

DuloCore® Monolithic Resin

A Revolution of Biomacromolecular Purification

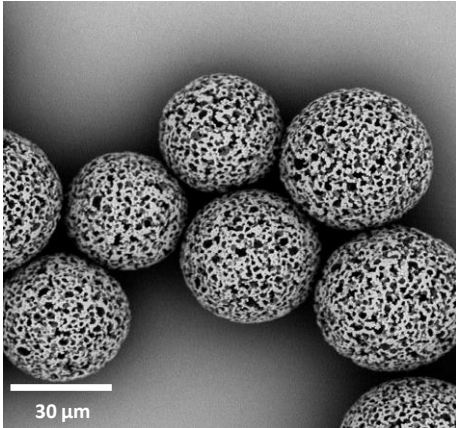


Fig. 1: The SEM image of DuloCore®.

DuloCore® is a crosslinked polymeric resin with a giga-porous structure which takes advantages of intra-resin convection instead of diffusion mass transport, particularly operated under high flow rates. In other words, DuloCore® behaves like monolithic chromatography but offers the scalable flexibility as a packed resin column. It provides low back pressure, high throughput, no clogging issue and can prevent target biomolecules from being destroyed during purification.

The unique structure of DuloCore® resin makes it your best choice for downstream purification of biomacromolecules, such as AAV (Adeno-associated virus), plasmid DNA, mRNA, Exosome, Lentivirus and other large bioparticles in biopharma.

Convective Mass Transport

The conventional resins exhibit the diffusive flow of the biomolecules inside the resin and the convective flow only in the voids. Thus, the binding capacity of the molecule is strongly influenced by the permeability of the molecule (i.e. molecule size) and the resin pore size. Small biomolecules can access the resin pores through diffusion and their binding capacities however decrease with the increase of the flow rate. On the other hand, large biomolecules cannot access the resin pore and only the voids. Thus, their binding capacities are typically very low.

In contrast, DuloCore® with giga-pores allows effortless flows of both large and small biomolecules which is similar to the monolithic column. Thus, the binding capacities of large biomolecules in DuloCore resin are much higher compared with the conventional diffusive resins, and are also less influenced by the flow rates. As a result, DuloCore resin is most preferable resins in high throughput downstream purification of large biomolecules or bioparticles.

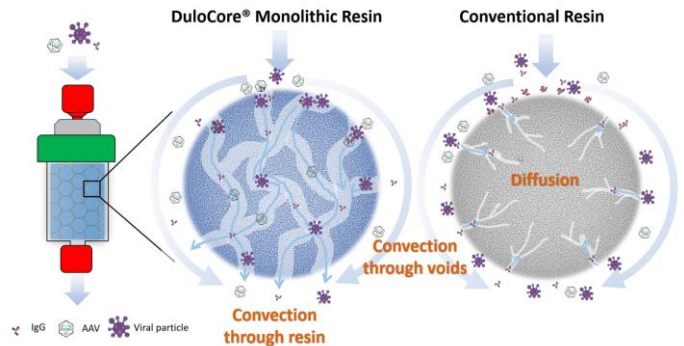


Fig. 2: The through-pore convective flow in DuloCore®.

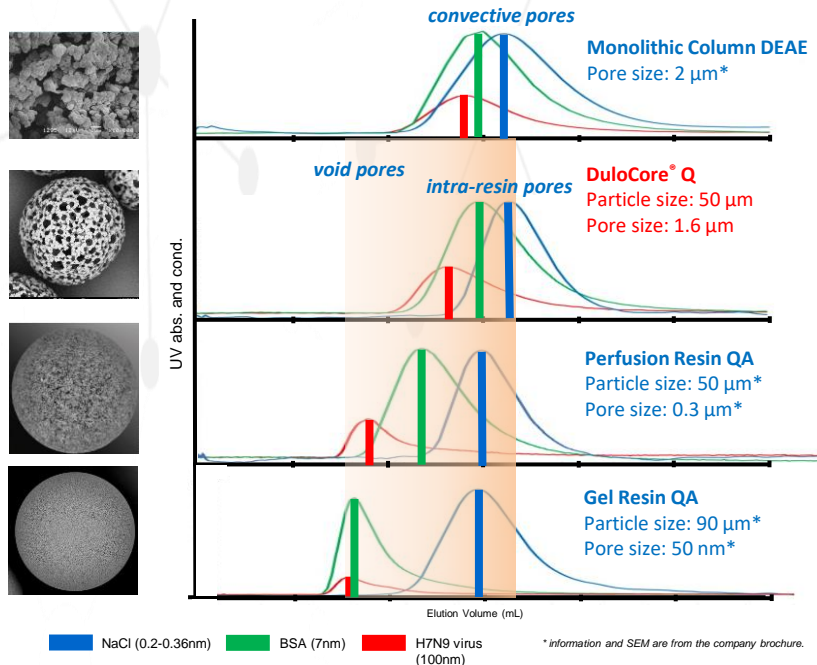


Fig. 3: The flow models with different sized molecules using various types of columns.

