Extracellular Vesicle and Particle (EVP) Protein Platform for Diagnosis and Prognosis of Cancer Subtypes

Lead Inventor:

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

Business Development Contacts:

Brian Kelly
Director, Technology Licensing
(646) 962-7041 | bjk44@cornell.edu

Larry Schlossman
Managing Director, BioPharma Alliance & Research Collaborations
(212) 746-6906 | las2041@med.cornell.edu
Extracellular Vesicle and Particle (EVP) Protein Platform for Diagnosis and Prognosis of Cancer Subtypes

**Background & Unmet Need**

- Pioneering work of Dr. Lyden showed that cancer cells secrete **protein-rich EVPs (exosomes)** that presage and prepare the metastatic niche
- Dr. Lyden and collaborators have **analyzed 426 samples** for protein content of EVPs from different sources (tumor/healthy samples; plasma; tissue explants, etc.)
- **Significant differences** between proteins in tissues and plasma of cancer vs healthy patients and cancer subtypes have been found, enabling a range of diagnostic and prognostic tests
- **Unmet Need:**
  - Diagnosis of Cancer of Unknown Primary Origin (CUP; ca. 2-5% of all cancers; poor prognosis)
  - Distinguishing malignant vs non-malignant growths (over 5M biopsies each year)
  - Cancer screening of at-risk patients (>50)

**Technology Overview**

- **The Technology**: Plasma EVP extraction and MS analysis workflow for the detection of multiple cancer subtypes
- Biomarker sets distinguishing plasma of patients: tumor vs. non-tumor; cancer types; malignant vs. premalignant tumors
- **PoC Data**: Distinguishes plasma from patients with and without tumor with 95% sensitivity and 90% specificity
- Identifies primary tumors in plasma: breast, colorectal, lung, pancreatic cancer, mesothelioma
- Distinguishes malignant vs. premalignant patients (e.g., PDAC vs. IMPN; myelodysplasia vs. leukemia)
- Additional validation of the workflow is ongoing

**Inventors:**
- David C. Lyden
- Ayuko Hoshino
- Linda Bojmar
- Han Sang Kim

**Patents:**
- US Application Filed
- EP Application Filed

**Publications:**
- Bojmar et al. **STAR Protoc.** 2021.

**Biz Dev Contact:**
- Brian Kelly
  - bjk44@cornell.edu
- Larry Schlossman
  - las2041@med.cornell.edu

**Cornell Reference:**
- D-9480
Extracellular Vesicle and Particle (EVP) Protein Platform for Diagnosis and Prognosis of Cancer Subtypes

<table>
<thead>
<tr>
<th>Technology Applications</th>
<th>Supporting Data / Figures</th>
<th>Inventors:</th>
</tr>
</thead>
</table>
| • CUP primary tumor identification to inform treatment strategy and **prolong patient survival** | Novel exosomal markers | David C. Lyden  
Ayuko Hoshino  
Linda Bojmar  
Han Sang Kim |
| • Malignant vs. premalignant test that **replaces the need for invasive biopsies** | Tissue-explant exosomal cancer biomarkers | Patents: |
| • Screening test for **rapid, early** tumor detection | | US Application Filed |
| | | EP Application Filed |
| | | Publications: |
| Technology Advantages | | Biz Dev Contact: |
| • Rapid, accurate, and non-invasive tests | | Brian Kelly  
bjk44@cornell.edu |
| • Fits into current clinical decision-making and delivers immediate value to physicians and patients | | Larry Schlossman  
las2041@med.cornell.edu |
| • Distinguishes plasma from patients with and without tumor with 95% sensitivity and 90% specificity | | Cornell Reference: |
| • Applicable to detection of numerous tumor types, including breast, colorectal, lung, pancreatic cancer, and mesothelioma | | D-9480 |

**Figure 1:** Overview of the EVP platform for diagnosis and prognosis of multiple cancer subtypes.
Extracellular Vesicle and Particle (EVP) Protein Platform for Diagnosis and Prognosis of Cancer Subtypes

**Supporting Data / Figures**

**Figure 2:** Identification of tumor-associated EVP signatures in plasma from patients with various cancers. EVP proteins with the highest predictive values in classifying tumor and non-tumor plasma.

**Inventors:**
David C. Lyden
Ayuko Hoshino
Linda Bojmar
Han Sang Kim

**Patents:**
US Application Filed
EP Application Filed

**Publications:**

**Biz Dev Contact:**
Brian Kelly
bjk44@cornell.edu

Larry Schlossman
las2041@med.cornell.edu

**Cornell Reference:**
D-9480