FCR 15

Office of the President
September 9, 2016

Members, Board of Trustees:

PATENT ASSIGNMENT REPORT

Recommendation: that the Board of Trustees accept the patent assignment report for the period April 1, 2016 – June 30, 2016.

Background: At its March 1997 meeting, the Board of Trustees authorized the University of Kentucky Research Foundation to conduct all future 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 ASSIGNMENTS
FOR THE PERIOD APRIL 1, 2016 TO JUNE 30, 2016

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: 15/142,087**
Filed: April 29, 2016
Title: Compositions and Methods for Treating Retinal Degradation
Inventors: Jayakrishna Ambati and Benjamin Fowler (formerly ophthalmology & visual sciences)
Technical Description: This invention relates to methods of treating degradation of the retinal pigment epithelium by administering compositions containing a nucleoside and/or a nucleoside reverse transcriptase inhibitor.
Summary: Geographic atrophy, an advanced form of age-related macular degeneration (AMD) that causes blindness in millions of people worldwide and for which there is no approved treatment, results from the death of retinal pigmented epithelium (RPE) cells. This invention discloses the chemical structures of several embodiments of a composition containing a nucleoside and/or a nucleoside reverse transcriptase inhibitor to treat retinal damage and/or degeneration, a method for administering a therapeutically effective amount of the composition coupled with a pharmaceutically acceptable carrier to a subject, and a method for synthesizing the composition.

2. **U.S. Patent Application Serial Number: 15/149,940**
Filed: May 9, 2016
Title: 3-aryl-4*H*-chromene-4-ones as Antineoplastic Agents for the Treatment of Cancer
Inventors: Svitlana P. Bondarenko (not a UK employee), Mykhaylo S. Frasinyuk (not a UK employee), Chunming Liu, and David S. Watt (molecular and cellular biochemistry)
Technical Description: This invention relates to the use of novel 3-aryl-substituted 4*H*-chromen-4-ones, commonly referred to as isoflavonoids, to inhibit cancer cell growth, particularly prostate cancer.
Summary: The invention discloses numerous chemical structures of 3-aryl-substituted 4*H*-chromen-4-ones embodiments that have the potential for the treatment of prostate cancer. The invention also discloses a pharmaceutical composition of one or more of these embodiments and a pharmaceutically acceptable carrier or excipient. Another aspect of the invention includes a method of treating prostate cancer by administering an effective amount of one or more of the novel compounds or a pharmaceutical composition thereof.

3. **U.S. Patent Application Serial Number: 15/152,185**
Filed: May 11, 2016
Title: Arylquinoline, Arylquinolone and Arylthioquinolone Derivatives and Use Thereof to Treat Cancer
Inventors: David S. Watt, Chunming Liu, (molecular and cellular biochemistry), Vivek M. Rangnekar (microbiology, immunology and molecular genetics), Vitaliy M. Sviripa (molecular and cellular biochemistry), Ravshan Burikhanov, and Wen Zhang (microbiology, immunology and molecular genetics)
Technical Description: This invention discloses arylquinoline, arylquinolone and arythioquinolone derivatives that promote cells to secrete a pro-apoptopic tumor suppressor, which promotes apoptosis in cancer cells or metastatic cells.
Summary: Par-4 is a tumor suppressor protein that induces apoptosis in diverse cancer cells, but not in normal cells. Par-4 is universally expressed in normal cells and tissues, but it is sequestered by an intermediate filament protein vimentin, and, hence, circulating levels of Par-4 are generally low. Secretagogues that bolster the release of Par-4 would constitute an important therapeutic advance. This invention discloses arylquinoline, arylquinolone and arylthioquinolone derivatives that induce or promote Par-4 secretion from normal cells, thereby triggering the paracrine apoptosis of cancer cells,
pharmaceutical compositions of the derivatives coupled with a pharmaceutically acceptable carrier or excipient, a kit which includes the derivatives for use alone or in combination therapies, and a method of administering therapeutically effective amounts of the derivatives for cancer treatment. The invention also discloses biotinylated versions of the derivatives for non-radioactive detection of target molecules that may play a role in apoptosis induction in cells and a method for screening for compounds that inhibit vimentin binding to Par-4.

4. **PCT Patent Application Serial Number: 15/154,069**
Filed: May 13, 2016
Title: Compositions and Methods for Pest Management
Inventors: Bruce Allen Webb (entomology), Kendra Hilz Steele (not a UK employee) and Angelika Fath-Goodin (not a UK employee)
Technical Description: This invention discloses compounds and a method for controlling pest populations consisting of genetically modified nudiviruses which are capable of causing sterility in a target population and may be sexually transmitted.
Summary: A sexually transmitted insect virus, *Helicoverpa zea* nudivirus 2 (HzNV-2), was genetically modified to render more than 90% of infected *H. zea* sterile. Since the nudivirus is sexually transmitted, infected *H. zea* released in farming areas can spread it throughout a population, causing a collapse in the target insect population as a method of pest control. Numerous modified genetic sequences are disclosed. The invention also discloses a method of reducing a target population of lepidopteran moths by introducing an insect infected with one of the genetically modified nudiviruses into the population of interest, as well as a method of creating an insect capable of such transmission. Other features of this invention include using insects infected with the genetically modified nudivirus to protect a crop susceptible to a moth pest and a method of sterilizing an insect population by introducing the genetically modified nudivirus into a target insect population.

