University of Pittsburgh | Office of Industry and Economic Partnerships
Office of Innovation and Entrepreneurship

Select physical- and life-science technologies available for licensing.
For more information please contact Paul-Valentin Pitou (pmp43@pitt.edu).

LAST UPDATED: 10/16/2023

Timeline	Ref#	Project Name	Description	Primary Therapeutic	Secondary Therapeu	Technology Type	Tag(s)	Stage of Development	Lead PI Last N	Lead PI First Name	PI Department
Recently Added	6267	Novel Senotherapeutic Agents for Cancer Therapy	Researchers from the University of Pittsburgh have developed a soluble guanylate cyclase activator with the potential to treat age related prostatic hyperplasia and prostate cancer. In the USA alone there are over a quarter of a million new cases of prostate cancer every year, accounting for nearly 35,000 deaths annually, over 10% of all cancer deaths in men. Treatment options for the more severe patient cases can include surgery, radiotherapy, and androgen deprivation therapy. This approach can destroy most cancerous cells, but surviving cells can become senescent and resistant to treatment, increasing the risk of reoccurrence. The novel approach described here can target these senescent cells, inducing apoptosis with the potential to improve patient outcomes.	Oncology	Urology	Small molecule	Aging; Small molecule	Cinaciguat has passed phase I and IIa clinical trials for heart failure. Further research is required to understand the potential of this and other sGC activators to promote apoptosis in treatment resistant senescent cells.	Kanai	Anthony	Med-Medicine
Recently Added	6247	Brain Ribbon: A Novel, Malleable Suction Retractor	Researchers from the University of Pittsburgh have designed a novel space saving surgical tool combining retraction and suction. During intracranial, intraspinal and thoracic/cardiac surgery manual and intermittent fixed retraction is critical for visualization of the surgery site. In addition, frequent manual suctioning is required to maintain a clear field of view. However, surgical dexterity and speed are impaired by an increased number of instrumentation present within the field at a given time, increasing operative time and blood loss while also potentially worsening surgical outcomes. A novel device combining retraction and suction has been designed allowing for better visualization and continuous suction during surgery.	Surgery	Neuroscience	Medical Device		A device has been designed. A prototype needs to be developed to allow for testing and optimization.	McDowell	Michael	Med-Neurological Surgery
Recently Added	6246	Novel Prediction Method of Dominant Viral Strains	A researcher from the University of Pittsburgh has developed a novel method for predicting the dominant strain of viral pathogens to allow for more effective vaccine design.□ The vaccines for circulating viral pathogens like SARS-CoV-2 and influenza require months of planning to determine which strains or variants should be included. However, viruses regularly mutate impacting on vaccine efficacy. The development of an analytical epidemiological model that infers the impacts of mutations on transmission effects can allow for rapid identification of new variants that require further investigation, thereby improving vaccine efficacy.□ Current approaches to developing the influenza vaccine require global surveillance and monitoring in addition to extensive lab research and computation models to identify which strains should be included in each annual vaccine. Each year, several months before flu season, WHO agree on the strains to include for optimal efficacy. However, viruses evolve overtime and the strain most dominant when the vaccine formulation is agreed upon may not be the strain circulating when vaccines are delivered to the public. Such an approach can impact on vaccine efficacy leading to reduced protection, increased illness, loss to economies, and death.□ This novel approach uses publicly available genomic data to track how variants mutate over time, and what impact these mutations have on transmission. The information allows for faster and more accurate prediction of the viral strains likely to be circulating at the time of vaccine deployment.	Vaccines	Infectious Disease	Discovery tool	Bioinformatics; Computational biology; Genomics	A mathematical model including both mathematical analysis and computer coding has been developed and evaluated.	Barton	John	Med-Computational and Systems Biology
Recently Added	6238	Gene Therapy for Diabetes	Researchers from the University of Pittsburgh have developed a novel approach to enhance gene therapy for the treatment of diabetes. Nuclear respiratory factor (NRF) shortened promoter has been shown to drive transdifferentiation of alpha cells into beta cells. This is through driving key beta cell transcription factors (including Pdx1 and MafA). Production of beta cells could allow for treatment in type 1 diabetes. Additionally, in type 2 diabetes rejuvenation of beta cells could improve patient outcomes through conversion of alpha cells into insulin-producing and insulin secreting cells. Various AAVs have been synthesized with gene inserts containing shorter (4x) or longer (10x) NRF1 promoter, Pdx1 and MafA sequences, containing <5000 base pairs (bps). Infection of human alpha cells with AAVs containing these specific gene inserts have been shown to lead to the secretion of insulin within 2 days, demonstrating the potential for double-stranded AAV vectors for use in gene therapy for diabetes.	Endocrinology	Metabolic Disease	Gene therapy	Autoimmune; Gene therapy; Pediatrics	In vivo testing has been carried out. Human studies are required for further optimization of treatment plan and approach.	Gittes	George	Med-Surgery
