FCR 21

Office of the President
June 13, 2024

Members, Board of Trustees:

PATENT ASSIGNMENT REPORT

Recommendation: that the Board of Trustees accept the patent assignment report for the period January 1, 2024 to March 31, 2024.

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 January 1, 2024 TO March 31, 2024

Patents

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

1. **U.S. Patent Application Number:** 18/228,452[1]
UKRFID: 2076
Filed: July 31, 2024
Title: COMPOSITIONS AND METHODS OF MODULATING 15-PGDH ACTIVITY
Inventors: Hsin-Hsiung Tai (formerly College of Pharmacy), Sanford Markowitz, James Willson, Bruce Posner, Joseph Ready, Youngyou Zhang, Monica Antczak, Stanton Gerson, KiBeom Bae, Sung Yeun Yang and Amar Desai.
Description and Application: The invention is a novel composition 15-PGDH inhibitor to treat gastrointestinal disease. The global market for the treatment of gastrointestinal disease is expected to reach $93.8 billion by 2032 with a compound annual growth rate (CAGR) of 6.21%.
License: Exclusively licensed to Rodeo Therapeutics Corporation

2. **U.S. Patent Application Number:** 18/557,411[2]
UKRFID: 2556
Filed: October 26, 2023
Title: DUAL-COLOR CSPBBR3 NANOCRYSTALS PREPARED BY WATER
Inventors: Fuqian Yang and Xiaobing Tang (College of Engineering)
Description and Application: This is a novel “green” method of preparing CsPbBr3 perovskite nanocrystals. CsPbBr3 perovskite nanocrystals have excellent optoelectronic properties such as large light absorption coefficient, high carrier mobility, long diffusion length, and thus have good application prospects in solar cells, photodetectors, high-energy radiation detectors and other fields. The novel method of preparation replaces harmful organic solvents used in producing perovskite nanocrystals with deionized water. The global perovskite solar cell market was valued at $400 million in 2020 and is expected to reach $6.6 billion by 2030 growing at a CAGR of 32.4%.
License: NA

[1] Informed of filing this quarter by Case Western Reserve University.
[2] Capture of late reporting by outside counsel.

3. **U.S. Patent Application Number:** 18/405,778
UKRFID: 2777
Filed: January 5, 2024
Title: DENDRITIC CELL-DERIVED VESICLES AND ACTIVATION OF ANTIGEN-SPECIFIC T-CELLS
Inventors: Jill Kolesar (College of Pharmacy) and Christopher Richardson (College of Arts and Sciences)
Description and Application: The invention is a novel composition and methods for activating antigen-specific T-cells. Antigen-specific T-cells are activated by harnessing the ability of dendritic cells. These dendritic cell membrane derived nanovesicles can be used in immunotherapy applications to target tumor cells. The global cancer therapeutic market size is expected to be $393.6 billion by 2032 with a CAGR of 9.2%.
License: Option in negotiations

4. **U.S. Patent Application Number:** 18/291,367
UKRFID: 2539
Filed: January 23, 2024
Title: INTELLIGENT MACHINE VISION SYSTEM FOR IN-PROCESS TOOL INHIBITION OF NEUROFIBRILLARY TANGLES USING OLIGONUCLEOTIDES AGAINST CIRCULAR RNAS FROM THE MICROTUBULE ASSOCIATED PROTEIN TAU (MAPT) LOCUS
Inventors: Stefan Stamm and Justin Welden (College of Medicine)
Description and Application: This invention is a novel method of targeting neurofibrillary tangles and related tauopathies by targeting circular RNAs. Targeting occurs by back splicing between exons from the microtubule associated protein tau (MAPT) locus, and by targeting translation thereof, to increase the translation of MAPT and other circular RNAs through adenosine to inosine (A>I) RNA editing. The global market for Alzheimer therapeutics was $18 billion in 2018 with an expected CAGR of 4.6% until 2026.
License: Optioned to CircCure Corporation

