Weill Cornell Medicine

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

Lead Inventor:

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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:
Hoshino et al. *Cell.* 2020.
Bojmar et al. *STAR Protoc.* 2021.

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Cornell Reference:
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Technology Applications

- CUP primary tumor identification to inform treatment strategy and **prolong patient survival**
- Malignant vs. premalignant test that **replaces the need for invasive biopsies**
- Screening test for **rapid, early** tumor detection

Technology Advantages

- Rapid, accurate, and non-invasive tests
- Fits into current clinical decision-making and delivers immediate value to physicians and patients
- Distinguishes plasma from patients with and without tumor with 95% sensitivity and 90% specificity
- Applicable to detection of numerous tumor types, including breast, colorectal, lung, pancreatic cancer, and mesothelioma

Supporting Data / Figures

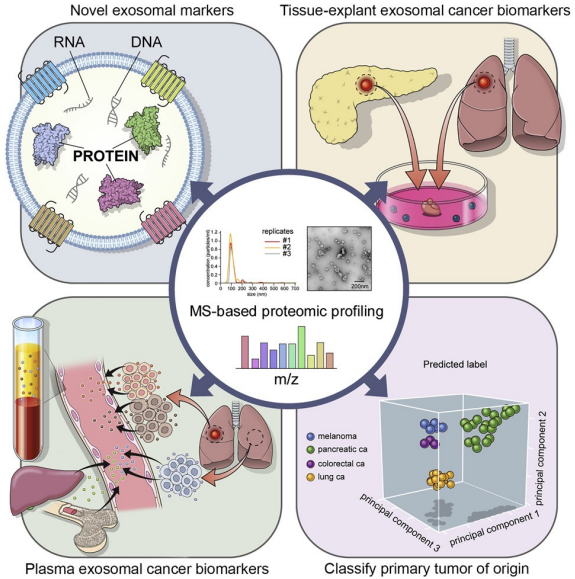

Figure 1: Overview of the EVP platform for diagnosis and prognosis of multiple cancer subtypes.

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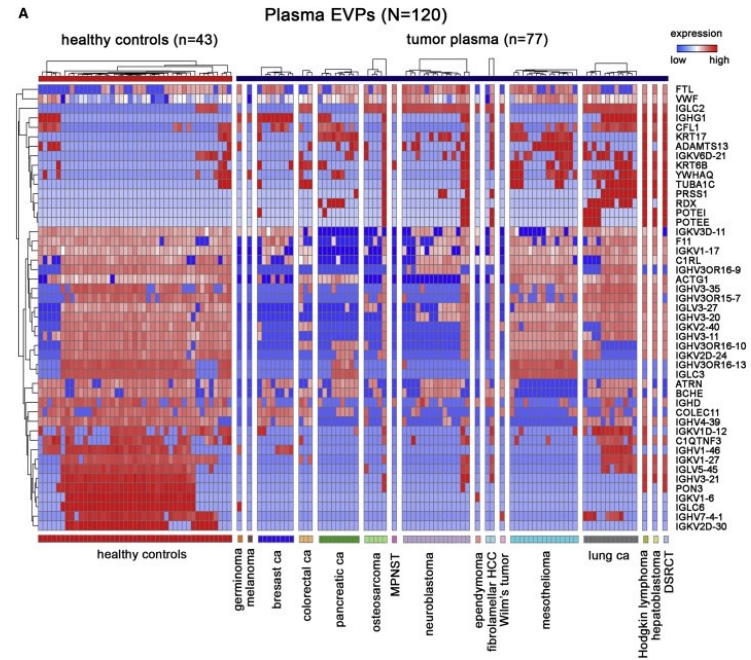

Figure 2: Identification of tumor-associated EVP signatures in plasma from patients with various cancers. EVP proteins with the highest predictive values in classifying tumor and non-tumor plasma.

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