## Characterization and Enumeration of Multiple Circulating Tumor Cell Phenotypes Using Two Distinct Platforms Establishes Presence of Epithelial-Mesenchymal Transition CTCs in Patients

**Lihua Wang¹, Sonny Khin², Francis Owusu³, Ralph E. Parchment⁴, Alice Chen⁵, Shivaani Kummar⁶, James H. Doroshow⁷, and Robert J. Kinders¹**

¹Laboratory of Human Toxicology and Pharmacology, Applied and Developmental Research Directorate, Leidos Biomedical Research, Inc., ²Frederick National Laboratory for Cancer Research, Frederick, Maryland 21702; and ³Division of Cancer Treatment and Diagnosis, National Cancer Institute, Bethesda, Maryland 20892

### Introduction

CTCs are now one of the few liquid biopsy markers of the primary tumour, due to the interplay of the tumour microenvironment, the effects of targeted or non-targeted drugs in clinical trials, and their potential use in monitoring treatment outcomes and developing new targeted therapies. A range of technologies have been developed to characterize CTCs, which are considered as putative early metastasis. The sensitivity and specificity of CTC detection systems are important, as the risk of false-positive results may lead to inappropriate treatment. CTCs can be divided into two types: epithelial and mesenchymal. Epithelial CTCs are characterized by the expression of epithelial markers such as cytokeratin (CK) and E-cadherin, while mesenchymal CTCs are characterized by the expression of mesenchymal markers such as vimentin and N-cadherin. The presence of both types of CTCs has been linked to poor prognosis and decreased survival in cancer patients. The current study aimed to establish the presence of epithelial-mesenchymal transition (EMT) CTCs in patients using two distinct platforms: the 5-Color System and the 4-Color System.

### Methods

#### Patients and Sample Collection:

- All enrolled patients and healthy subjects were informed about the study inclusion and were enrolled using individual four-color panel-based platforms.
- A “home brew” CTC kit was developed that captures circulating cells that are either EpCAM or CD146 marker positive, and it was capable of identifying high numbers of EMT+ tumor marker+ double-positive CTCs.
- Two platforms demonstrated the presence of high numbers of CTCs with the epithelial-mesenchymal transition (EMT) phenotype, and widely used marker systems such as CD45, EpCAM, or PD-L1 to detect CTCs were performed.

#### CTC Characterization and Identification in Patient Blood

- **Sample ID:** 0 0 3 1 1 0 0 0 1 0 0 0 0 0 0 0
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#### Results

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### Acknowledgments

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### References


### Summary and Conclusions

- **Two platforms, Apoptosis and the Tissue CellSearch system, have been applied for monitoring drug exposure in non-small cell lung cancer patients and drug effectiveness in regulating DNA damage (CTC).**
- **Four-color CTCs are characterized by CD45+ and EpCAM+ double-positive CTCs, which were capable of identifying high numbers of EMT+ tumor marker+ double-positive CTCs in patients with sarcoma patients.**
- **These results were corroborated by a statistical analysis indicating that CTCs (5-color) with CD45+ and EpCAM+ double-positive CTCs were identified in non-small cell lung cancer patients.**
- **The presence of multiple CTCs has been observed in patients expressing the EMT phenotype may be related to the intensive prior treatment (>3 prior therapies, median) of our phase 1 population.**

### Table

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