5. **U.S. Patent Application Number:** 18/439,523
UKRFID: 1935
Filed: February 12, 2024
Title: COMPOSITIONS AND METHODS FOR TREATING RETINAL DEGRADATION
Inventors: Jayakrishna Ambati, Benjamin Fowler and Kameshwari Ambati (formerly College of Medicine)
Description and Application: These are methods to treat degradation of the retinal pigment epithelium (RPE) by administering compositions with a nucleoside and/or a nucleoside reverse transcriptase inhibitor (NRTI). Geographic atrophy, an advanced form of age-related macular degeneration, causes blindness in millions of people worldwide. There are no approved treatments, and it results from death of RPE cells. The inventive treatment to reduce RPE cell death includes: 1)

inhibiting inflammasome activation 2) reducing permeability of a cell 3) reducing the amount of mitochondrial reactive oxygen species in the cell and/or 4) inhibiting activation of at least one inflammasome in a subject's eye. The global pharmaceutical market for age-related macular degeneration is expected to reach $18.7 billion in 2028.
License: Exclusive License to Inflammasome Therapeutics, Inc.

6. **U.S. Patent Application Number:** 18/441,876
UKRFID: 2730
Filed: February 14, 2024
Title: INTERACTIVE INDICATOR SENSING TOURNIQUET
Inventors: Brittany Levy, Jennifer Castle (College of Medicine) and Grant Levy
Description and Application: A novel interactive tourniquet for untrained personnel. The tourniquet system includes sensors downstream of the pressure application location and audible feedback provided when sufficient pressure is reached. The global tourniquet market is expected to reach $873 million by 2030 with a 7.9% CAGR.
License: Optioned to TourniTech, LLC

7. **U.S. Patent Application Number:** 18/442,752
UKRFID: 2715
Filed: February 15, 2024
Title: PHENOTHIAZINE DERIVATIVES AND REDOX-FLOW BATTERY
Inventors: Susan Odom and Paban Sitaula (formerly College of Arts and Sciences)
Description and Application: Novel phenothiazine derivatives suitable for a redox-flow battery. The phenothiazine derivatives are permanent-charge-bearing that are redox-active, have beneficial solubility, and do not require supporting salts when used in redox flow battery applications. Redox flow batteries are useful as grid-energy storage devices because power and energy density are independently scalable. The global market for redox flow batteries is expected to reach $805 million by 2028 with a CAGR of 22.8%.
License: N/A

8. **U.S. Patent Application Number:** 18/685,208
UKRFID: 2584
Filed: February 20, 2024
Title: DOWNREGULATION OF CIRCULATING GHRELIN AND THERAPEUTIC APPLICATIONS THEREOF
Inventors: Chang-Guo Zhan and Fang Zheng (College of Pharmacy)
Description and Application: This invention is a novel method of treating substance use disorder by inactivating ghrelin by administering a ghrelin hydrolase to convert the ghrelin to desacyl-ghrelin. The ghrelin hydrolase includes butyrylcholinesterase polypeptide variant. The treatment is also useful for appetite control or as an anti-obesity therapeutic. The global market for appetite control is $191 billion with an expected CAGR between 6-9%. The global market for

substance use disorder was $10 billion in 2021 with an expected CAGR of 9% until 2031.
License: N/A

9. **U.S. Patent Application Number:** 18/583,392
UKRFID: 2672
Filed: February 21, 2024
Title: METHOD OF TREATING PULMONARY FIBROSIS BY TARGETING GLYCOGEN UTILIZATION
Inventors: Matthew Gentry, Ramon Sun, Ronald Bruntz (formerly College of Medicine) and Christopher Waters (College of Medicine)
Description and Application: The invention is a novel treatment for pulmonary fibrosis. Pulmonary fibrosis is an incurable disease that affects hundreds of thousands of patients. The novel treatment includes administering either a glycogen phosphate inhibitor, acid alpha-glucosidase inhibitor, glycogen synthase inhibitor, glycogen phosphorylase inhibitor or combinations thereof. The global pulmonary fibrosis market is expected to reach $11.7 billion by 2031 with a CAGR of 7.3%
License: Option in Negotiations