Recently Added	6112	Novel Approach to Immunotherapy in Ovarian Cancer	Researchers from the University of Pittsburgh have identified an approach using cytokines produced by Lactobacillus reuteri (LR) to stimulate one of the key proteins (PD-L1) involved in programed cell death in cancer cells to facilitate immunotherapy. Ovarian cancer (OC) can be a devastating disease, due to rare symptoms resulting in diagnosis often only when cancer is at an advanced stage and has spread. Treatment is challenging and many patients relapse within 6–18 months of surgery and chemotherapy, with the added complication of being resistant to first-line chemotherapy. Effective treatment is urgently required as current therapies for OC are often ineffective with only a 50% survival rate. This approach has the potential to improve outcomes in patients with OC.	Oncology	Radiology	Antibody,protein,peptide	Biologic; Immuno-oncology; Protein	Preclinical studies have shown treatment with LR-IL-22 or LR-IFN-□ and WAI treatment increase intra-tumoral CD8+ T cells in OC. Development of oral delivery and human trials is required.	Greenberger	Joel	Med-Radiation Oncology
Recently Added	6109	Novel Device to Detect Ventilator Associated Pneumonia	Researchers from University of Pittsburgh have developed a device designed to collect exhaled respiratory aerosols from mechanically ventilated patients. This device is designed to be non-invasive, highly efficient and can be readily placed in the exhalation line of ventilators without interfering in the functions of the ventilator. VAP can be difficult to diagnosis. Current approaches involve cultures of endotracheal aspirate or bronchoalveolar lavage (BAL). However, endotracheal aspirate by contaminated by upper airway secretions The collection of BAL is less prone to contamination, but it is invasive and unable to be repeated frequently. □ A common complication in mechanically ventilated patients (MVPs) is ventilator associated pneumonias (VAP), which can lead to increased stays in ICU, poorer outcomes, and increased medical costs. Rates of VAPs in MVPs are particularly high in those with COVID-19 (>50%). Early treatment is key to improving outcomes and requires timely and efficient detection and identification of the pathogens. This device aims to improve outcomes in VAP patients through better monitoring of infection.	Respiratory	Infectious Disease	Medical Device	Biomarker; Minimally invasive	A functional prototype has been developed and is being tested mechanically in laboratory settings and with healthy volunteers.	Corcoran	Timothy	Med-Medicine
Recently Added	6099	Novel Approach to Bone Regeneration and Rejuvenation	Researchers from the University of Pittsburgh have established a novel approach to tackle the current challenge of bone regeneration and bone mass loss through harnessing the power of skeletal stem cells (SSCs). A lack of strategies to endogenously harness skeletal stem cells (SSCs) has been a significant barrier to their use as an effective therapeutic approach to regenerate bone in bone defects and to stimulate bone formation in skeletal segments affected by bone loss. Our technology has shown the potential of surgical and chemical approaches to “activate” SSCs present in humans, increasing their number to promote bone regeneration and bone formation even in absence of biomaterial implants or other osteogenic tissue implants.	Musculoskeletal	Dental	Small molecule	Regenerative medicine; Small molecule	Further studies are needed to investigate whether the benefits from niclosamide can be sustained.	Intini	Giuseppe	Dent Med-Periodontics/Preventive Dentistry

Recently Added	6089	Fusion Gene Based Machine Learning Tool Enhances the Prediction of Prostate Cancer Outcomes	Prostate cancer is the second leading cause of cancer death among men in the U.S. and predicting its course has been challenging, since only a fraction of patients experienced cancer recurrence after radical prostatectomy or radiation therapy. Researchers at the University of Pittsburgh have found a new way to better predict the outcomes of prostate cancer by developing a fusion gene-based machine learning tool. By examining the expression of 14 fusion genes in 607 prostate cancer samples, their results showed that fusion genes consistently improved the prediction rate of prostate cancer recurrence by Gleason score and serum PSA level, or the combination of both. Researchers integrated the profiling of 14 fusion genes in prostate cancer samples with Gleason score and serum PSA level to develop machine learning models to predict the recurrence of prostate cancer after radical prostatectomy. The machine learning algorithms were developed by analyzing the data from the University of Pittsburgh cohort as a training set using leave-one-out-cross-validation method, and validated by two external cohorts.	Oncology	Urology	Molecular diagnostic	Biomarker; Genomics	In-vivo data	Luo	Jianhua	Med-Pathology
