i>with</i> 980.7 mg of glacial acetic acid <i>and</i> add DI water to a final volume of 1 L)	AAV serotypes 1, 5, 7, and 8
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Recommended cell lysis condition for AAV9

Lysis Buffer: 10% w/v sodium deoxycholate and 50 mM Tris buffer at pH 8.0 in DI water

Step 1: Adjust cell culture harvest pH to 8.0 using 1 M Tris buffer pH 10.0

Step 2: Add DNase (typically 20-90 U of benzonase per mL of cell culture and 2 mM $MgCl_2$)

Step 3: Mix the Lysis Buffer with the HEK293 cell culture harvest at a 1:20 volume ratio

Step 4: Incubate for 2 hours under gentle stirring at 37°C

Step 5: Remove the precipitate via centrifugation (4000g for 30 min) or depth filtration

Step 6: Conduct tangential flow filtration (TFF) of the clarified lysate against 5 Diavolumes of 10 mM Bis-Tris buffer, 20 mM NaCl, 0.01% v/v Pluronic F68, pH 7.0

Binding (residence time: 3 min) and washing	
AAV serotypes 2, 3, 6, 9, and rh.10	10 mM Bis-Tris buffer, 20 mM NaCl, 0.01% v/v Pluronic F68, pH 7.0
AAV serotypes 1, 5, 7, and 8	50 mM Acetate buffer, 2 mM MgCl ₂ , 0.01% v/v Pluronic F68, pH 5.0 (Acetate Buffer: mix <i>either</i> 2.762 g of sodium acetate anhydrous <i>or</i> 4.581 g of sodium acetate trihydrate <i>with</i> 980.7 mg of glacial acetic acid <i>and</i> add DI water to a final volume of 1 L)
Elution (residence time: 1 min)	
AAV serotypes 2, 3, 6, 9, and rh.10	Elution 1 [§] (10 CVs): 10 mM Bis-Tris, 0.4 M MgCl ₂ , 0.01% v/v Pluronic F68, pH 6.0 Elution 2 (10 CVs): 10 mM Bis-Tris, 1 M MgCl ₂ , 0.01% v/v Pluronic F68, pH 6.0
AAV serotypes 1, 5, 7, and 8	Elution 1 [§] (10 CVs): 10 mM Bis-Tris, 20 mM NaCl, 0.01% v/v Pluronic F68, pH 7.0 Elution 2 (10 CVs): 10 mM Bis-Tris, 0.4 M MgCl ₂ , 0.01% v/v Pluronic F68, pH 6.5
§ Conducting AAV elution in two steps promotes the enrichment of “full” capsids in the “Elution 1” step.	
Regeneration and Cleaning-in-Place (CIP)	
Step 1: 10 CVs of Binding Buffer Step 2: 15 CVs of 0.5 M NaOH (optional add 2 M NaCl) and incubation for 15 minutes Step 3: 10 CVs of Binding Buffer Step 4: 15 CVs 10 mM sodium phosphate with 150 mM NaCl and 0.01% Pluronic-F68 at pH 2.0 Step 5: 10 CVs of Binding Buffer	

2. General Recommendations

2.1. Resin preparation: prior to the first use with AAV, perform a blank run (load Binding Buffer) including washing, elution, and regeneration and CIP. Equilibrate the resin with 10 CVs of Equilibration Buffer at the residence time of 1 min (or until achieving constant pH and conductivity of the effluent).

2.2. Loading ratio: Measuring the binding capacity (DBC_{10%}) of the AAV product is highly recommended, since product design (*e.g.*, transgene length) and capsid concentration can cause variations in DBC_{10%}.

- Recommended Loading Ratio ~ 95% - 100% of DBC_{10%}
- Note: underloading the column leads to lower AAV recovery.

2.3. Residence time:

- Loading of cell lysate: 3 min in down-flow mode
- Elution: 1 min in up-flow mode
- Washing, Regeneration, and Cleaning-in-Place: 1 min