10. **U.S. Patent Application Number:** 18/688,945
UKRFID: 2609
Filed: March 4, 2024
Title: QUALITY ASSURANCE DEVICE FOR A MEDICAL ACCELERATOR
Inventors: Janelle Molloy, Allison Palmiero and Justin Visak (formerly College of Medicine)
Description and Application: This invention is a novel apparatus adapted for automated quality assurance device alignment for radiation therapy. The novel apparatus automatically repositions and changes the angular orientation of a quality assurance device. The apparatus includes a base and a translation stage. The translation stage includes a cradle, rotation adjustment assembly, tile adjustment assembly, and position sensor. The radiation therapy quality assurance market is expected to reach $36 million by 2028 with a CAGR of 4.5%.
License: Licensed to Iridesce Solutions, Inc.

11. **U.S. Patent Application Number:** 18/613,399
UKRFID: 2717
Filed: March 22, 2024
Title: COMPOSITION AND METHOD FOR SUPPRESSING PERCEPTION OF SMOKE OR VAPOR ODOR AND FOR SMOKING OR VAPING CESSATION
Inventors: Timothy McClintock and Dong Young Han (College of Medicine)
Description and Application: The invention is a novel method for cessation of smoking or vaping using an odorant or agent for masking an odor. The odorant includes an agent for masking the odors of 1-pentanethiol, guaiacol or combinations thereof. The odorant may also include citronella and methyl-2-

methylbutyrate. The smoking cessation market is expected to reach $54 billion by 2031 with an expected CAGR of 10.6%.
License: NA

12. **International Application Number:** PCT/US2024/10576
UKRFID: 2740
Filed: January 5, 2024
Title: 3D MICROFLUIDIC DEVICE AND METHOD OF SEPARATING PARTICLES BY SIZE FROM A SUSPENSION
Inventors: Guigen Zhang (College of Engineering)
Description and Application: A novel three-dimensional (3D) microfluidic device and its use. The 3D device may be printed and provide stable alignment, focusing, fractionation and separation of conventional particles, including bioparticles. The global microfluidic market is expected to reach $41 billion by 2028 with a CAGR of 13%.
License: N/A

13. **International Application Number:** PCT/US2024/10575
UKRFID: 2752
Filed: January 5, 2024
Title: 3D MICROFLUIDIC TRANSFECTION DEVICES AND METHOD OF TRANSFECTING TARGET CELLS WITH A TRANSFECTION AGENT
Inventors: Guigen Zhang and Sheng Tong (College of Engineering)
Description and Application: A novel three-dimensional (3D) printed microfluidic device enabling cell transfection in a continuous flow-through and clog-free manner. The 3D device increased uniformity, consistency and efficiency with minimal adverse effects. The global transfection market is expected to reach $1.8 billion by 2028 with a CAGR of 9.4%.
License: N/A

14. **International Application Number:** PCT/US2024/12494
UKRFID: 2718
Filed: January 23, 2024
Title: A STAGED-FEED POST-COMBUSTION CO2 CAPTURE TECHNOLOGY FOR FLUE GAS STREAM
Inventors: Kunlei Liu, Zhen Fan, Heather Nikolic and Reynolds Frimpong (Center for Applied Energy Research)
Description and Application: The invention is a novel system for capturing carbon dioxide from a gas stream. The system includes staged absorbent regeneration, staged absorber feed applied through spray nozzles in the absorber, heat integration, maintaining a low temperature at the bottom of the packing, and eliminating additional flue gas feed blower via increasing back pressure. The global carbon capture market size is expected to reach $5 billion by 2026 with a CAGR of 15%.
License: N/A

15. **Foreign Application Number:** EP 22846864.1
UKRFID: 2539
Filed: February 22, 2024
Title: INTELLIGENT MACHINE VISION SYSTEM FOR IN-PROCESS TOOL INHIBITION OF NEUROFIBRILLARY TANGLES USING OLIGONUCLEOTIDES AGAINST CIRCULAR RNAS FROM THE MICROTUBULE ASSOCIATED PROTEIN TAU (MAPT) LOCUS
Inventors: Stefan Stamm and Justin Welden (College of Medicine)
Description and Application: This invention is a novel method of targeting neurofibrillary tangles and related tauopathies by targeting circular RNAs. Targeting occurs by back splicing between exons from the microtubule associated protein tau (MAPT) locus, and by targeting translation thereof, to increase the translation of MAPT and other circular RNAs through adenosine to inosine (A>I) RNA editing. The global market for Alzheimer therapeutics was $18 billion in 2018 with an expected CAGR of 4.6% until 2026.
License: Licensed to CircCure