Recently Added	6088	Use of Deep Brain Stimulation to Treat Seizures	University of Pittsburgh researchers have developed a device that can deliver direct electrical stimulation to areas of the brain to treat intractable seizures with motor and sensory manifestations. Epilepsy is the fourth most common, global neurological disorder. Focal resection of the epileptogenic zone is the current standard of care for medically refractory epilepsy (MRE), only where the cortical area of brain tissue can be safely removed without the risk of devastating complications. For patients with focal epilepsy, resection is not an option due to the high risk of neurological complications and treatment remains an unmet need. This novel device could provide relief for patients using deep brain electrode implants in areas of the thalamus, and without the need for brain resection.	Central Nervous System	Neuroscience	Medical Device	Materials; Pediatrics	In vivo testing has shown fibers connecting the thalamus to the premotor and motor cortices can be targeted with the potential to suppress seizures.	Damiani	Arianna	Bioengineering
Recently Added	6081	Novel Approach to Reverse Cerebral Cortex Decline	Researchers from the University of Pittsburgh have successfully mapped the cortical proteome in conjunction with dendritic spine quantification and identified proteins that mediate the effects of aging on the brain. From a signature of proteins associated with spine loss in aging, a set of 10 drugs is identified that may protect the brain from these effects and provide a protective effect against the onset of neurodegenerative dementia.	Central Nervous System	Neuroscience	Antibody,protein,peptide	Aging; Biomarker	Further studies are required to assess the efficacy on the 10 drugs identified in reversing age-related dendritic spine loss.	Sweet	Robert	Med-Psychiatry
Recently Added	6074	Polynucleotides for Safer Vaccine Designs	Investigators at the University of Pittsburgh have identified a key helical motif in the SARS-CoV-2 spike protein that is responsible for suppressing α7nAChR expression on cell surface and consequently linking to many of the symptoms of long COVID. The SARS-CoV-2 spike protein (S12) plays a crucial role in the ability of the virus to infect host cells but can also disrupt cellular functions. A helical motif in S12 has been found to interact with the chaperones of the α7 nicotinic acetylcholine receptor (α7nAChR) and suppress the cell surface expression of this receptor. A modified polynucleotide based on this helical motif has been developed to eliminate or minimize the suppressive effects of S12 on α7nAChR.	Infectious Disease	Vaccines	Antibody,protein,peptide	Peptide; Polymer	In vitro analysis has shown that a modified polypeptide in the S12 spike protein of SARS-CoV-2 can significantly reduce the impacts of SARS-CoV-2 on the body.	Tang	Pei	Med-Anesthesiology and Perioperative Medicine
Recently Added	6060	Novel Design of Intracortical Microelectrode Array	University of Pittsburgh researchers designed a new polymer-based buckling-resistant intracortical microelectrode array (MEA) for use in brain-machine interface applications. Neurological disorders impact up to one billion people (approximately 1 in 6), with an estimated global economic burden of $800bn. MEAs can allow for treatment and study of neurological disorders via high resolution interfacing with the brain. Current MEAs can disrupt native brain tissue and rupture the blood brain barrier potentially causing secondary complication. Finding better approaches for implanting MEAs remains an unmet need with the potential to improve treatment options and better research tools for neurological conditions.	Central Nervous System	Neuroscience	Medical Device	Materials	In vitro testing has shown the device can be successfully implanted with a considerably reduced risk of buckling. In vivo insertion without assistive devices has been demonstrated.	Pwint	May Yoon	Bioengineering
Recently Added	6038	Retinal Vision Sensor: A New Class of Vision Sensors	University of Pittsburgh researchers have developed a new class of sensor, Retinal Vision Sensor (RVS), which is a neuromorphic sensor that extracts multiple events from the visual scene using plenoptic functions. □ This device will be similar to biological retinas, including the different types of ganglion cells, extracting different information from a scene and providing the visual cortex with rich detail in a timely manner. This technology will build on existing state-of-the-art Active Pixel Sensor (APS) cameras and event-based Dynamic Vision Sensors (DVS). This new class of cameras will play a significant role in making efficient, robust, and autonomous bio-inspired vision a reality.□ Current sensors on the market have many shortcomings, including the inability to accurately collect information for fast-moving objects, high-power consumption, and difficulty in rapidly adjusting between darker and lighter environments. DVS cameras are asynchronous requiring post-processing and extract temporal contrast events only. Unlike traditional sensors where time stamps dictate image collection, the RVS will be inspired by biology and responds to events within the scene of view. This approach produces a continuous time stream of pixel 'events' (temporal contrast, spatial contrast, diagonal contrast etc), at a higher resolution containing zero redundancy, thereby reducing power and data needs of the sensor.	Ophthalmology	Neuroscience	Hardware	Materials	The sensor is currently in the design phase. Development and optimization of work is required. Development of an integrated data processing system is also needed.	Chinnakonda Kubendran	Rajkumar	Electrical and Computer Engineering
