

FCR 12

Office of the President
September 11, 2012

Members, Board of Trustees:

PATENT ASSIGNMENT REPORT

Recommendation: that the Board of Trustees accept the patent assignment report for the period April 1 through June 30, 2012.

Background: On March 4, 1997, the Board of Trustees authorized the University of Kentucky Research Foundation to conduct copyright and patent filings and prosecutions. Quarterly reports on patent and copyright applications are to be submitted to the Finance Committee of the Board.

Action taken: Approved Disapproved Other _____

PATENT ASSIGNMENT
QUARTERLY FOR THE PERIOD THROUGH June 30, 2012

Patents

The following assignment on behalf of the Board of Trustees of the University of Kentucky Research Foundation has been executed:

1. **U.S. Patent Application Serial Number: 13/479,899**

Filed: May 24, 2012

Title: High-Activity Mutants of Butyrylcholinesterase for Cocaine Hydrolysis

Inventors: Chang-Guo Zhan, Fang Zheng and Wenchao Yang (Pharmaceutical Sciences).

Technical Description: This invention relates to a method of treating a cocaine-induced condition through the use of butyrylcholinesterase (BChE) polypeptide variants that enhance the catalytic efficiency for (-)-cocaine and a suitable pharmaceutical carrier for the variants.

Summary: Cocaine mediates its reinforcing and toxic effects by blocking neurotransmitter reuptake, and the classical pharmacodynamic approach has failed to yield small-molecule receptor/transporter antagonists due to the difficulties inherent in blocking a blocker. An alternative approach is to interfere with the delivery of cocaine to its receptors/transporters and accelerate its metabolism in the body. The dominant pathway for cocaine metabolism in humans is butyrylcholinesterase (BChE)-catalyzed hydrolysis at the benzoyl ester group. More than 90% of cocaine is catalyzed by BChE. Human experiments have shown that enhancement of BChE activity by administering exogenous enzyme substantially decreases cocaine half-life. This invention discloses BChE variants that enhance the catalytic efficiency for (-)-cocaine and a suitable pharmaceutical carrier. The treatment described involves administering an effective amount of one of the BChE variants to lower blood cocaine concentration.

2. **U.S. Patent Application Serial Number: 13/474,882**

Filed: June 12, 2012

Title: Intranasal Opioid Composition

Inventors: Daniel P. Wermeling (Pharmacy Practice and Science)

Technical Description: This invention relates to intranasal opioid compositions with improved bioavailability and that improve patient compliance.

Summary: Pain is a major symptom of many diseases, including cancer, arthritis, neurological diseases, and heart attacks, and a patient's non-compliance or failure to take pain medication as prescribed has been linked to inadequate treatment of pain. Intranasal delivery of pain medications is being explored as an alternative to the intravenous route. Intranasal administration's advantages include non-invasive delivery, rapid drug absorption through the nasal mucosa, the convenience of not having to sterilize needles or dispose of them safely, fewer side effects, and less time commitment from both the patient and the medical professional. Opioids (e.g.,

morphine, methadone, hydromorphone, and butorphanol) play one of the most important roles in pain treatment. Several intranasal opioid formulations exist, but some have reduced bioavailability at conventional doses. This invention combines an effective amount of an opioid, a liquid nasal carrier for the opioid, and one or more sweeteners, flavoring agents, and/or masking agents. By disguising the taste of the medication, patients' resistance to taking medication regularly is reduced or eliminated.

3. **U.S. Patent Application Serial Number: 13/538,308**

Filed: June 29, 2012

Title: Few-layer Graphene Nanoribbon and a Method of Making the Same

Inventors: Douglas Strachan, Joseph Stieha, David Hunley, and Stephen Johnson (Physics and Astronomy).

Technical Description: The invention describes for the first time how few-layer graphene (FLG), consisting of less than 10 layers, can be catalytically etched with metallic nanoparticles along highly chryystallographic trenches or etch tracks to produce graphene nanoribbons with widths of less than 20 nm.

Summary: Graphene is a two-dimensional material with tremendous potential use in future nano-scale electronics while also providing a wealth of novel physical properties and phenomena. Confined graphene structures' electrical properties are expected to depend strongly on the orientation and nature of the confining boundaries and edges. These electrical properties might be engineered through fine control over these confining boundaries, and to achieve truly engineered graphene nano-electronics, it is expected that the boundaries must be controlled to at least sub-10 nm precision. Mass production of these confining boundaries has remained elusive. Unsuccessful top-down manufacturing techniques include electron-beam lithography, electron-beam milling, and ion-beam milling. Unsuccessful bottom-up techniques include tearing graphene nanoribbon strips and slicing open carbon nanotubes. This invention discloses a novel alternative approach—growing FLG film on a substrate, applying nanoparticles to the film's surface, and performing vapor etching to creates nanoribbons with widths of less than 20 nm. The production of mass parallel nanoribbon structures can be enhanced and altered for application by tuning various parameters.

Patent Activities
Fiscal year to date as of June 30, 2012

Number of Patent Applications	13
Number of Patents Issued	24
Patent Gross Revenue	\$1,652,263