

FCR 3

Office of the President
October 29, 2002

Members, Board of Trustees:

PATENT ASSIGNMENT REPORT

Recommendation: that the patent assignment report for the period June 1, 2002 through September 30, 2002 be accepted.

Background: FCR 5, dated March 4, 1997, authorized that all future copyright and patent filings and prosecutions be conducted by the University of Kentucky Research Foundation (UKRF), and that the Vice President for Research and Graduate Studies or his designee be authorized to execute any needed documents to obtain appropriate patent or copyright protection. 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 JUNE 1, 2002 THROUGH SEPTEMBER 30, 2002

Patents

The following assignments on behalf of the Board of Trustees to the University of Kentucky Research Foundation have been executed:

1. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled "CO₂-SELECTIVE MEMBRANES CONTAINING AMINO GROUPS". Inventor: Dr. Winston Ho. This invention provides novel compositions suitable for CO₂-selective membranes. In one aspect, the present invention is directed to compositions comprising polyimide/polyamine blends and copolymers, and to compositions comprising interfacially polymerized polyamides. In another aspect this invention is directed to novel CO₂-selective membranes comprising such polyimide/polyamine blends and copolymers, and to novel CO₂-selective membranes comprising interfacially polymerized polyamides. In yet another aspect, the present invention is directed to a novel water-gas-shift (WGS) reactor comprising the novel CO₂-selective membranes. Advantageously, the use of the novel CO₂-selective membrane allows alteration of the normal WGS reaction equilibrium, shifting the reaction towards production of H₂. Carbon dioxide on the high pressure, feed gas side of the membrane reactor reacts with the novel membranes of the present invention at the interface between the feed gas and the membrane. The reaction product permeates through the membrane to the interface between the feed gas and the low pressure side of the membrane, where the CO₂-desorbs into the low pressure side and is removed.
2. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled "SYNTHESIS OF MULTI-WALL CARBON NANOTUBES USING UNSEEDED HYDROCARBON DIFFUSION FLAMES". Inventors: Dr. Kozo Saito, Dr. Forman Williams, Dr. Alvin Gordan and Mr. Liming Yuan. This invention provides a method for synthesizing carbon nanotubes from unseeded methane-air diffusion flames. A novel stainless steel and Ni-Cr wire probe is also provided for collecting carbon nanotubes from those diffusion flames.
3. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled "SUBSTITUTED PENTACENES AND ELECTRONIC DEVICES MADE WITH SUBSTITUTED PENTACENES". Inventor: Dr. John E. Anthony. This invention provides novel substituted pentacenes and electronic devices made with those substituted pentacenes.
4. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled "FEEDBACK-REGULATED EXPRESSION SYSTEM AND USES THEREOF". Inventors: Drs. Arthur G. Hunt, Qingshun Li and Tomal Dattaroy. This invention provides a feedback-regulated expression system comprising a nucleic acid construct comprising a first polynucleotide encoding an elicitor

operably linked to a first plant promoter comprising at least one *E. coli* lac operator (LacO) located between the promoter TATAa box and the translation initiation site of the first polynucleotide, wherein the first plant promoter is constitutive; and a second polynucleotide encoding an *E. coli* lac repressor (LacI) operably linked to a PR gene. The invention further provides a feedback-regulated expression system used to generate transgenic plants that have enhanced resistance to plant pathogens.

5. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled “PROCESS FOR THE CONTINUOUS PRODUCTION OF ALIGNED CARBON NANOTUBES”. Inventors: Drs. David N. Jacques and Rodney J. Andrews. This invention provides novel methods and apparatus for continuous production of aligned carbon nanotubes. In one aspect, the method comprises dispersion of a metal catalyst in a liquid hydrocarbon to form a feed solution, and volatilizing the feed solution in a reactor through which a substrate is continuously passed to allow growth of nanotubes thereon. In another aspect, the apparatus comprises a reactor, a tube-within-a-tube injector, and a conveyor belt for passing a substrate through the reactor. The present invention further discloses a method for restricting the external diameter of carbon nanotubes produced thereby comprising passing the feed solution through injector tubing of a specified diameter, followed by passing the feed solution through an inert, porous medium. The method and apparatus of this invention provide a means for producing aligned carbon nanotubes of a particular external diameter which is suitable for large scale production in an industrial setting.
6. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled “AMYLOID PEPTIDE INACTIVATING ENZYME TO TREAT ALZHEIMER’S DISEASE”. Inventor: Dr. Louis B. Hersh. This invention provides a method of treating patients with Alzheimer’s Disease by increasing the expression and activity of amyloid peptide inactivating enzyme.
7. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled “MULTIMODE STRUCTURE FOR CURRENT MEASUREMENT, ULTRASONIC AND NEAR-IR SPECTRUM COLLECTING AND PROCESSING”. Inventor: Dr. Robert A. Lodder. This invention provides a compact device and method for collecting and processing acoustic and near-IR spectra of a bio-sample. The device has a spectrometric unit and, in proximity to an outer surface of the spectrometric unit, is a unit for processing spectral data collected by the spectrometric unit. The spectrometric unit out surface has: an acoustic energy transmission port and a near-IR radiation port for applying, respectively, acoustic energy and near-IR radiation to the bio-sample in the presence of a magnetic field; an electrode-terminal for measuring an electrical signal; an acoustic wave receiving port; and a near-IR radiation receiving port. The processing unit is preferably adaptable for performing at least one numeric operation on at least a portion of the data collected. The method includes: positioning an outer surface of a spectrometric unit nearby a surface of the bio-

sample in the presence of a magnetic field; receiving acoustic waves and near-IR radiation with, respectively, an acoustic wave receiving port and a near-IR radiation receiving port; measuring an electrical signal with at least one electrode-terminal on the outer surface; and processing spectral data collected by the spectrometric unit.

8. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled “2,6-DISUBSTITUTED PIPERIDINES AS MODULATORS OF NICOTINIC ACETYLCHOLINE RECEPTOR MEDIATED NEUROTRANSMITTER RELEASE, UPTAKE AND STORAGE”. Inventors: Drs. Peter Crooks, Linda Dwoskin, Vladimir Grinevich, Dennis K. Miller, Seth D. Norrholm, and Guangrong Zheng. This invention provides 2,6-disubstituted piperidines useful for treating dependence on or withdrawal from a drug of abuse, for an eating disorder or for a CNS disease or pathology.
9. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled “SELECTIVE PARP-1 TARGETING FOR DESIGNING CHEMO/RADIO SENSITIZING AGENTS”. Inventor: Dr. Marcos Oliveira. Poly(ADP-ribose) polymerase-1 (PARP-1) is a central signaling enzyme in a cell nucleus. PARP-1 is a target for the development of radio and chemo sensitizing agents in cancer treatment as well as providing protection from stroke. An SH3 domain and an SH3 ligand domain have now been discovered on the PARP-1 protein. These domains are involved in PARP-1 activation. This discovery makes possible the use of bioinformatics tools for the design of new drugs and strategies for drug target selection, specifically targeting the PARP-1 enzyme.
10. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled “COMPOSITION AND METHOD OF USING THE MIRABILIS MOSAIC CAULIMOVIRUS SUB-GENOMIC TRANSCRIPT (SGT) PROMOTER FOR PLANT GENETIC ENGINEERING”. Inventors: Dr. Indu B. Maiti and Dr. Nrisingha Dey. This invention provides for the isolation of and methods of using a sub-genomic transcript (Sgt) promoter from mirabilis mosaic virus (MMV). A 333 bp MMV Sgt promoter fragment (sequence -306 to +27 from the transcription start site, TSS) was found to be sufficient for strongest promoter activity. This MMV Sgt promoter fragment shows comparable promoter activity to the MMV PLt promoter both in transgenic plants and in protoplasts. The MMV Sgt promoter also demonstrates much greater activity compared to cauliflower mosaic virus (CaMV) 19S promoter and 35S promoter. The MMV Sgt promoter fragment and any chimeric gene to which it may be linked are useful for plant genetic engineering to obtain transgenic plants, plant cells and seeds.
11. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled “SYSTEM AND METHOD FOR SENSING A CHARACTERISTIC OF A FLUID AND RELATED APPARATUS”. Inventor: Dr. Fred Payne. This invention provides an apparatus for use in measuring, sensing or detecting a characteristic of a fluid, such as a liquid food product. The apparatus includes a body having a pocket for

positioning adjacent to the opening in a pipe or like structure for receiving a portion of a fluid therein. In one possible use, a first optical medium, such as an optical fiber, transmits light from a source toward a portion of the fluid flow entering the pocket. Light received by one or more optical mediums positioned in backscatter, sidescatter, or transmission configurations relative to the first optical medium is detected by a corresponding sensor or detector. Using the output of this sensor or detector, an optical characteristic of the fluid may be measured. An overall system using the apparatus and related method for detecting an optical characteristic of a fluid are also disclosed.

12. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled "METHODS AND COMPOSITIONS FOR CRYOPRESERVATION OF BIOLOGICAL CELLS AND TISSUES". Inventors: Dr. Dayong Gao, Dr. Gary Van Zant and Dr. Xiangdong Cui. This invention provides methods, compositions and devices for achieving optimal cooling of living cells during cryopreservation. In one aspect, the method comprises gradually cooling the cell to a first predetermined temperature, followed by rapidly cooling the cell to a second predetermined temperature. In another aspect, a device is described for achieving a desired cooling rate for a cell, comprising a first container for holding a cell, a second container for holding the first container, and optionally a frame for holding the first container in a spaced apart relationship with the second container. The method of the invention comprises placing cells into the first container, placing the first container in the second container and sealing the second container, and placing the second container in a suitable cooling device. A software program is provided for calculating the required materials and dimensions of the device to achieve a particular cooling rate with a high degree of accuracy. In yet another aspect, novel cryoprotectant compositions are provided comprising conventional cryoprotectant plus one or more high molecular weight cryoprotectants.

13. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled "BUBBLE COLUMN APPARATUS FOR SEPARATING WAX FROM CATALYST SLURRY". Inventors: Dr. James K. Neathery and Dr. Burtron H. Davis. This invention provides novel methods and devices for production of liquid hydrocarbon products from gaseous reactants. In one aspect, a method for separating a liquid hydrocarbon, typically a wax, from a catalyst containing slurry is provided, comprising passing the slurry through at least one downcomer extending from an overhead separation chamber and discharging into the bottom of a slurry bubble column reactor. The downcomer includes a cross-flow filtration element for separating a substantially particle-free liquid hydrocarbon for downstream processing. In another aspect, a method for promoting plug-flow movement in a recirculating slurry bubble column reactor is provided, comprising discharging the recirculating slurry into the reactor through at least one downcomer which terminates near the bottom of the reactor. Devices for accomplishing the above methods are also provided.

14. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled “METHOD AND DEVICE FOR REMOVAL OF CRYOPROTECTANT FROM CRYOPRESERVED BIOLOGICAL CELLS AND TISSUES”. Inventors: Dr. Dayong Gao, MingDong Liu, and Dr. Xiangdong Cui. This invention provides methods and devices for removing cryoprotectant from cryoprotectant-containing liquids, and from cells residing therein. In one aspect the method comprises passing the cryoprotectant containing liquid through at least one semipermeable hollow fiber membrane contained in a hollow module in a first direction, while passing a liquid which is substantially free of cryoprotectant through the hollow module in a second direction to remove cryoprotectant across a diffusion gradient. In another aspect, a device is described for removing cryoprotectant from a liquid, comprising a hollow module with at least one semipermeable hollow fiber membrane therein for accomplishing such counter-current diffusion removal of cryoprotectant. A software program is also provided for predicting optimal flow rates through the device of the invention, thereby allowing optimal cryoprotectant removal regardless of the cryoprotectant used or the material from which the semipermeable hollow fiber membrane is fabricated.
15. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled “PHARMACEUTICAL FORMULATION FOR POORLY WATER SOLUBLE CAMPTOTHECIN ANALOGUES”. Inventors: Dr. Tiang-Xiang and Dr. Bradley D. Anderson. This invention provides a general method to retard the precipitation inception time for poorly water-soluble camptothecin analogues from a supersaturated solution by chemical conversion approach via pH alteration. This method is successfully utilized to prepare stable parenteral formulations for silatecan 7-t-butyldimethylsilyl-10-hydroxycamptothecin (DB-67), a poorly water-soluble lipophile camptothecin analog, in aqueous solutions containing b-cyclodextrin sulfobutyl ether or other solubilizing agents. The formulations manufactured by this method are more simple and cost-effective, of higher doses and better quality in terms of manufacture loss and formulation stability, and can be free of organic solvents.
16. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled “SEAL ASSEMBLY FOR MACHINERY HOUSING”. Inventors: Dr. L. Scott Stephens and Dr. Kevin W. Kelly. This invention provides a seal assembly for a machinery housing and consists of a seal ring having a micro heat exchanger and a gland plate for securing the seal ring to the machinery housing. The gland plate includes a cooling fluid port in communication with the micro heat exchanger.
17. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled “CIS-2,6-DISUBSTITUTED PIPERIDINES FOR THE TREATMENT OF CENTRAL NERVOUS SYSTEM DISORDERS”. Inventors: Dr. Linda P. Dwoskin, Peter A. Crooks, and Marlon D. Jones. This invention provides Cis-2,6-disubstituted piperidine analogs, or lobeline analogs which are used to treat diseases of the