Flow Rate Independence

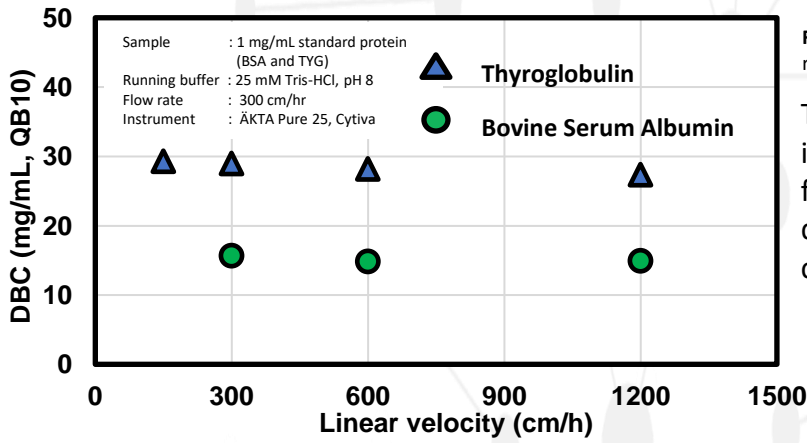


Fig. 3: Dynamic binding capacity performance under varying flow rates.

The dynamic binding capacity of DuloCore® is not impacted by flow rate changes. As the flow rate increases, DuloCore® continues to deliver high-throughput performance with consistent dynamic binding capacity.

High Flow Rate with Low Backpressure

Suggested max. flow rates of gel resin and monolith

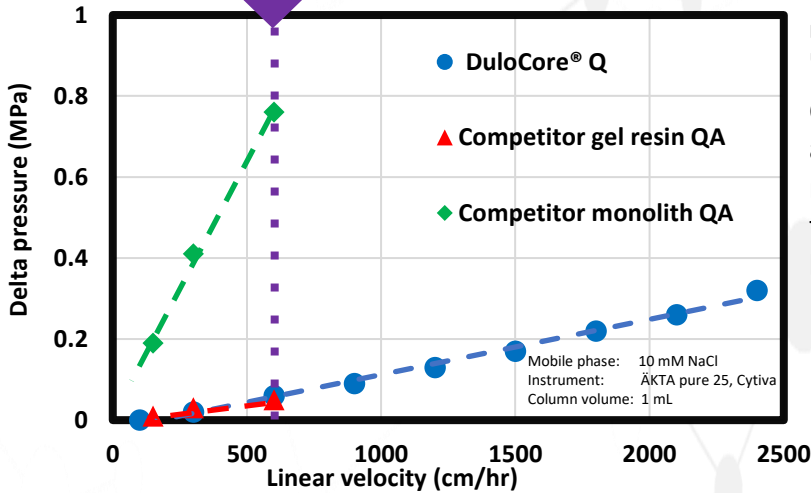


Fig. 4: The comparison of backpressure under varying flow rates using various columns.

Compared with conventional gel resin and monolith columns, DuloCore® monolithic resin excels high operational flow rates while keeping backpressure low.

Lifetime Stability

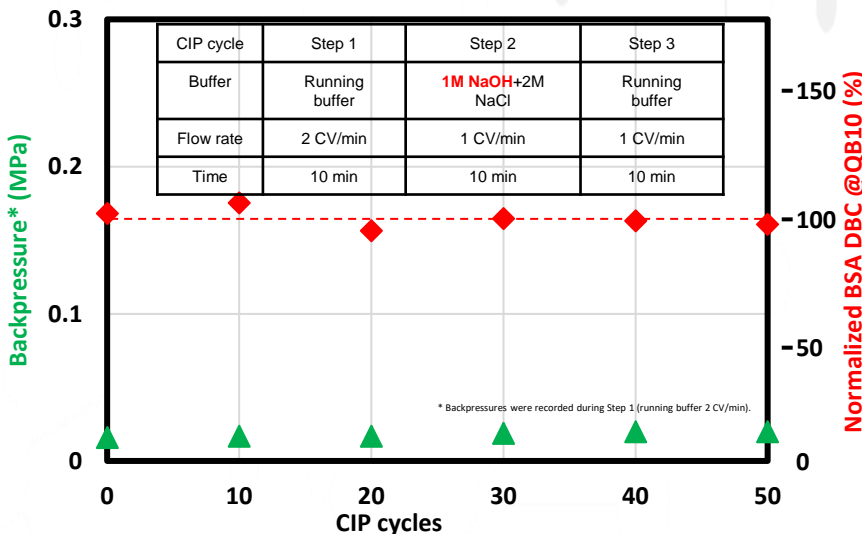


Fig. 5: The lifetime stability of DuloCore® has been confirmed through its demonstrated backpressure stability and dynamic binding ability.

