

# Exosome and Immunoglobulin Isolation via coupled column technology (2024-017)

A single integrated two-dimensional liquid chromatography (2DLC) method for the quantitative recovery of both exosomes and antibodies from a singular sample aliquot.

## Market Overview

Cultured cell lines are commonly used for the mass production of therapeutic proteins such as monoclonal antibodies. An emergent alternative means of treating diseases is the use of gene therapies, wherein genetic cargo is “packaged” in nanosized vesicular structures, referred to as “vectors”. One particularly attractive vector option is extracellular vesicles (EVs), of which exosomes are of greatest interest. Effective recovery of both exosomes and monoclonal antibodies provides a unique opportunity for researchers to investigate disease mechanisms and applications of such vectors for various clinical applications. Current exosome isolation methods such as ultracentrifugation (UC) are capital-expensive with long, multistage processing times and low purity exosome isolates. To circumvent these shortfalls, a Clemson University researcher has developed a single, integrated two-dimensional liquid chromatography (2DLC) method for the quantitative recovery of both exosomes and antibodies from a singular sample aliquot. Chromatography-based exosome processes provide potential benefits with regards to lower capital costs, high levels of throughput and automation, and the integration of in-line means of detection/quantification.

## Technical Summary

The proposed isolation technique successfully combines two forms of C-CP fiber column types (native polyester and protein A modified polypropylene) to affect the tandem isolation of exosomes and immunoglobulin G (IgG) from a single CHO cell bioreactor supernatant sample in less than 10 minutes. The process has been successfully demonstrated on the analytical scale (20 microliters of sample), with projections to increase to much larger volumes employed in commercial gene and immunotherapy applications.

### Application

Isolation/recovery; exosomes; multimodal separations

### Development Stage

TRL 4/5

### Advantages

- **Novel, rapid, cost-effective** means of isolating and quantifying two therapeutic agents from a single cell culture source.
- Incorporates versatility of the C-CP fiber phases
- High levels of throughput and automation, and the integration of in-line means of detection/quantification.



## About the Inventors

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Dr. Marcus earned B.S. degrees in chemistry and physics from Longwood College and a Ph.D. in analytical chemistry from the University of Virginia. He serves on the editorial advisory board for three international journals and was the recipient of the S.C. Governor's Award for Excellence in Science Research.

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