CMaT New Technology Tracking (as of 9/29/2021)

Date of Invention Disclosure	ID	Invention Title	Inventors	Link to university description	Information	Patent Application
5/3/2018	GTRC ID 7904 GTRC ID 7944	Dynamic Sampling Interface for Bioreactor Monitoring Multisensor Dynamic Sampling Platform (DSP-X) for Continuous Online Bioreactor Monitoring and Feedback Control	Andrei G. Fedorov; Mason Chilmonczyk; Peter Arthur Kottke	https://licensing.research.gatech.edu/technology/dynamic-sampling-interface-sample monitoringanalysis	Complimentary aspects of the novel dynamic sampling platform (DSP) are described which can be integrated with a suite of different biochemical sensors, for in-line dynamic monitoring of the secretome and metabolome of cells in a bioreactor. Both the system design, its practical realization and methods of use are described along with specific examples of applications. The main components of DSP are the microfabricated mass exchanger capable of on-demand solvent exchange, calibrant introduction, interferent removal, and cell lysis/target analyte extraction, and a low volume dynamic sampling interface from a bioreactor and sample delivery system.	PCT/US2019/046644
9/29/2018	GTRC ID 8016	Hydrogel Surfaces for Modulation of Cell secretory activity, secreted factor sequestration and growth in serum-free media	Molly Ogle; Gilad Doron; Johnna Temenoff	https://licensing.research.gatech.edu/technology/hydrogel-surfaces-modulation-cell-secretory-activity	This technology is a hydrogel cell culture platform that controls the secretory behavior of cells and the sequestration of cell-secreted proteins thereby improving cell proliferation with reduced serum levels. The invention overcomes a major cell manufacturing hurdle, reducing the dependence on serum and recombinant growth factors for cell culture and expansion, while promoting a highly potent cell phenotype	PCT/US2019/055165
4/8/2019	UGA ID 2019-180	A Multifunctional Glioma-On-Chip Microfluidic Device for Immunotherapy Potency Assays	Lohitash Karumbaiah;Meghan Taylor Logun; Wujun Zhao; Leidong Mao	https://patents.google.com/patent/WO2020210296A1/en?oq=PCT%2fUS2020%2f027181 https://uga.flintbox.com/technologies/d172fc55-2d1c-4280-8854-2a887b6a3e12 Yuan Si; yuan.si@uga.edu	This invention is a microfluidic assay device that mimics in vitro the in vivo biological environment, supporting endothelization, allowing for perfusive flow similar to in vivo blood flow conditions, and providing for realistic interactions between T-cells and solid tumor cells, such as glioblastoma multiforme tumor cells. Also described herein are methods of using this microfluidic assay device for the study of interactions of immune cells with tumor cells, such as glioblastoma multiforme tumor cells, and the development of improved immunotherapeutic approaches against cancers, such as glioblastoma multiforme.	PCT/US2020/027181
7/15/2019	GTRC ID 8247	Microfluidic Platform for Refrigeration Induced Phase Separation of Aqueous-Acetonitrile Solutions	Austin Culberson	https://licensing.research.gatech.edu/technology/microfluidic-platform-phase-separation-aqueous-solutions	Georgia Tech inventors have created a microfluidic system capable of accomplishing refrigeration induced phase separation of aqueous-acetonitrile solutions. The system has integrated fluidic connections for sample introduction and removal of the resulting phases. The device is unique due to the solutions of acetonitrile and water, being fully miscible in one another at room temperature, separate into two distinct phases upon refrigeration. This phenomenon has been demonstrated across a broad range of process	PCT/US2020/027181
8/25/2019	GTRC ID 8275	Focused Liquid NanoBeams Enabling Injection of Charged Cargo for Intracellular Delivery and Cell Transfection	Andrei Fedorov	https://licensing.research.gatech.edu/technology/guided-injection-charged-cargo-intracellular-delivery	Georgia Tech inventors have created a system and method for precise delivery of cargos, including DNA, RNA, proteins, peptide, organelles, functionalized nanoparticles, virus, CRISPR, and exosomes. Through an in vitro or in vivo delivery to a system, the method focuses on a network of individual cells or a multicellular tissue construct, which is stabilized on the substrate or flowing through open channels in a microfluidic system. This technology creates possibilities to apply and locally control the injection of the solubilized cargo into cells/tissue of the substrate or channel and is suitable for multiplexed, parallel processing.	PCT/US2020/61798
8/2/2019	UGA ID 2020-028	High Purity Circulating Tumor Cells Isolation and Single Cell Subtyping through a Microfluidic Differential Migratory Assay	Leidong Mao, Yang Liu	https://uga.flintbox.com/technologies/def41a8c-f83f-4fc4-967d-0c6177085b9d https://patents.google.com/patent/US20210039089A1/en?oq=16%2f986%2c930 Cory Acuff cacuff@uga.edu	UGA researchers have developed a microfluidic assay/technology that explores the migratory difference between circulating tumor cells (CTCs) and blood cells (white blood cells) in order to enrich CTCs, as well as subtype CTCs based on their migratory phenotypes.	16/986,930
10/4/2019	GTRC ID 8300	An Ultra-High Resolution Multimode Imaging System With Beam Enabled Accurate Mapping And Molecular Analyte Profiling	Andrei G. Fedorov, Peter Arthur Kottke	https://licensing.research.gatech.edu/technology/ultra-high-resolution-multimodal-imaging-system	Inventors at Georgia Tech disclose a unique new instrument for multi-modal imaging of biological samples with subcellular spatial resolution. The instrument is composed of a combination of Scanning Electron Microscopy (SEM) and a new mode of Desorption Electrospray Ionization (DESI) imaging mass spectrometry. Termed BeamMap, for Beam Enabled Accurate Mapping & Molecular Analyte Profiling, it provides untargeted characterization of protein, metabolite and lipid chemistry and correlation with topological features, yielding an order of magnitude improvement in the achievable resolution for electrospray based imaging. Beam Map has potential to bring about a transformative effect on many areas of biomedical sciences.	PCT/US2020/054043
