


### Relevant Reviews


9. Redelman D, Welniak LA, Taub D, Murphy WJ. Neuroendocrine hormones such as growth hormone (GH) and prolactin (PRL) are integral members of the immunological cytokine network. *Cell Immunol.* 2008 Mar–Apr; 252(1–2):111–121. [PubMed: 18313040]


### Licensing Status:


**Development Status:** Preliminary clinical data; validation studies are ongoing (confirmed findings in two independent patient groups).

**Market:** Cancer Vaccines are emerging as the forefront treatment regimens for several cancers. Provenge® was recently approved by the FDA for the treatment of prostate cancer. There are several other cancer vaccines in clinical trials. This technology can be developed into a pioneering test, as no such test to monitor prognosis and efficacy of cancer vaccines currently exists in the market.

**Inventors:** Jeff Gildersleeve, et al. (NCI).

**Publications:** No publications directly related to this technology.

**Patent Status:**


**Licensing Contact:** Available for licensing.

**Licensing Contact:** Sabarni Chatterjee, M.B.A., PhD; 301–435–5587; chatterjeesa@mail.nih.gov.

**Collaborative Research Opportunity:** The Center for Cancer Research, Chemical Biology Laboratory, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize anti-glycan serum antibodies as biomarkers for cancer or most types of cancer vaccines, are a class of antigens that has been largely understudied but play a significant role in the immune response of cancer vaccines.

This invention involves the identification of serum biomarkers for cancer that target carbohydrate antigens. The biomarkers are specific sub-populations of serum antibodies present in the serum of patients that bind to various glycan and/or glycoprotein antigens, such as the Forssman antigen.

The biomarkers are useful for (a) predicting a patient’s immune responses to a cancer vaccine, (b) measuring the efficacy of a cancer vaccine, and (c) determining the prognosis and long-term survival of cancer patients.

**Applications:**

- Diagnostic and prognostic test to monitor the progression and long-term survival of cancer patients.
- Predictive indicator of cancer patients’ immune response to a cancer vaccine.
- Indicator to monitor the efficacy of a cancer vaccine.

**Advantages:** The technology is backed by clinical data.

**SUMMARY:** The inventions listed below are owned by an agency of the U.S. Government and are available for licensing in the U.S. in accordance with 35 U.S.C. 207 to achieve expeditious commercialization of results of federally-funded research and development. Foreign patent applications are filed on selected inventions to extend market coverage for companies and may also be available for licensing.

**ADDRESSES:** Licensing information and copies of the U.S. patent applications listed below may be obtained by writing to the indicated licensing contact at the Office of Technology Transfer, National Institutes of Health, Public Health Service, HHS.

**CONTACT:** Notice.

**DESCRIPTION OF TECHNOLOGY:**

- Indicator to monitor the efficacy of a cancer vaccine.
- Diagnostic and prognostic serum biomarkers for cancer patients treated with cancer vaccines.

**Legal: The Center for Cancer Research, Chemical Biology Laboratory, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize anti-glycan serum antibodies as biomarkers for cancer or most types of cancer vaccines, are a class of antigens that has been largely understudied but play a significant role in the immune response of cancer vaccines.

This invention involves the identification of serum biomarkers for cancer that target carbohydrate antigens. The biomarkers are specific sub-populations of serum antibodies present in the serum of patients that bind to various glycan and/or glycoprotein antigens, such as the Forssman antigen.

The biomarkers are useful for (a) predicting a patient’s immune responses to a cancer vaccine, (b) measuring the efficacy of a cancer vaccine, and (c) determining the prognosis and long-term survival of cancer patients.

**Applications:**

- Diagnostic and prognostic test to monitor the progression and long-term survival of cancer patients.
- Predictive indicator of cancer patients’ immune response to a cancer vaccine.
- Indicator to monitor the efficacy of a cancer vaccine.