DuloCore® offers unparalleled lifetime stability for at least 50 CIP cycles and continue maintaining consistency in dynamic binding capacity and low backpressure even with repetitive exposures to high-alkaline CIP solution.

Separation of Empty and Full AAV8 Capsids

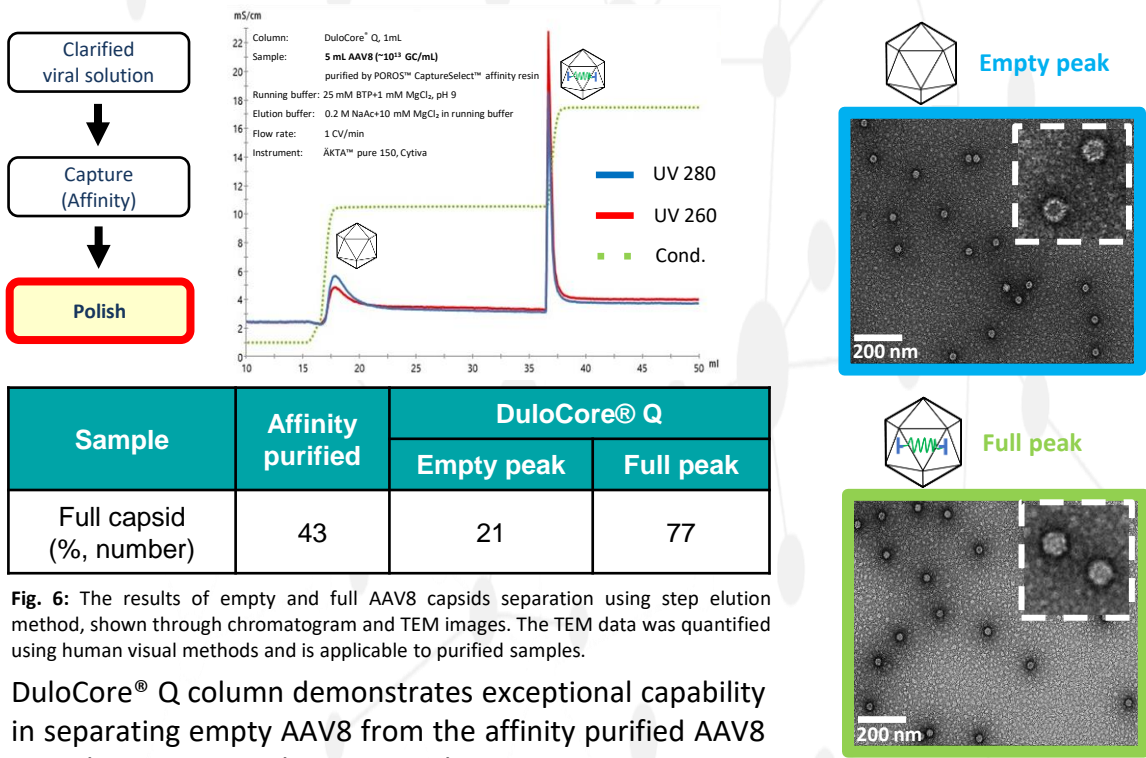


Fig. 6: The results of empty and full AAV8 capsids separation using step elution method, shown through chromatogram and TEM images. The TEM data was quantified using human visual methods and is applicable to purified samples.

DuloCore® Q column demonstrates exceptional capability in separating empty AAV8 from the affinity purified AAV8 capsids using a simple isocratic elution.