Recently Added	6006	Novel Treatment Approach for Metabolic Disorders	University of Pittsburgh researchers are pioneering a new drug design approach to treat mitochondrial metabolic disorders. The disease models used to provide proof of concept include propionic acidemia (PA), methylmalonic acidemias (MMA), and fatty acid oxidation disorders (FAODs). The new compounds currently under development remedy the Krebs cycle dysfunction by replenishing depleted succinyl-CoA, a prominent biochemical manifestation of these diseases. The drug design approach leverages predictable pharmacokinetics of the compounds, so designed to deliver intermediates that are depleted while bypassing the metabolic block or pathway dysfunction. The leading candidate compounds have shown effectiveness across a number of critical primary, secondary, and tertiary biomarkers in cells from patients diagnosed with propionic acidemia.	Metabolic Disease	Rare Diseases	Small molecule	Pediatrics; Small molecule; Rare disease	All in vitro tests have shown effectiveness in restoring a number of biomarkers in a dose responsive manner to near control levels. Animal models are available and will be used to provide the preclinical data necessary to proceed to clinical trials.	Mohsen	Al-Walid	Med-Pediatrics
Recently Added	6000	Novel Device for Coating Medical Conduits	Researchers from the University of Pittsburgh have developed a novel device for coating medical conduits with solid state micro/nano particles. These will act as biodegradable nerve guides/conduits to bridge long-gap nerve damage and improve regeneration. Nerve guides are used to surgically treat peripheral nerve damage. Successful manufactures require uniform and consistent micro/nano particle coating within and between each conduit to ensure efficient and localized delivery of medicinal agents to patients. This device, the RegenCoat™ is designed to repeatedly create a consistent, uniform layer of microparticles.	Central Nervous System	Rehabilitation/Mobility	Medical Device	Biomaterial; Coating; Regenerative medicine	A 3D printed prototype has been produced for the manual coating of medical conduits and is being used in a GMP facility. Further development of a high throughput device is required.	Fedor	Caroline	Med-Plastic Surgery
Recently Added	5988	Novel Treatment for Dry Eye Disease	A team of scientists and clinicians from the University of Pittsburgh have developed a novel form of eyedrops for the treatment of dry eye disease (DED). Harnessing the understanding of the underlying inflammatory pathways in DED, the team use cytokine IL-4 to tackle the underlying cause of the disease. DED is one of the leading ocular morbidities, impacting as many as one third of the global population. Severe DED can lead to vision loss. Symptoms which include itchiness, blurred vision, difficulty in completing tasks requiring visual effort, and ongoing pain, all have an impact on a patient's quality of life. These novel IL-4 eye drops could help to address a previously unmet clinical need through treating patients with DED and potentially saving millions of dollars in healthcare costs.	Ophthalmology	Immunology	Formulation	Biomaterial; Drug delivery; Protein	An animal study has demonstrated the efficacy of these IL-4 eyedrops to treat DED. Previous research has suggested IL-4-dermantan sulfate may have a superior result and further research is required to optimize these drops.	Nolfi	Alexis	Bioengineering

Recently Added	5982	Novel Maxillo-Mandibular Measurement Tool	A team of University of Pittsburgh researchers have developed a novel, easy-to-use tool to measure alveolar overjet in very young children with craniofacial abnormalities. Pediatric patients can experience restricted growth in the mandible and/or maxilla. This can be a result of craniofacial pathologies due to congenital abnormalities or mechanical disruption of these tissues. The bony structure underlying the gums in the mouth is the alveolus. If there is a restriction in the relative growth of the mandible to the maxilla (or vice versa), this is an alveolar overjet (or underjet). A key element of determining the need for surgical correction, and the extent to which surgical correction should be done, is the measurement of alveolar overjet. In addition, there is a need to measure alveolar overjet postoperatively as patients continue to grow. This device allows for simple measurement of alveolar overjet using a simple-to-use handheld device.	Dental	Pediatrics/Neonatology	Hardware	Pediatrics; Tissue engineering	A prototype has been produced. Mass production methods may need to be developed.	Goldstein	Jesse	Med-Plastic Surgery
