Biomarker to Enable Eradication of CML Stem Cells

Tech ID: 22549 / UC Case 2012-155-0

BACKGROUND

Chronic Myeloid Leukemia (CML) is known to be associated with a chromosomal transposition that yields a constitutively active BCR-ABL “fusion” kinase and current therapies include kinase inhibitors (e.g., imatinib and dasatinib) that are designed to “turn off” the constitutive activation of the fusion kinase. However, these are marginally effective in the later, more aggressive stages of the disease. One cause of refractory disease is the residence of cancer stem cells (CSC) in protected tumor niches where they exit the cell cycle and revert to a quiescent state, which does not respond to the standard line of care. Such cells are found to have an altered isoform expression profile of Bcl2- family members, which may provide new means to attack stem cells that are refractory to first-line therapies.

TECHNOLOGY DESCRIPTION

UC researchers have found that non-cycling stem cells in protected niches express distinctive patterns of Bcl-2 mRNA isoforms. Such information on cell cycle status and isoform profile may yield:

- A predictive biomarker for CSC drug susceptibility;
- A determination of cancer prognosis and progression; and
- An indicator of patient CSC response to anti-cancer therapies.

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ADVANTAGES

By targeting CSC in specific tumor niches, this invention may present a novel and effective means of treating cells that have evaded eradication by other therapies. Unlike other approaches, this method:

- accounts for and compensates for the heterogeneity of most tumors;
- targets cancer stem cells, as opposed to the diverse, bulk population; and
- clarifies the relevance of cell cycle status within the tumor niche.

STATE OF DEVELOPMENT

Inventors have identified characteristic ratios of specific, Bcl-2 family, mRNA-splice isoforms, which differ between tumor cell populations that are:

- within vs. not in protected, tumor niches;
- either CSC vs. normal cells, over the course of treatment; and
- at various stages of the cell cycle.

RELATED MATERIALS

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OTHER INFORMATION

KEYWORDS

biomarker, chronic myelogenous leukemia, chronic myeloid leukemia, CML, Stem Cell, CSC, blast crisis, isoforms, cancer, oncology, tumor, prognosis, diagnosis, progression, cell cycle, profile

CATEGORIZED AS

- **Medical**
  - Diagnostics
  - Disease: Cancer
  - Stem Cell

RELATED CASES

2012-155-0, 2009-187-0

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INTELLECTUAL PROPERTY INFO

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PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,001,485	06/19/2018	2012-155
United States Of America	Issued Patent	9,194,862	11/24/2015	2009-187

RELATED TECHNOLOGIES

- Compositions and Methods for Determining Cancer Stem Cell Self-Renewal Potential

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