account for twenty percent of primary brain tumors and fifty percent of astrocytomas. These indications are designated as rare diseases as there is an annual 2–3 newly diagnosed cases of glioblastoma per 100,000 people in the United States whereas the astrocytoma incidence rate is 1.22 cases per 100,000 for individuals aged 0–19 years in the United States.

Applications:
• Blood based diagnostic assays.
• Assay for clinicians to choose effective treatments.
• Therapy to treat human glioblastoma.

Advantages:
• Non-invasive diagnostics.
• Easy, ready to use assays.

Development Status: The technology is currently in the pre-clinical stage of development.

Market: Brain cancer market was worth an estimated $1,094 million in 2009 and expected to reach $1.3 billion by 2016.

Inventor: Zheng-gang Liu (NCI).


Licensing Status: Available for licensing.

Licensing Contact: Jennifer Wong; 301–435–4633; wongje@mail.nih.gov.

Collaborative Research Opportunity: The National Cancer Institute, Cell and Cancer Biology Branch, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize this technology. Please contact John Hewes, Ph.D. at 301–435–3131 or hewesj@mail.nih.gov for more information.

Inflammatory Genes and MicroRNA–21 as Biomarkers for Colon Cancer Prognosis

Description of Invention: Colon adenocarcinoma is the leading cause of cancer mortality world-wide and accounts for approximately 50,000 deaths annually in the United States. Adjuvant therapies improve survival for stage III colon cancer patients; however, it remains controversial if stage II patients should be given these therapies. Some stage II patients will benefit from therapy (such as patients with undetectable micro-metastases where surgery will not be curative); but therapy for others will harm quality of life with little therapeutic benefit (such as patients where surgery removed all cancerous tissue and therefore do not need additional therapy). Thus, there is a need to for biomarkers capable of accurately identifying high risk, stage II patients that are suitable for therapeutic intervention.

The investigators have identified an inflammatory gene and microRNA biomarker portfolio that can predict aggressive colon cancer, colon cancer patient survival, and patients that are candidates for adjuvant therapy. These biomarkers provide clinicians with a powerful tool to diagnose colon cancer patients and chose effective treatment methods.

Applications:
• Method to predict aggressive form of colon cancer, especially in stage II cancer patients.
• Method to determine appropriate colon cancer patients for adjuvant therapy.
• Diagnostic arrays.

Advantages:
• Rapid, easy to use arrays to accurately predict colon cancer and patients suitable for adjuvant therapy.
• Method to stratify colon cancer patients for adjuvant therapy to minimize negative side effects.
• Method to identify stage II patients that are likely to have undetectable micro-metastases.

Development Status: The technology is currently in the pre-clinical stage of development.

Market:
• Global cancer market is worth more than eight percent of total global pharmaceutical sales.
• Cancer industry is predicted to expand to $85.3 billion by 2010.

Inventors: Curtis C. Harris and Aaron J. Schetter (NCI).


Licensing Status: Available for licensing.

Licensing Contact: Jennifer Wong; 301–435–4633; wongje@mail.nih.gov.

Collaborative Research Opportunity: The NCI Laboratory of Human. Carcinogenesis is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize cancer biomarkers and therapeutic targets. Please contact Curtis_Harris@nih.gov for more information.
chains. PNAs are synthetic molecules that possess the bases derived from DNA. This invention could revolutionize the way in which multivalent display is used in research as well as help make vaccinations or prevent disease.

**Applications:**
- Controlled interactions ensure only a single stoichiometry is attained.
- Simple access to a wide range of multivalent platforms.

**Development Status:** Early stage.

**Inventors:** Daniel Appella et al. (NIDDK).


**Licensing Status:** Available for licensing.

**Licensing Contact:** Charlene Sydnor, PhD; 301–435–4698; sydnorc@mail.nih.gov.

**Collaborative Research Opportunity:**
The NIDDK Laboratory of Bioorganic Chemistry is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize this novel scaffold or to collaborate on related laboratory interests. Please contact Marguerite J. Miller at 301–496–9003 and/or millermarg@niddk.nih.gov for more information.