Recently Added	5932	Novel Approach in the Treatment of Respiratory Syncytial Virus Disease (RSV)	Respiratory syncytial virus (RSV) is the single most common cause of viral bronchiolitis among children worldwide, yet no vaccine or successful treatment currently exists. Severe RSV infections can cause bronchiolar obstruction, air trapping, and emphysema, and a therapeutic strategy that mitigates damaging immune responses to viruses without sacrificing antiviral activity is urgently needed. University of Pittsburgh researchers have recently synthesized antioxidant cerium oxide nanoparticles (CNPs) in various shapes, which have demonstrated about 9-fold greater antioxidant activity compared to commercial antioxidant Trolox. These crystalline nanoparticles have been proven safe in preclinical studies and can be tolerated up to 100mg/kg for 10 days in male rats. This discovery highlights the therapeutic ability of CNPs to modulate oxidative stress in RSV. CNPs may also potentially be combined with other drugs or vaccines as adjuvants to achieve better therapeutic outcomes not only in RSV, but various infections and diseases including cancer with similar pathologies.	Respiratory	Infectious Disease	Small molecule	Drug delivery; Materials; Pediatrics	In-vivo data	Sant	Shilpa	Pharm-Pharmaceutical Science
Recently Added	5866	Novel Human Antibody Domains for Disease Treatment	These novel antibody domains directly target various epitopes on CD276 and may mediate T cell recognition of cancer cells, facilitating cell death. CD276 expressed in various solid tumors making it a useful target.	Oncology		Antibody,protein,peptide		In vitro testing shows efficacy	Dimitrov	Dimiter	Med-Medicine
Recently Added	5859	Human Antibodies Targeting ENPP1	University of Pittsburgh researchers have identified a fully human antibody targeting ectonucleotide pyrophosphatase/phosphodiesterase 1 (ENPP1) with the potential to treat a variety of cancers. ENPP1 is a type II transmembrane glycoprotein. It plays an important role in immunological responses to various stimuli and regulates immune cells such as neutrophils, B lymphocytes and natural killer (NK) cells. ENPP1 expression in M2 macrophages is heightened in the presence of cancer and linked to tumor growth promotion and spread. The use of antibodies specifically targeting ENPP1 could stimulate an immune response causing immunosuppression in the tumor leading to cell death. This novel approach has the potential to target many cancers with a view to improving patient outcomes and mortality.	Oncology	Immunology	Antibody,protein,peptide	Biologic; Immuno-oncology	In vitro testing has shown these novel antibodies target different epitopes on ENPP1 and can induce cell death. These antibodies can also be used with ADC, BiTE, BiKE and CAR-T technology.	Dimitrov	Dimiter	Med-Medicine
	5857	Using STAT5 Inhibitors for the Treatment of Cardiovascular Calcification	University of Pittsburgh researchers have discovered that early in osteogenic differentiation of valve interstitial cells and vascular smooth muscle cells, telomerase reverse transcriptase (TERT) interacts with Signal Transducer and Activator of Transcription 5A/B (STAT5) to bind to the promoter of RUNX2. RUNX2 is the master transcription factor required for osteogenesis. Disrupting this interaction is a targeted approach to stall or prevent osteogenic reprogramming of cardiovascular cells and cardiovascular calcification.	Cardiovascular	Musculoskeletal	Small molecule	Small molecule	In-vitro data	St Hilaire	Cynthia	Med-Medicine
Recently Added	5840	Novel Approach to Treatment of Osteoarthritis	A team of University of Pittsburgh researchers have identified the role of estrogen receptor-α (ERα) in osteoarthritis (OA), a debilitating and painful joint disease. Through enhancing ERα levels in damaged cartilage cells, treatment of OA may be possible. While there are multiple causes of OA, in OA affected joints both preserved (P-C) and severely damaged (D-C) cartilage is present in the affected joints, suggesting that OA is linked to distinct mechanical loads and not to changes in synovial fluids. RNA sequencing showed the estrogen receptor-1 (ESR1), a gene encoding ERα , is significantly downregulated in D-C when compared to P-C. Enhancing ERα levels may be a novel approach to treating osteoarthritis.	Musculoskeletal	Orthopedics	Drug delivery	Aging; Biomarker; Regenerative medicine; Tissue engineering	Animal studies have shown the benefit of increasing ERα in reversing some of the damage from OA. Potential compounds to increase ERα levels have been identified.	Lin	Hang	Med-Orthopedic Surgery
Recently Added	5823	Video Image Classification of Tympanic Membranes of Children	A University of Pittsburgh clinician has developed software to improve diagnosis of acute otitis media (AOM) in young children. Using videos of tympanic membranes, deep learning neural networks have been trained to assess the features of the membrane to predict those most at risk of AOM. AOM is a common pediatric disease with approximately one fifth of children having reoccurring infections and annual medical costs in billions of US dollars. Children who develop their first AOM episode before the age of six months are most likely to experience recurrence. Developing better diagnostic tools to discriminate between AOM and otitis media with effusion (OME) and "normal" middle ear status in young children allows for earlier, more targeted treatment in AOM patients.	Otolaryngology	Pediatrics/Neonatology	Medical Device	Artificial intelligence (AI)	Software has been developed using a database of over 1000 videos and a deep learning neural network to recognize features of AOM and OME with a high accuracy. FDA registration pending.	Hoberman	Alejandro	Med-Pediatrics
