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

Tech ID: 22170 / UC Case 2009-187-0

BACKGROUND

Traditional chemotherapy may fail to achieve complete remission of cancers due to resistance of the underlying cancer stem cells (CSCs) to the therapeutic agents. It is now well accepted that to achieve greater efficacy there is a need to specifically target CSCs within a tumor cell population. Furthermore, understanding the self-renewal potential of these CSCs, as well as their susceptibility to drug treatment and the overall malignant potential of the cancer, are essential steps to more successful cancer therapy.

TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have developed a method for determining the self-renewal potential of CSCs. This technology involves CSC-specific analysis and quantitation of key players (splice variants of proteins and transcripts) in metabolic pathways that are critical for cell survival and self-renewal. The analysis of the cross-talk within cell survival and self-renewal pathways enables the:

- Determination of the self-renewal potential of cancer stem cells.
- Determination of the prognosis or malignant potential of cancer from the CSC.
- Identification of targets for drugs that lower self-renewal potential.
- Prediction of the susceptibility of a CSC to drug treatment (inhibition of self-renewal).

STATE OF DEVELOPMENT

Validation experiments confirm cell type and context specific deregulation of apoptosis via deregulated expression in the CSC population. *In vivo* studies on CSC engraftment validate the therapeutic potential of targeting survival pathways and *in vitro* studies suggest mechanism of action.

RELATED MATERIALS

- Abrahamsson A.E. et al., (2009) Glycogen Synthase Kinase 3beta Missplicing Contributes to Leukemia Stem Cell Generation. Proc Natl Acad Sci USA. 106(10):3925-9.
- Jamieson C.H. (2008) Chronic Myeloid Leukemia Stem Cells. Hematology 1:436-42.
- Jamieson C.H.M. et al., (2008) Miscreant myeloproliferative disorder stem cells. Leukemia 22:2011-9.
- Kitada S. et al., (1998) Expression of Apoptosis-Regulating Proteins in Chronic Lymphocytic Leukemia: Correlations with *In Vitro* and *In Vivo* Chemo Responses. Blood. 1998 91(9):3379-89.
- See also http://cancer.ucsd.edu/summaries/cjamieson.asp.

INTELLECTUAL PROPERTY INFO

Pending U.S. patent application 20110059448.

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

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INVENTORS

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OTHER INFORMATION

KEYWORDS

self-renewal, cancer stem cell, leukemia, apoptosis, survival, Bcl-2, Bcl-XL, Mcl-1, Wnt, GSK3, GSK-3, glycogen synthase kinase, hedgehog, Shh, transcript, splice variant, isoform, expression, biomarker

CATEGORIZED AS

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

RELATED CASES

2009-187-0, 2012-155-0

- Biomarker to Enable Eradication of CML Stem Cells

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Therapeutic Approach Targeting Malignant Reprogramming in CML Stem Cells

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