**Advantages:** The technology is backed by clinical data.
HIV vaccines and/or as prognostic biomarkers. Please contact John Hewes, PhD at 301–435–3121 or hewes@email.nih.gov for more information.

A New Class of Antibiotics: Naturally-Occurring Chrysophaetins and Their Analogues

Description of Invention: This invention, offered for licensing and commercial development, relates to a new class of naturally occurring antimicrobial compounds called Chrysophaetins, and to their synthetic analogues. Isolated from an alga species, the mechanism of action of these compounds is through the inhibition of bacterial cytoskeletal protein FtsZ, an enzyme necessary for the replication of bacteria. FtsZ is responsible for Z-ring assembly in bacteria, which leads to bacterial cell division. Highly conserved among all bacteria, FtsZ is a very attractive antimicrobial target.

The chrysophaeatin exhibits antimicrobial activity against drug resistant bacteria, methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococcus faecalis* (VRE), as well as other drug susceptible strains. The general structure of the natural compound is shown below:

![Diagram of the natural compound]

The inventors are working on a synthetic route for the compound and analogs. They have made progress and now have two halves of the molecule. These will be further dimerized to produce a synthetic chrysophaeatin. It is expected that the analogues will show similar antimicrobial activity to the natural products and will utilize the same mechanism of action.

The market potential for the disclosed compounds is huge ($24 billion in 2008) due to the very limited number of new antibiotics developed in recent decades and the increased epidemic of infectious diseases. In fact, infectious diseases are the leading cause of death worldwide. In the United States alone, more people die from MRSA than from HIV (Journal of the American Medical Association, 2007) and more than 90,000 people die each year from hospital acquired bacterial infections (Centers for Disease Control). A development of new drugs with distinct mechanism of action and efficacy against resistant bacterial strains may therefore be commercially attractive.

Advantages include:
- Structurally distinct antimicrobial compounds.
- Attack newly validated antibacterial targeted protein FtsZ.
- These compounds have a unique mechanism of action which works by inhibiting FtsZ GTPase activity.
- The chrysophaetins can be obtained by synthetic routes through dimerization of their synthetic shorter analogues.

Applications:
- Therapeutic potential for curing bacterial infections in vivo, including for clinical and veterinary applications.
- Antiseptics in hospital settings.
- Since FtsZ is structurally similar, but do not share sequence homology to eukaryotic cytoskeletal protein tubulin, these compounds may have antitumor properties against some cancer types or cell lines.

Development Status:
- Initial isolation and chemical and structural characterization using NMR spectroscopy have been conducted.
- Antimicrobial testing against MRSA, *Enterococcus faecium*, and VRE were conducted *in vitro* using a modified disk diffusion assay and microbroth liquid dilution assays.
- MIC<sub>50</sub> values were determined using a microbroth dilution assay.
- Mode of action was elucidated and Saturation Transfer Difference (STD) NMR was conducted to map the binding epitope of one of these compounds in complex with recombinant FtsZ.
- Other experiments on different areas to further characterize these compounds and their mode of action are currently ongoing.
- Shorter analogues of the natural products have shown to be readily synthesized and synthetic chrysophaetins can be obtained from them by chemical dimerization.

Inventors: Carole A Bewley Clore (NIDDK); Peter Wipf (U. of Pittsburgh).

Relevant Publications:

Patent Status:

Licensing Status: Available for licensing.

Licensing Contacts:
- Uri Reichman, PhD, MBA; 301–435–4616; UR70@nih.gov.
- John Stansberry PhD; 301–435–5236; js852e@nih.gov.

Collaborative Research Opportunity: The National Institute of Diabetes and Digestive and Kidney Diseases, Laboratory of Bioorganic Chemistry, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize the chrysophaeatin antibiotics. Please contact Marguerite J. Miller at 301–451–3636 or millermarg@niddk.nih.gov for more information.

Dated: March 29, 2011.

Richard U. Rodriguez, Director, Division of Technology Development and Transfer, Office of Technology Transfer, National Institutes of Health.