Recently Added	5722	Novel Therapy to Prevent Liver Disease	University of Pittsburgh, Kyushu University, and University of Michigan researchers have identified a key pathway involved in the development of cirrhosis with targets to prevent liver disease, thereby reducing the need for liver transplantation. Previous work has demonstrated a link between a variant on the PNPLA3 gene, rs738409:G, a gene variant found in about 8% of the global population and in 30–50% of patients with End-Stage Liver Disease (ESLD) or earlier stages of liver disease such as Metabolic dysfunction-Associated Fatty Liver Disease' (MAFLD). Novel work has now discovered that lipid peroxidation of polyunsaturated fatty acids (PUFAs) and ferroptosis, a form of iron-dependent cell death are key drivers in the development of liver cirrhosis in carriers of this variant. Targeting the ferroptosis pathway could be a novel approach to preventing liver cirrhosis in carriers of the rs738409:G variant on PNPLA3.	Hepatology		Molecular diagnostic	Biomarker; Genetics; Genomics; Small molecule	Software has been developed using a database of over 1000 videos and a deep learning neural network to recognize features of AOM and OME with a high accuracy. FDA registration pending.	Soto Gutierrez	Alejandro	Med-Pathology
	5721	Promising Approach to Prevent Acute Lung Injury for Patients with Sickle Cell Disease	Recent clinical trial has shown a ~50% reduction in hospitalization of Sickle Cell Disease (SCD) patients receiving intravenous P-selectin Ab therapy, suggesting that therapies beyond P-selectin inhibition would be needed to prevent ACS in SCD patients. Researchers at the University of Pittsburgh have developed an approach to ameliorate the remaining (~50%) lung vaso-occlusion associated morbidity in SCD by inhibiting the Gasdermin-D (GSDMD) dependent signaling in leukocytes. The preliminary in vivo evidence using P-selectin-deficient SCD mice shows significant amelioration of lung vaso-occlusion and lung Injury following GSDMD-inhibition.	Respiratory	Hematology	Antibody,protein,peptide	Antibody; Biologic	In-vivo data	Sundd	Prithu	Med-Medicine

Recently Added	5650	Fully Human Fabs Binding to the CD94/NKG2A Heterodimer	In attempts to seek and develop a fully human mAb-mediated blockade against CD94/NKG2A, Pitt researchers have taken several complementary approaches for antibody discovery including soluble CD94/NKG2A preparation, panning of a phage-displayed antigen binding fragment (Fab) library against CD94/NKG2A, comprehensive binding assessment for isolated Fabs and IgG, and in vitro functional assays to observe restored NKcell mediated cytotoxic activity. After panning with an IgG1 Fc-fused with CD94/NKG2A and CD94/NKG2C extracellular domain, one clone was isolated and shown to exhibit high specificity for the CD94/NKG2A while not binding to CD94/NKG2C. An affinity-matured second clone, is covered by yeast display technology, showed improved competition for binding, comparable to that for monalizumab, a humanized antibody inhibitor of CD94/NKG2A. These mAbs are expected to be the first fully human immune □ checkpoint inhibitors of CD94/NKG2A with enhancement of anti-tumor and anti-viral responses to CD94/NKG2A-positive immune cells. Taken together, these mAbs can restore NK cell- and CD8+ T cell-mediated toxicity activity with the enhancement of immunity by surrounding immune cells, providing novel therapeutic avenues for cancer and HIV treatment.	Oncology	Immunology	Antibody,protein,peptide	Antibody; Immuno-oncology	In-vitro data	Dimitrov	Dimiter	Med-Medicine
Recently Added	5611	Personalized Prevention of Intraoperative Hypotension	University of Pittsburgh and Carnegie Mellon University researchers have developed a novel approach to reducing the risk of intraoperative hypotension (IOH). The approach defines hemodynamic parameters that clinicians should aim to maintain during surgery, and which are based on the risk factors of the individual and the surgical procedure. IOH, low blood pressure during surgery, causes complications in over 70 million surgeries annually in the US alone. Severe complications can include heart, kidney, and brain damage. Effective prevention strategies present an unmet need and the development of such would empower clinicians to reduce the incidence of IOH improving quality of care, lowering costs of surgery, and improving outcomes for patients.	Surgery	Cardiovascular	Other diagnostic	Precision medicine	An app has been developed to identify the MAP below which individual patients are at risk of IOH. Currently undergoing clinical testing and further optimization may be required.	Schnetz	Michael	Med-Anesthesiology and Perioperative Medicine