central nervous system, drug abuse and withdrawal therefrom as well as eating disorders.

18. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled “AGENTS AND METHOD FOR MODULATING INTERACTIONS BETWEEN GONADOTROPIN HORMONES AND THEIR RECEPTORS”. Inventors: Dr. Tae H. Ji and Dr. Inhae Ji. This invention provides agents and methods for the modulation of gonadotropin hormones and their receptors, including methods of treating gonadotropin disorders and conditions and screening and development of therapies. Specifically, the present invention relates to modulation of gonadotropin hormones through the inhibition of activity of leucine rich repeats on the exodomain of the gonadotropin hormone receptors. The present invention also relates to methods and compositions for activating adenylyl cyclase to produce cAMP with a hormone-receptor complex, via trans- or cis- activation.
19. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled “GENE EXPRESSION PROFILE BIOMARKERS AND THERAPEUTIC TARGETS FOR BRAIN AGING AND AGE-RELATED COGNITIVE IMPAIRMENT”. Inventors: Drs. Philip W. Landfield, Eric M. Blalock, Kuey-Chu Chen and Thomas Foster. This invention provides a statistical and functional correlation strategy to identify changes in cellular pathways specifically linked to impaired cognitive function with aging. Analyses using the strategy identified multiple groups of genes expressed in the hippocampi of mammals, where the genes were expressed at different levels for several ages. The aging changes in expression began before mid-life. Many of the genes were involved in specific neuronal and glial pathways with previously unrecognized relationships to aging and/or cognitive decline. The process identified by the strategy suggest a new hypothesis of brain aging in which initially decreased neuronal activity and/or oxidative metabolism trigger separate but parallel genomic cascades in neurons and glia. In neurons, the cascade results in elevations in calcium signaling and reductions of immediate early gene signaling, biosynthesis, synaptogenesis and neurite remodeling. In contrast, glia undergo increased lipid metabolism and mediate a cycle of demyelination and remyelination that induces antigen presentation, inflammation, oxidative stress and extracellular restructuring.

These identified genes and the proteins they encode can be used as novel biomarkers of brain aging and as targets for developing treatment methods against age-related cognitive decline, Alzheimer’s Disease and Parkinson’s Disease.

20. U.S. Patent Serial Number: (to be assigned), filed (to be filed), titled “TUBULAR FILTER WITH BRANCHED NANOPOROUS MEMBRANE INTEGRATED WITH A SUPPORT AND METHOD OF PRODUCING SAME”. Inventors: Drs. The inventors are Drs. Craig A. Grimes and Dawei Gong. This invention provides a nanoporous tubular filter having a membrane comprising a network of generally branched pores formed by anodization of a section of metal tubing. The network extends from an inner wall of the filter to and through an outer exposed

wall area of the membrane, and has a first layer of pores with a diameter greater than that of pores of an adjacent second layer. Further, the network is integral with an outer support matrix having been formed of an outer wall of the section of tubing by removing selected portions of the outer wall, thus leaving the exposed wall area of the membrane. The outer support matrix corresponds with a patterned area formed of an external-coat applied to the tubing's outer wall. An electroplating of a magnetostrictive material deposited on the outer support matrix or on an interior surface is adapted for use as a diffusion ON-OFF switch. The filter is adaptable for use as a hydrogen reactor whereby an electroplating of a catalyst material is deposited on at least a portion of the filter's inner wall. Also, a method for producing a nanoporous tubular filter that includes the steps of: applying an external-coat to an exterior surface of an outer wall of a section of metal tubing; anodizing the section of tubing at a first voltage for a first time-period then at a second voltage for a second time-period, a membrane produced thereby comprising a network of generally branched pores; and forming a patterned area to cover that portion of the outer wall that will form an outer support matrix.