16. **Foreign Application Number:** CA 3,233,404
UKRFID: 2609
Filed: March 29, 2024
Title: QUALITY ASSURANCE DEVICE FOR A MEDICAL ACCELERATOR
Inventors: Janelle Molloy, Allison Palmiero and Justin Visak (formerly College of Medicine)
Description and Application: This invention is a novel apparatus adapted for automated quality assurance device alignment for radiation therapy. The novel apparatus automatically repositions and changes the angular orientation of a quality assurance device. The apparatus includes a base and a translation stage. The translation stage includes a cradle, rotation adjustment assembly, tile adjustment assembly, and position sensor. The radiation therapy quality assurance market is expected to reach $36 million by 2028 with a CAGR of 4.5%.
License: Licensed to Iridesce Solutions, Inc.

Patent Activities
Fiscal Year to Date as of March 31, 2024

Total FY2023-24					
	FY24Q1	FY24Q2	FY24Q3	FY24Q4	Total FY24
Invention Disclosures[i]	24	34	49	0	107
Full Patent Applications[ii]	22[3]	16[4]	14	0	52
Provisional Patent Applications[iii]	18	15	25	0	58
Patents Issued	11[5]	12[6]	6	0	29
License Income	$446,360.22	$3,380,740.08	$332,705.97	$0	$4,159,806.27
New Licenses and Options Executed	13	17	14	0	44
New UK Startups Formed	2	3	0	0	5

[3] Capture of application filed by collaborative institution.
[4] Capture of late reporting from outside counsel.
[5] Capture of late reported foreign issuance.
[6] Capture of three late reported foreign issuances.

Patent Activities
FY2022-23

Total FY2022-23					
	FY23Q1	FY23Q2	FY23Q3	FY23Q4	Total FY23
Invention Disclosures[iv]	24	34	31	25	114
Full Patent Applications[v]	25	15	16	11	67
Provisional Patent Applications[vi]	24	20	23	27	94
Patents Issued	8	6	12	6	32
License Income	$317,370.67	$172,263.56	$103,698.50	$214,573.50	$807,906.23
New Licenses and Options Executed	7	5	14	11	37
New UK Startups Formed	3	0	1	1	5

Patent Application Summary Table

Inventors	College(s)	Title	Brief description
Biomedical			
Hsin-Hsiung Tai, Sanford Markowitz, James Willson, Bruce Posner, Joseph Ready, Youngyou Zhang, Monica Antczak, Stanton Gerson, KiBeom Bae, Sung Yeun Yang and Amar Desai.	College of Pharmacy	Compositions and methods of modulating 15-pgdh activity	A novel composition to treat gastrointestinal disease.
Jill Kolesar and Christopher Richardson	College of Pharmacy	Dendritic cell-derived vesicles and activation of antigen-specific T-cells	A novel composition and methods to activate antigen-specific T-cells.

Inventors	College(s)	Title	Brief description
Stefan Stamm and Justin Welden	College of Medicine	Intelligent machine vision system for in-process tool inhibition of neurofibrillary tangles using oligonucleotides against circular RNAs from the microtubule associated protein tau (MAPT) locus	A novel method to target neurofibrillary tangles and related tauopathies by targeting circular RNAs.
Jayakrishna Ambati, Benjamin Fowler and Kameshwari Ambati	College of Medicine	Compositions and methods for treating retinal degradation	Methods to treat degradation of the retinal pigment epithelium (RPE).
Brittany Levy, Jennifer Castle and Grant Levy	College of Medicine	Interactive indicator sensing tourniquet	A novel interactive tourniquet for untrained personnel.
Chang-Guo Zhan and Fang Zheng	College of Pharmacy	Downregulation of circulating ghrelin and therapeutic applications thereof	A novel method to treat substance use disorder by inactivating ghrelin by administering a ghrelin hydrolase.
Matthew Gentry, Ramon Sun, Ronald Bruntz and Christopher Waters	College of Medicine	Method of treating pulmonary fibrosis by targeting glycogen utilization	A novel treatment for pulmonary fibrosis.