10/28/2019	UGA ID 2020-083	MSC Exosomes Increase T Cell Differentiation Towards T Regulatory Cells	Steven Stice, Seth Andrews, Ross Marklein	https://uga.flintbox.com/technologies/b1978510-cce2-4358-bab5-81a09cb5f951	A manufacturing process is described for generating Regulatory T Cells (Tregs) thought to be involved in tissue regeneration and repair. Exosomal vesicles (EVs) derived from MSCs primed with acidosis induced the formation of Tregs while other MSC-EV groups had no significant effect on T cell activation	PCT/US2021/025566
1/17/2020	WARF ID P200184	Nonviral Generation of Genome Edited T Cells	Krishanu Saha, Christian Capitini, Katherine Muelier, Nicole Piscopo, Amritava Das, Matthew Forsberg, Louise Saraspe	bwerner@warf.org	This invention from Kris Saha et al from UWisc is a method of making CAR-T cells that does not involve using viruses but instead utilizes PCR and CRISPR/Cas. The inventors targeted the T cell receptor alpha constant (TRAC) locus in T cells. They chose that location because insertion of the CAR chimera there would disrupt TRAC gene expression, which has been shown to potentially improve efficacy of the CAR-T cells. They designed their single guide RNA to target a position just upstream of the TRAC gene. The CAR sequences are flanked by homology domains from that same area of the genome to promote incorporation of the CAR into the genome at the specific Cas9 cut site (Cas9 will cut where the sgRNAs bind). The inventors PCR amplified, purified, and concentrated the CAR + homology regions (HDR) and used electroporation as the means of getting the HDR and the Cas9 protein/sgRNA complex (RNP) into the T cells. T cells are very sensitive to both electroporation and the insertion of large DNA constructs into the cells. Rather than inserting a large vector (the CAR constructs they wanted to insert into the genome are relatively large along with other required DNA to get insertion), the inventors used PCR to provide high concentration of the HDR without the need to use a vector. They also modified the cell rescue methodology to help the T cells survive the electroporation.	PCT/US2021/019806
8/21/2020	GL2020-810	Novel Screening Assay for SARS-CoV-2 Infection of Vulnerable Human Cells	Todd McDevitt, Bruce Conklin, Melanie Ott, Juan Perez-Bermejo, Serah Kang, Sarah Rockwood, Camille Simoneau, Gokul Ramadoss, David Joy	girard.courteau@gladstone.ucsf.edu	Todd McDevitt of the Gladstone Institute has developed an assay for evaluating the effects of SARS-CoV-2 infection of Vulnerable Human Cells. Methods and compositions are disclosed that are useful for identifying compounds that can inhibit SARS-CoV-2 infection or the effects thereof. The assay relies upon the highly infectible nature of cardiomyocytes (CMs) by coronaviruses, including SARS-CoV-2. Even low multiplicities of infection (MOI) of SARS-CoV-2 can infect cardiomyocytes and support robust SARS-CoV-2 viral replication. Moreover, human cardiomyocytes exposed to the virus exhibit significant phenotypic differences from unexposed cardiomyocytes. Examples of these differences are myofibrillar disruption (including a distinct pattern of sarcomeric fragmentation), and a lack of nuclear DNA (as shown by common detection methods, such as Hoechst or hematoxylin staining). In contrast, SARS-CoV-2 does not appear to infect induced pluripotent stem cells (iPSCs), endothelial cells, or cardiac fibroblasts. The adverse morphologic features of virally infected cardiomyocytes are distinct and potentially unique compared to other genetic or environmental stresses that are known to induce cardiomyopathy phenotypes.	PCT/US2021/047255
8/5/2020	21-001-UPR	Synthetic Matrixes for Cell Culture and Manufacture	Madeline Torres-Lugo; Janet Mendez-Vega; Gaby del Rocío Lizana-Vásquez; Luis Felipe Arrieta-Viana	jhernandez@prsciencetrust.org	Madeleine Torres-Lugo and others from UPRM developed a synthetic polymer molecularly designed for the growth and testing of manufacturable cells. The technology is a non-cytotoxic smart platform, capable of encapsulating cells during culture, while providing the opportunity to easily remove them without mechanical manipulation. Furthermore, the platform also provides transparency to monitor cell growth by microscopy and the capability to easily incorporate molecular cues for cell expansion	63/119,463
9/25/2020	GTRC ID 8587	Microfluidic Arrays for Particle Capture and Pairing	Emily Jackson-Holmes; Hang Lu; Gongchen Sun; Guillaume Aubry	https://licensing.research.gatech.edu/technology/microfluidic-array-capturing-and-pairing-cells-immunotherapy-diagnostics-and-research	This technology developed at Georgia Tech allows interactions between different cell types to be studied without the need for labor-intensive manipulations. This technology provides the ability to study cell-cell interactions, which is of particular interest in the field of CAR-T cell therapies. The technology consists of a microfluidic device that automatically traps microscale particles such as cells in chambers, where they can then be imaged using light or fluorescent microscopy. Due to its unique design, this device allows controllable pairing of different ratios of cells. This device and method enable interactions between defined numbers of each cell type to be observed in real time. Beyond studying cells, the technology can also be adapted to assessing other microscale objects of interest, such as embryos, worms, or microparticles	PCT/US2021/052181