Recently Added	5459	BioBulwark: Implants with Biofilm-Resistant Coating to Prevent Bacterial Infection	Implanted medical devices cause over a million infections per year, posing both an enormous burden on the healthcare system and serious risk to the health of the patient. To combat infection, metal coatings are typically applied to the device surface which have potent bactericidal properties, but eventually decay and release toxic and carcinogenic metal ion deposits within the body. The BioBulwark is a bactericidal and biofilm-eliminating coating that can be applied to polypropylene mesh implants. BioBulwark will save the healthcare system billions while awarding patients a peace of mind and the reliable implants that they deserve. Devices with BioBulwark are coated with vertically oriented graphene that slices open biofilms and bacterial cell membranes. Graphene is first applied vertically to the device surface using a technique called Plasma Enhanced Chemical Vapor Deposition (PECVD). The device surface is then coated with 60-100 nm “spikes” that are sharp enough to pierce bacterial cell membranes and biofilms while keeping larger human cells intact. The stability of vertically oriented graphene makes it impervious to decay and its bactericidal properties are well-documented in the literature, setting it apart from the competition. Research also indicates that bacterial cells exhibit no signs of developing resistance to the coating and that the coating does not damage human host cells.	Surgery	Cardiovascular	Medical Device	Biomaterial; Coating	Concept	Shaker	Eric	Bioengineering
Recently Added	5065	Protection of Small Intestine from Radiation by Genetically Engineered Probiotics	Radiation damage exists in the public imagination as a result of terrorist events or nuclear reactor accidents, but patients undergoing radiative therapies for cancer are often afflicted, too. Severe total body irradiation causes intestinal crypt cell and villus damage, penetration of the intestinal protective barrier by gut bacteria, and sepsis, leading to death within days. Radiation mitigation is crucial to enable radiation treatment of ovarian cancer patients; without it, radiation therapy will destroy the intestinal tissue. Although radiation therapy is □ the most effective treatment for these patients, at the moment it is too toxic to be used. Following irradiation, crypt cells, intestinal immunocytes, including T-cells that produce anti-inflammatory cytokines such as interleukin-22, and goblet cells that produce mucin to protect the intestinal epithelium and barrier function are rapidly depleted. High-dose radiation damage is also associated with shrinkage of antimicrobial intestinal Paneth cells that produce defensins, lysozymes, protective cytokine interferon-B, and other important factors. In the delicate balance of gut taxa, interleukin-22 has been shown to ameliorate intestinal radiation damage and can restore functionality to Paneth cells if administered at 48 hours after total-body or whole-abdominal irradiation. By enteric administration of two strains of bacteria, L. reuteri and E. coli, that have been genetically engineered to deliver therapeutic amounts of IL-22 or IFN-B, researchers have been able to achieve profound radiation mitigation. These microbial therapeutics represent a brand-new approach to radiation mitigation, and will optimize recovery from total body irradiation.	Radiology	Gastroenterology	Antibody,protein,peptide	Biologic; Protein	Pre-clinical	Zhang	Xichen	Med-Radiation Oncology
Recently Added	5032	Novel Activators of AMP-Activated Protein Kinase	University of Pittsburgh researchers have identified a library of small molecules found to promote activity of AMP-activated Protein Kinase (AMPK), a key regulator of several metabolic pathways. AMPK regulates many processes in the body including glucose uptake, mitochondrial biogenesis, and protein synthesis. AMPK is involved in disorders including immuno-oncology, and metabolic and inflammatory diseases. Previous work by the inventors has identified a novel target to inhibit the degradation of AMPK, the Fbxo48 cavity on the Skp-Cullin-F box (SCF) complex of ubiquitin E3 Ligases. Initial in silico analysis and structure-activity relationship (SAR) studies led to the synthesis of compounds that increased cellular levels of activated AMPK. Further work has developed more compounds, many requiring <1 □M dosages to increase AMPK activation, suggesting these are highly efficient AMPK activators with reduced risk of side effects.	Metabolic Disease	Oncology	Small molecule	Aging; Small molecule	A library of F-box inhibitors has been synthesized and found to increase AMPK activity. Further work is required to assess efficacy in humans.	Chen	Beibei	Med-Medicine
Recently Added	4864	Novel Compounds to Inhibit TNF-Induced NF-kB Signaling	Researchers from The University of Pittsburgh have identified small molecules to specifically inhibit tumor necrosis factor (TNF) induced Nuclear Factor κB (NF-κB) inflammatory pathways. Using a novel systems biology approach combining transcriptomics and structural analysis with live-cell imaging, two first-in-class protein-protein inhibitors (PPIs) have been identified and shown to selectively inhibit TNF-induced NF-κB activity. Selective inhibition of these pathways has the potential to reduce off-target impacts and preserve other vital processes that regulate TNF-induced NF-κB signaling . Additionally, this network-centric drug discovery approach could identify other selective pathway inhibition drugs in other diseases.	Immunology	Rheumatology	Small molecule	Autoimmune;Bioinformatics;Computational biology;Drug discovery;Research tool;Small molecule	This network-centric approach has been shown to identify small molecules capable of selectively inhibiting inflammatory pathways. This approach has the potential to revolutionize drug discovery.	Camacho	Carlos	Med-Computational and Systems Biology
