Use of Novel Target to Inhibit Nucleotide Synthesis in Cancerous Cells

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BACKGROUND

Tumor growth and maintenance requires a complex set of perturbations in cellular metabolism. Among these metabolic changes, oncogenic cells preferentially utilize sugar and amino acids in anabolic reactions to produce nucleotides required for the cellular growth, energy homeostasis, and excess dNTPs necessary for replication of genetic material of parental oncogenic cells. The *de novo* nucleotide biosynthetic pathway which synthesizes nucleotides from sugar and amino acid building blocks is a frequent target for chemotherapeutics seeking to combat cancer. However, current chemotherapies which use this approach often demonstrate significant toxicities in normal cells. Furthermore, many cancers have mechanisms to evade these approaches. There is a need to identify targets which can efficiently inhibit nucleotide biosynthesis specifically in cancerous cells.

TECHNOLOGY DESCRIPTION

Investigators at the University of California, San Francisco have identified a target which can be utilized for inhibition of the nucleotide biosynthetic pathway. This target is a key component for the production of pyrimidines, purines and pyridines. Since it is specific to proliferating cells, inhibition of this target may effectively avoid toxicity in normal cells while killing the oncogenic cells. The investigators have demonstrated the utility of this target in mouse and human oncogneic cell lines, wherein inhibition of the target resulted in cell death of Myc over-expressing cells but not wild type normal cells. It should be noted that MYC oncogene is a master regulator of normal cell growth, cell proliferation and metabolism. Myc couples cell cycle machinery with energy metabolism and ensures that adequate cellular resources are attained for cell growth and DNA synthesis. Thus, inhibiting the novel target has potential to restrain nucleotide biosynthesis and thereby inhibit the cancer-causing mechanism inherent within Myc overexpressing cells, thus killing them. The investigators are in the process of chemically screening compounds to inhibit this target. There is potential to collaborate and develop this technology rapidly.

APPLICATIONS

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OTHER INFORMATION

KEYWORDS

Cancer, Novel Targets, Myc Pathway, Chemotherapy

CATEGORIZED AS

- Medical
  - Disease: Cancer
  - Therapeutics

RELATED CASES

2012-205-0

- Novel target for cancer therapy
- Chemotherapy
- Develop novel therapeutics to inhibit cancer

ADVANTAGES

- Specifically inhibit/kill proliferating cells
- Reduce chemotherapy toxicity in normal cells
- Inhibition of nucleotide synthesis in cancerous cells

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,765,337	09/19/2017	2012-205

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