hGC-1 –Differentiation Marker for Potential Use in Diagnosis and Prognosis of Gastrointestinal Cancers and Hematopoietic Malignancy: A Gene Encoding A Member of the Olfactomedin-Related Protein Family

Description of Technology:

This invention relates to the identification and characterization of a previously unidentified human gene, human granulocyte colony stimulating factor, (hGC-1), nucleic acids, cDNA, vectors, polypeptides, protein, antibodies, cells and other compositions related to hGC-1, as well as the use of these compositions for the diagnosis and prognosis of gastrointestinal cancers and hematopoietic malignancy.

hGC-1 gene expression has been associated with human gastrointestinal cancer and inflammatory disease. It has been shown to be over expressed in gastric cancer and associated with tumor stage and metastasis. The hGC-1 gene is up-regulated in liver metastases associated with colorectal cancer and in pancreatic cancer. In addition, hGC-1 has been reported in gastric biopsies from patients infected with *Helicobacter pylori* and chronic bowel disease.

Applications:

This technology provides a novel and sensitive marker for the differentiation of gastric carcinoma and potential application in the treatment of such disorders. Claimed in the patent application are the nucleotide sequences, vectors, polypeptides, antibodies related to hGC-1. Additional primers are provided for identifying hGC-1. Related protein expression in gastric cancer tissues may also be used to determine the cancer differentiation.

Advantages:

This invention provides for the identification and characterization of a previously unidentified human gene. hGC-1 provides a novel and sensitive marker of gastric cancer differentiation and may play a role in tumor progression.

Market:

Gastric cancer is the fourth most common cancer and the second leading cause of cancer-related death in the world. Companies interested in investigating the treatment and diagnosis of gastric cancers may be interested in collaboration with the inventors or in the licensing of this technology.

Development Status:

The novel hematopoietic granulocyte colony-stimulating factor hGC-1 induced olfactomedin-related glycoprotein (hGC-1) has been cloned. The hGC-1 protein expression in normal gastrointestinal tissues and the relationship between its expression pattern and the histological type and differentiation grade of gastric carcinoma has been investigated. An anti-hGC-1 polyclonal antibody has also been generated and characterized.

Inventors:

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Publications:

Liu W, Zhu J, Cao L, Rodgers GP The expression of hGC-1 is correlated with the differentiation of gastric cancer. Histopathology, in press.

Liu W, Chen L, Zhu J, Rodgers GP The glycoprotein hGC-1 binds to cadherin and lectins. Exp Cell Res. 2006 Jun 10;312(10):1785-97. Epub 2006 Mar 29. [Pubmed Reference]

Patent Status:

DHHS Reference No. E-166-2001, U.S. Patent Application Serial No.10/497,890

Licensing Status:

Available for exclusive or non-exclusive licensing

Licensing Contact:
Dr. David Lambertson, (301) 435-4632, David.Lambertson@od.nih.gov

Collaborative Research Opportunity:

The National Institute of Diabetes and Digestive and Kidney Diseases is seeking parties interested in collaborative research to further develop, evaluate, or commercialize diagnostic or therapeutic applications for hGC-1. Please contact Rochelle S. Blaustein at Rochelle.Blaustein@nih.gov for more information.

Research Focus and Selected Publications for Principal Investigator

Dr. Griffin P. Rodgers, Director NIDDK, Chief, Molecular and Clinical Hematology Branch

(1) Plans and conducts basic and clinical research on selected inherited and acquired diseases of human blood, utilizing contemporary biochemical, molecular, and physiological techniques; (2) Develops and validates models, including cellular and transgenic systems, to permit the delineation of regulatory mechanisms in normal and pathological hematopoesis and to facilitate pharmacological or molecular genetic approaches to correct or compensate for abnormalities associated with disease states; (3) Expedites the translation of novel basic scientific discovery to the appropriate level of preclinical or clinical investigation.

Molecular Hematology Section

(1) Plans and conducts research on the molecular and cellular bases of selected congenital and acquired hematological disorders; (2) develops quantitative methods to express disease severity or activity, amenable to sequential applications; (3) studies gene expression and differentiation in erythroid cells in normal and pathological hematopoietic states; (4) studies the molecular basis of lineage-specific differentiation of hematopoietic stem cells; (5) develops therapies for hemoglobinopathies and other genetic blood disorders based on the modification of target gene expression.

1. Zhang J, Liu WL, Tang DC, Chen L, Wang M, Pack SD, Zhuang Z, Rodgers GP Identification and characterization of a novel member of olfactomedin-related protein family, hGC-1, expressed during myeloid lineage development. Gene. 2002 Jan 23;283(1-2):83-93. [Pubmed Reference]

2. Zhuang Z, Huang S, Kowalak JA, Shi Y, Lei J, Furuta M, Lee YS, Lubensky IA, Rodgers GP, Cornelius AS, Weil RJ, Teh BT, Vortmeyer AO From tissue phenotype to proteotype: sensitive protein identification in microdissected tumor tissue. *Int J Oncol* (28): 103-10, 2006. [Full Text/Abstract]

3. Lin EE, Rodgers GP, Gladwin MT Hemolytic anemia-associated pulmonary hypertension in sickle cell disease. *Curr Hematol Rep* (4): 117-25, 2005. [Full Text/Abstract]

4. Tang DC, Zhu J, Liu W, Chin K, Sun J, Chen L, Hanover JA, Rodgers GP The hydroxyurea-induced small GTP-binding protein SAR modulates gamma-globin gene expression in human erythroid cells. *Blood* (106): 3256-63, 2005. [Full Text/Abstract]

5. Zoueva OP, Rodgers GP Inhibition of beta protein 1 expression enhances beta-globin promoter activity and beta-globin mRNA levels in the human erythroleukemia (K562) cell line. *Exp Hematol* (32): 700-8, 2004. [Full Text/Abstract]