Recently Added	3887	Novel Activators of AMP-actived Protein Kinase	University of Pittsburgh researchers have identified new small molecules to promote AMP-activated Protein Kinase (AMPK) activity, a key regulator of several metabolic pathways. By discovering the protein degradation mechanism of active AMPK, and subsequent computational screening of millions of compounds, a series of small molecules have been identified. AMPK regulates many processes in the body, including glucose uptake, mitochondrial biogenesis, and protein synthesis. AMPK is involved in disorders including cancer and metabolic and inflammatory diseases, with AMPK activation successfully used to manage type 2 diabetes. Through identification and analysis of active sites on AMPK, a novel mechanism of AMPK activation has been discovered, potentially allowing for new treatment approaches to many of the medical conditions linked with AMPK.	Respiratory	Cardiovascular	Small molecule	Aging; Small molecule	In vivo studies show these First-in-Class F-box inhibitors increase AMPK activity at nanomolar concentrations. Further work is required to optimize the chemical structure and assess efficacy in humans.	Chen	Beibei	Med-Medicine

Recently Added	3119	Compounds Targeting Androgen Receptor to Treat Castration-Resistant Prostate Cancer	Innovators at the University of Pittsburgh have identified novel small molecules that bind to the androgen receptor (AR) and block the nuclear localization and function of AR in CRPC cells. The compounds are not cytotoxic and decrease nuclear AR levels in CRPC cells. Xenograft studies using these small molecules showed inhibition of castration-resistant growth of C4-2 and 22Rv1 xenograft tumors in SCID mice. This work demonstrates the potential of these compounds in CRPC tumor therapy. A second class of compounds significantly decreases cell proliferation in AR-positive cell lines while they have no effect on proliferation in AR-negative cell lines.	Oncology	Urology	Small molecule	Small molecule	In vivo and In vitro data	Wipf	Peter	Chemistry
Recently Added	2289	Urine Biomarkers to Predict Recovery from AKI	University of Pittsburgh researchers have identified urinary biomarkers with the potential to identify patients with acute kidney injury (AKI) most likely to develop end stage renal disease (ESRD). Approximately 5% of admissions to ICUs will develop severe AKI requiring dialysis. Less than 60% of patients with AKI will regain renal function within two months with many developing ESRD and requiring lifelong dialysis or transplantation. The identification of those patients most likely to recover, and those needing more advanced treatment, allows for targeted treatment of patients at highest risk. Earlier intervention and removing the risk of adverse events related to unnecessary aggressive treatment would improve outcomes in patients with a lower risk of developing ESRD.	Nephrology	Critical Care	Molecular diagnostic	Biomarker; Precision medicine	Biomarkers to predict outcomes in AKI patients have been identified in in vivo testing. Validation and larger studies are required.	Kellum	John	Med-Critical Care Medicine
Recently Added	2163	Novel Biomarker for Diagnosis of Acute Kidney Injury	University of Pittsburgh and Astute Medical researchers have identified urinary biomarkers capable of diagnosing acute kidney injury (AKI). AKI places a huge economic burden on healthcare systems and is a key indicator of morbidity and mortality in patients. This risk of mortality increases with severity of AKI. Previous work from this team has shown the non-sulfonated glycosaminoglycan hyaluronic acid (HA) levels in urine to be a useful predictor of recovery from AKI. HA has the potential to be a more sensitive and specific marker of AKI and its use in early diagnosis, disease monitoring and determining prognosis could improve patient outcomes through early and more targeted treatment plans.	Nephrology	Critical Care	Molecular diagnostic	Biomarker	With the identification of HA as a biomarker of interest, further work is required to develop testing approaches and validate clinically normal ranges to allow this test to be used more widely.	Kellum	John	Med-Critical Care Medicine
Recently Added	1776	Urinary Biomarkers for Predicting Long-Term Dialysis	Researchers from University of Pittsburgh have identified urinary biomarkers capable of providing early prediction of dialysis-dependency after acute kidney injury. Chronic kidney disease (CKD) is a growing problem in human health, affecting around 10% of the population globally and is the leading cause of death in the US. One of the major causes of CKD is acute kidney injury (AKI) which can lead to costly and disruptive dialysis. In patients with severe AKI requiring dialysis, mortality within the first year following hospital discharge can be as high as 64%. Identifying those patients most likely to require dialysis would allow for tailored, aggressive treatment to begin earlier. Conversely, individuals identified as most likely to recover kidney function without long-term dialysis would be spared from more aggressive treatments and potential adverse effects.	Nephrology	Critical Care	Molecular diagnostic	Biomarker	With the identification of HA as a biomarker of interest, further work is required to develop testing approaches and validate clinically normal ranges to allow this test to be used more widely.	Singbartl	Kai	Department of Anesthesiology