Inventors	College(s)	Title	Brief description
Janelle Molloy, Allison Palmiero and Justin Visak	College of Medicine	Quality assurance device for a medical accelerator	A novel apparatus adapted for automated quality assurance device alignment for radiation therapy.
Timothy McClintock and Dong Young Han	College of Medicine	Composition and method for suppressing perception of smoke or vapor odor and for smoking or vaping cessation	A novel method for cessation of smoking or vaping using an odorant or agent for masking an odor.
Stefan Stamm and Justin Welden	College of Medicine	Intelligent machine vision system for in-process tool inhibition of neurofibrillary tangles using oligonucleotides against circular RNAs from the microtubule associated protein tau (MAPT) locus	A novel method to target neurofibrillary tangles and related tauopathies by targeting circular RNAs.
Janelle Molloy, Allison Palmiero and Justin Visak	College of Medicine	Quality assurance device for a medical accelerator	A novel apparatus adapted for automated quality assurance device alignment for radiation therapy.

Engineering			
Guigen Zhang	College of Engineering	3D microfluidic device and method of separating particles by size from a suspension	A novel three-dimensional (3D) microfluidic device and its use.

Inventors	College(s)	Title	Brief description
Guigen Zhang and Sheng Tong	College of Engineering	3D microfluidic transfection devices and method of transfecting target cells with a transfection agent	A novel three-dimensional (3D) printed microfluidic device enabling cell transfection.
Fuqian Yang and Xiaobing Tang	College of Engineering	Dual-color CsPbBr3 nanocrystals prepared by water	A novel method of preparing CsPbBr3 perovskite nanocrystals.
Center of Applied Energy Research			
Kunlei Liu, Zhen Fan, Heather Nikolic and Reynolds Frimpong	CAER	A staged-feed post-combustion CO2 capture technology for flue gas stream	A novel system for capturing carbon dioxide from a gas stream.
College of Arts and Sciences			
Susan Odom and Paban Sitaula	College of Arts and Sciences	Phenothiazine derivatives and redox-flow battery	Novel phenothiazine derivatives suitable for a redox-flow battery.

[i] Invention disclosures include new technologies and intellectual property disclosed to the Office of Technology Commercialization (OTC) that do not fall under an existing technology number. This number captures the potential new intellectual property disclosed to OTC.

[ii] Full patent applications, as used by OTC, include nonprovisional patent application filings at the United States Patent and Trademark Office (USPTO), Patent Cooperation Treaty filings, and foreign patent application filings. These are technologies that are assigned to the University of Kentucky that OTC has identified to invest further into in an effort to obtain patent protection and are described in more detail in the patent assignment section above.

[iii] Provisional patent applications are legal documents filed at the USPTO that establish a filing date and protect the owner from anticipated publication of the technology, but do not mature into an issued patent unless the applicant files a full patent application within one year. Although owned by the University of Kentucky, the provisional patent applications are not included in the patent assignment descriptions as they will not mature into full patent applications without further action and investment.

[iv] Invention disclosures include new technologies and intellectual property disclosed to the Office of Technology Commercialization (OTC) that do not fall under an existing technology number. This number captures the potential new intellectual property disclosed to OTC.

[v] Full patent applications, as used by OTC, include nonprovisional patent application filings at the United States Patent and Trademark Office (USPTO), Patent Cooperation Treaty filings, and foreign patent application filings. These are technologies that are assigned to the University of Kentucky that OTC has identified to invest further into in an effort to obtain patent protection and are described in more detail in the patent assignment section above.

[vi] Provisional patent applications are legal documents filed at the USPTO that establish a filing date and protect the owner from anticipated publication of the technology, but do not mature into an issued patent unless the applicant files a full patent application within one year. Although owned by the University of Kentucky, the provisional patent applications are not included in the patent assignment descriptions as they will not mature into full patent applications without further action and investment.