5. **U.S. Patent Application Serial Number: 15/155,627**
Filed: May 16, 2016
Title: Selective Immunoproteasome Inhibitors with Non-peptide Scaffolds
Inventors: Chang-Guo Zhan, Kyung Bo Kim, Vinod Kasam and Na-Ra Lee (pharmaceutical sciences)
Technical Description: This invention relates to immunoproteasome inhibitors with non-peptide scaffolds.
Summary: This invention discloses the chemical structures of dozens of immunoproteasome inhibitors with non-peptide backbones for the treatment of various cancers. These compounds selectively inhibit immunoproteasome 35i. The invention discloses compositions made of one of these compounds and a pharmaceutically acceptable carrier or excipient, and a method of inhibiting immunoproteoasome activity by administering one of the compositions. The compounds may be suspended in biodegradable polymers to make injectable depot forms of the drug, and polymers may be added to control the rate of drug release within the body.

6. **U.S. Patent Application Serial Number: 15/036,916**
Filed: May 16, 2016
Title: Arylquinoline and Analog Compounds and Use Thereof to Treat Cancer
Inventors: David S. Watt, Chunming Liu (molecular and cellular biochemistry), Vivek Rangnekar (microbiology, immunology and molecular genetics), Vitaliy M. Sviripa (molecular and cellular biochemistry), Ravashan Burikhanov, and Wen Zhang (microbiology, immunology and molecular genetics)
Technical Description: This invention relates to cancer treatment and/or treatment or inhibition of cancer metastasis through the use of arylquinoline compounds and analogs that promote cells to secrete a pro-apoptotic tumor suppressor, such as Par-4, which promotes apoptosis in cancer cells or metastatic cells.
Summary: Par-4 is a tumor suppressor protein that induces apoptosis in diverse cancer cells but not in normal cells. This invention discloses the method of using arylquinoline and analog compounds and compositions for the treatment of cancer or for the treatment or inhibition of cancer metastasis by administering an effective amount of the compound or a composition thereof, comprised of the compound and a pharmaceutically acceptable carrier and/or excipient. The chemical structures of numerous analogs are disclosed. The invention discloses a kit for use with patients which is comprised of one or more of the novel analogs for use in combination therapies. Additionally, the invention discloses a method for screening compounds that inhibit vimentin binding to Par-4.

7. **PCT Patent Application Serial Number: PCT/US2016/035239**
Filed: June 1, 2016
Title: Chloroquine Induction of Par-4 and Treatment of Cancer
Inventors: Vivek Rangnekar (microbiology, immunology and molecular genetics)
Technical Description: The invention relates to methods of treating cancer by administering chloroquine in amounts sufficient to induce production and/or secretion of the tumor suppressor prostate apoptosis response-4 (Par-4) by normal cells, preferably in an amount sufficient to inhibit proliferation and/or metastasis of cancer cells and/or reduce the recurrence of tumors.
Summary: The tumor suppressor Par-4 induces cell death specifically in cancer cells but not in normal cells. The basal level of Par-4 secreted by normal cells is inadequate to induce apoptosis of cancer cells or inhibit the growth of tumors. This invention discloses the discovery that the anti-malarial drug chloroquine induces robust Par-4 production from normal human and mouse cells and can be used to inhibit proliferation and/or metastasis of cancer cells and to inhibit recurrent tumor formation. Par-4 induction may be enhanced by administering chloroquine with curcumin and/or ibuprofen. This invention discloses that chloroquine induces Par-4 secretion via the classical secretory pathway that requires activation of p53. Mechanistically, p53 directly induces Rab8b, a GTPase essential for vesicle transport of Par-4 to the plasma membrane prior to secretion. The invention also discloses a method of treating a subject that has cancer cells that are p53-deficient and are resistant to apoptosis induced by Par-4 exposure by increasing the amount of Par-4 receptor on such cells by administering an effective amount of an NF-kB inhibitor.

8. **U.S. Patent Application Serial Number: 15/183,155**
Filed: June 15, 2016
Title: Green Synthesis Nanocomposite Membranes
Inventors: Dibakar Bhattacharyya, Vasile Smuleac (chemical and materials engineering) and Rajender Varma (not a UK employee)
Technical Description: This invention relates to a nanocomposite membrane incorporating metal nanoparticles synthesized *in situ* in the pores of the membrane via green synthesis techniques.
Summary: This invention discloses a macroporous polymer membrane including a plurality of pores and a plurality of metal nanoparticles synthesized and immobilized within said plurality of pores, with the nanoparticles reduced and capped with a green agent and a method of making such materials. Multiple variations are disclosed. Advantages include protection of the nanoparticles from oxidation and agglomeration, which provides more efficient and effective reductive degradation of toxic chlorinated organic compounds and other target contaminants or pollutants in a water supply.

Patent Activities
Fiscal year to date as of June 30, 2016

Number of Patent Applications	17
Number of Patents Issued	34
Patent Gross Revenue	$6,563,189.55