

Co-Development Opportunity in Hepatocellular Carcinoma (HCC)

Ref. Nos. E-024-2009, E-139-2010

Keywords: Hepatocellular carcinoma, breast cancer, liver, diagnostic, metabolite profiling, PI3K, and myc signaling.

Summary: Hepatocellular carcinoma (HCC) is the most frequent malignant tumor in the liver and the third leading cause of cancer death worldwide. HCC also represents an extremely poor prognostic cancer, and patients are often diagnosed with end-stage cancer and have poor survival. HCC is also a very heterogeneous disease and often arises from chronic liver disease.

Technology: Researchers at NCI have discovered a driver gene signature for predicting survival in patients with solid malignancies in hepatocellular carcinoma (HCC) and breast cancer. The gene signature includes ten cancer-associated genes, and NCI researchers have further discovered that a decrease in DNA copy number or mRNA expression of some genes is associated with poor prognosis in HCC tumors and breast cancer. They have also demonstrated that at least four of these cancer-associated genes are functional tumor suppressor genes. Thus, these genes may be potential molecular targets of HCC and breast cancer.

Metabolite profiling identifies and measures changes in cellular metabolites as a means to determine a direct correlation between gene expression and changes in biological function. NCI Investigators have also identified a unique set of metabolite biomarkers associated with HCC. Subsets of this metabolite/gene signature can distinguish HCC tumors from normal tissues, identify early stage HCC patients, prognose negative patient outcome, and identify a HCC stem cell subtype. These metabolites and gene surrogates are elements of the PI3K and myc signaling networks which can potentially be targeted for therapeutic purposes.

Collaborative Research Opportunity: The National Cancer Institute's Laboratory of Human Carcinogenesis is seeking parties interested in collaborative research to further evaluate or commercialize effective diagnostics/prognostics involving HCC. Any or all of the inventions in this announcement are available for co-development and collaboration.

Potential Commercial Applications:

- Method to diagnose HCC, including HCC subtypes.
- Method to prognose for HCC and breast cancer patient outcome and survival
- Method to stratify HCC patients for appropriate treatment

Competitive Advantages:

- Subsets of this metabolite/gene signature can distinguish HCC tumors from normal tissues
- Highly accurate metabolite/gene signature that can be developed into a variety of diagnostic and prognostic applications.
- Simple and less invasive.



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Developmental Status:

- [Gene Signature for Predicting Solid Tumors Patient Prognosis \(E-024-2009\)](#)

Patent Status: U.S. 13/127,701 filed 04 May 2011

Developmental Status: Pre-clinical development ongoing.

- [Diagnostic and Prognostic HCC Related Metabolites \(E-139-2010\)](#)

Patent Status: PCT, Application No. PCT/US2011/032285 filed 13 Apr 2011

Developmental Status: Pre-Clinical development ongoing.

References:

For information on the Laboratory of Human Carcinogenesis of the National Cancer Institute (NCI) please visit: <http://ccr.cancer.gov/labs/lab.asp?labid=94>

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