

# Tumor-Derived Exomeres as Biomarkers for Cancer Detection and Monitoring

## Lead Inventors:

### David C. Lyden, M.D., Ph.D.

Professor of Pediatrics, Weill Cornell Medical College  
Stavros S. Niarchos Professor in Pediatric Cardiology,  
Weill Cornell Medical College  
Professor of Cell and Developmental Biology,  
Weill Cornell Medical College

### Haiying Zhang, Ph.D.

Assistant Professor of Cell and Developmental Biology in  
Pediatrics, Pediatrics, Weill Cornell Medical College



## Business Development Contact:

Brian Kelly  
Director, Technology Licensing

(646) 962-7041  
bjk44@cornell.edu

# Tumor-Derived Exomeres as Biomarkers for Cancer Detection and Monitoring

## Background & Unmet Need

- Extracellular vesicles and particles (EVPs) (including exosomes) are secreted by both healthy and cancerous cells
- EVPs contain proteins, nucleic acids, lipids, and metabolites and can transfer their contents from one cell to another as a form of cell-cell communication
- EVPs are promising tools for use in detection, diagnosis, prognosis, and treatment decisions in cancer
- However, EVPs are heterogenous and separating them into distinct, meaningful populations has been difficult
- **Unmet Need:** Identification of distinct EVP subgroups for use as biomarkers in diagnosis and treatment of cancer

## Technology Overview

- **The Technology:** The use of a newly identified class of particles, called exomeres, as biomarkers for diagnosis, prognosis, and treatment of cancer
- **The Discovery:** The inventors used asymmetric field-flow fractionation techniques to identify and characterize EVPs by size
- They identified three sub-types with distinct proteomic, N-glycan, lipid, and nucleic acid compositions
- These classes were Exo-S, Exo-L, and a nanoparticle class called exomeres
- **PoC Data:** Exomeres were found to be enriched in metabolic enzymes and specific pathways, such as glycolysis and mTOR signaling, indicating that they may modify the metabolism of target cells
- Exomeres were also found to contain proteins related to hypoxia, microtubule function and coagulation

### Inventors:

David Lyden  
Haiying Zhang

### Patents:

[US Patent Application Filed](#)  
EP Application Filed  
[CN Application Filed](#)

### Publications:

[Zhang et al.](#) *Nat Cell Biol.*  
2018.

### Biz Dev Contact:

Brian Kelly  
(646) 962-7041  
bjk44@cornell.edu

### Cornell Reference:

D-8035



# Tumor-Derived Exomeres as Biomarkers for Cancer Detection and Monitoring

## Technology Applications

- Use as a biomarker and diagnostic tool for the detection of cancer, metastasis or disease recurrence
- Use as a biomarker for prognosis and treatment decisions for cancer

## Technology Advantages

- EVP sub-types yield more granular data on properties of cancer and metastasis
- Exomere separation protocol is highly reproducible, rapid, and simple

## Supporting Data / Figures

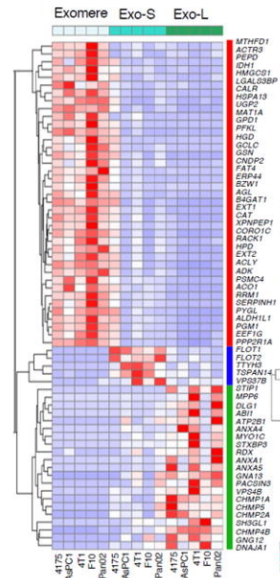


Figure 1: Heat map illustration of unique proteins specifically associated with different exosome sub-types.

## Inventors:

David Lyden  
Haiying Zhang

## Patents:

[US Patent Application Filed](#)  
[EP Application Filed](#)  
[CN Application Filed](#)

## Publications:

[Zhang et al. Nat Cell Biol. 2018.](#)

## Biz Dev Contact:

Brian Kelly  
(646) 962-7041  
bjk44@cornell.edu

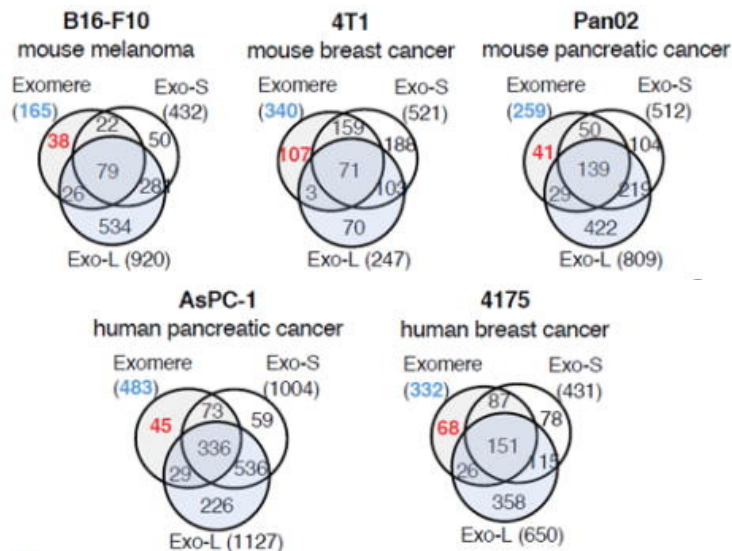
## Cornell Reference:

D-8035



# Tumor-Derived Exomeres as Biomarkers for Cancer Detection and Monitoring

## Supporting Data / Figures



**Figure 2:** Proteins associated with exomere and exosome subpopulations are differentially expressed in various cancer types.

### Inventors:

David Lyden  
 Haiying Zhang

### Patents:

[US Patent Application Filed](#)  
[EP Application Filed](#)  
[CN Application Filed](#)

### Publications:

[Zhang et al. Nat Cell Biol.](#)  
 2018.

### Biz Dev Contact:

Brian Kelly  
 (646) 962-7041  
[bjk44@cornell.edu](mailto:bjk44@cornell.edu)

### Cornell Reference:

D-8035



**Weill  
Cornell  
Medicine**