Purifications of Plasmid DNA

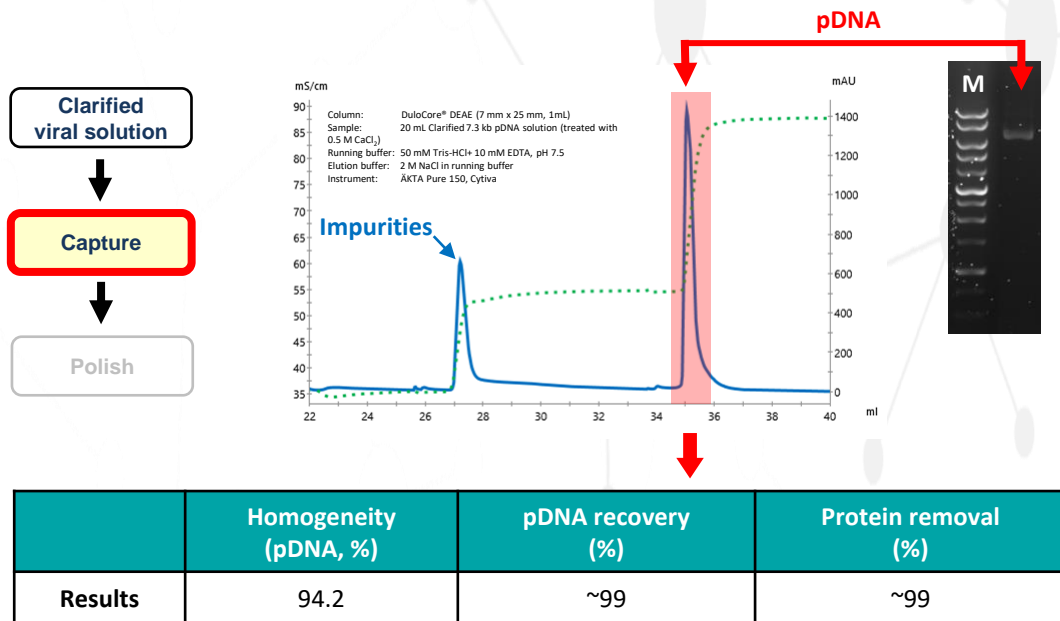


Fig. 7: The separation of impurities and plasmid DNA in the chromatogram was further confirmed by gel electrophoresis, which demonstrated the purity of the fractions.

DuloCore® DEAE column has proven its capability in removing the impurities from the cell lysate and isolating the desired plasmids DNA. The gel electrophoresis results support high purity of the DNA fractions has been collected.

Specifications & Order Information

Matrix	Cross-linked polymethacrylic polymer
Particles size (Dv ₅₀)	50 µm
Inter-pore size	1.6 µm
Ligand type	anion exchanger (Q, DEAE)
Dynamic binding capacity	≥12 mg/mL (BSA); ≥10 mg/mL (Thyroglobulin)
Maximum pressure (over the packed bed during operation)	0.8 Mpa
Compression factor	1.05
Recommended linear flow rate	150 - 900 cm/h
pH stability	2 – 13 (Q); 2-10 (DEAE)
CIP (Cleaning in place)	1 M NaOH
Storage	4 to 30°C, 20% ethanol



Series	Product no.	Description
IEX – SAX	GP23101Q22-00	DuloCore® Q (1.6µm), Pre-Packed Column, 1 mL
IEX – SAX	GP23101Q22-05	DuloCore® Q (1.6µm), Pre-Packed Column, pack of 5 × 1 mL
IEX – SAX	GP23105Q22-00	DuloCore® Q (1.6µm), Pre-Packed Column , 5 mL
IEX – SAX	GP23105Q22-05	DuloCore® Q (1.6µm), Pre-Packed Column, pack of 5 × 5 mL
IEX – SAX	GP23121Q23-00	DuloCore® Q (1.6µm), 100mL
IEX – SAX	GP23125Q23-00	DuloCore® Q (1.6µm), 500mL
IEX – SAX	GP23131Q23-00	DuloCore® Q (1.6µm), 1L
IEX – SAX	GP23135Q23-00	DuloCore® Q (1.6µm), 5L
IEX – WAX	GP23101D22-00	DuloCore® DEAE (1.6µm), Pre-Packed Column, 1 mL
IEX – WAX	GP23101D22-05	DuloCore® DEAE (1.6µm), Pre-Packed Column, pack of 5 × 1 mL
IEX – WAX	GP23105D22-00	DuloCore® DEAE (1.6µm), Pre-Packed Column, 5 mL
IEX – WAX	GP23105D22-05	DuloCore® DEAE (1.6µm), Pre-Packed Column, pack of 5 × 5 mL
IEX – WAX	GP23121D23-00	DuloCore® DEAE (1.6µm), 100mL
IEX – WAX	GP23125D23-00	DuloCore® DEAE (1.6µm), 500mL
IEX – WAX	GP23131D23-00	DuloCore® DEAE (1.6µm), 1L
IEX – WAX	GP23135D23-00	DuloCore® DEAE (1.6µm), 5L
Epoxy	GP23121V03-00	DuloCore® Epoxide Activated (1.6µm), 100mL
Epoxy	GP23125V03-00	DuloCore® Epoxide Activated (1.6µm), 500mL
Epoxy	GP23131V03-00	DuloCore® Epoxide Activated (1.6µm), 1L
Epoxy	GP23135V03-00	DuloCore® Epoxide Activated (1.6µm), 5L