**N-Methanocarba Adenosine Derivatives and Their Dendrimer Conjugates as A3 Receptor Agonists**

**Description of Invention:** This technology relates to specific (N)-methanocarba adenosine nucleosides that have been developed and dendrimers that connect these compounds to create molecules with multiple targets. Dendrimers are essentially repeated molecular branches presenting the core receptor-binding molecules. The compounds synthesized function as agonists and antagonists of a receptor of the G-protein coupled receptor (GPCR) superfamily. In particular, the receptors of interest for this invention include A3 adenosine receptors and agonists and antagonists of P2Y receptors, such as P2Y1, and P2Y14.

Dendrimer conjugates may have one or more advantages, such as increased solubility, reduced toxicity, and improved pharmacokinetic properties. They can also be used to connect other types of molecules without affecting the agonist or antagonists properties. For instance, molecules such as those used for imaging or tracing can be added. Dendrimers can also be used to link more than one type of agonist or antagonist to confer multiple functionalities. This technology provides a novel mechanism to treat a number of disorders related to dysregulation of A3 adenosine receptors.

**Applications:**
- Cardiac arrhythmias or ischemia
- Inflammation
- Stroke
- Diabetes
- Asthma
- Cancer
- Imaging

**Development Status:** Research quantities of compounds have been synthesized and tested for receptor selectivity.

**Inventors:** Kenneth A Jacobson and Dilib K. Tosh (NIDDK).


**Licensing Status:** Available for licensing.

**Licensing Contact:** Steven Standley, PhD; 301–435–4074; sstand@mail.nih.gov.

**Collaborative Research Opportunity:**
The National Institute of Diabetes and Digestive and Kidney Diseases, Laboratory of Bioorganic Chemistry, Molecular Recognition Section, is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize this technology. Please contact Dr. Kenneth Jacobson at kajacobs@helix.nih.gov for more information.

**Species-Independent A3 Adenosine Receptor Agonists Which May Be Useful for Treating Ischemia, Controlling Inflammation, and Regulating Cell Proliferation**

**Description of Invention:** This invention claims species-independent agonists of A3AR, specifically (N)-methanocarba adenosine nucleosides and pharmaceutical compositions comprising such nucleosides. The A3 adenosine receptor (A3AR) subtype has been linked with helping protect the heart from ischemia, controlling inflammation, and regulating cell proliferation. Agonists of the human A3AR subtype have been developed that are also selective for the mouse A3AR while retaining selectivity for the human receptor. This solves a problem for clinical development because animal model testing is important for pre-clinical validation of drug function. Novel agonists have been made that exhibit as much as 6000x selectivity for A3 versus A1 in humans while retaining at least 400x selectivity for A3 versus A1 in mice. In addition, the molecules of the invention exhibit very low nanomolar affinity. This innovation will not only facilitate moving A3 agonists into the clinical phase of drug development by being more amenable to animal studies, but also provide much greater selectivity in humans, and thereby potentially fewer side effects than drugs currently undergoing clinical trials.

**Applications:**
- Cardiac arrhythmias or ischemia
- Inflammation
- Stroke
- Diabetes
- Asthma
- Cancer

**Development Status:** Research quantities of compounds have been synthesized and tested for receptor selectivity.

**Inventors:** Kenneth A. Jacobson and Artem Melman (NIDDK).


**Licensing Status:** Available for licensing.

**Licensing Contact:** Steven Standley, Ph.D.; 301–435–4074; sstand@mail.nih.gov.

**Collaborative Research Opportunity:**
The NIDDK Laboratory of Bioorganic Chemistry is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize A3 Adenosine Receptor Agonists. Please contact Marguerite J. Miller at 301–496–9003 and millermarg@niddk.nih.gov for more information.

**Dated:** August 11, 2010.

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

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