

# Biomedical Technologies

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# Oncology/Hematology/Angiogenesis

Indication	Target	Therapeutic Description	Stage of Development	Patents	Faculty
<b>Cancer</b>	Intitial data in metastatic breast cancer, as well as colon, liver, lung, prostate, and skin cancer	Engineered HSV oncolytic virus for cancer immunotherapy	Preliminary data confirmed in mouse models	US, EP, AU, CN, SK, JP, IN Pending	Bin He
<b>Breast Cancer, Estrogen Positive</b>	Estrogen Receptor	Brain penetrating Selective Estrogen Receptor Degraders	In vitro data, In vivo pending	US, EP, CN, JP, SK, CN Pending	Greg Thatcher, Rui Xiong and Debra Tonetti
<b>Tumor &amp; Ocular Angiogenesis</b>	selective VEGF regulation through KAI	Peptide based inhibitor of VEGF activation	In vitro validation and early in vivo studies in a mouse lung cancer model	Divisional pending/Nationalization	Kaori Yamada & Asrar Malik
<b>Tumor &amp; Ocular Angiogenesis</b>	VEGF activation	Fusion peptide inhibitor based on Histatins	In vitro data, In vivo data	Nationalization	Vinay Aakalu
<b>Acute Lymphocytic Leukemia</b>	Asparagine Depletion via Asparaginase enzyme	Engineered selective Asparaginases that are safer to use in adult cancer patients	Biochemical and in vivo animal validated biologics	Nationalization	Arnon Lavie
<b>Pancreatic cancer and Ovarian Cancer</b>	Novel Fusion Protein - confidential targets	Fusion protein that rapidly eliminates pancreatic cancer cells in animals.	Validated in xenograft studies to completely eliminate pancreatic cell lines implanted in rodents	Nationalization	Arnon Lavie
<b>Oncology</b>	BET Bromodomain Inhibitors	BET proteins are involved in transcriptional and cell cycle regulation.	In vitro data characterized but awaiting in vivo validation.	Provisional filed Nationalization	Greg Thatcher and Rui Xiong
<b>Prostate Cancer</b>	PSA and TEM8	Vaccine combining a PSA (Prostate specific) peptide and a TEM-8 (Tumor endothelial marker 8) peptide plus GM-CSF	PSA peptide vaccine - tested in a phase I human clinical trial; PSA peptide vaccine/TEM-8 peptide - <i>in vivo</i> mouse data	US Patent 8,557,777	David Peace
<b>Metastatic Breast Cancer (BC) Cell Models</b>	Estrogen Receptor & specific kinases	When BC Mets become resistant to tamoxifen, ER-targeting agents become a valuable therapeutic option.	Cellular and xenograft/PDX models of tamoxifen resistance have been used to validate novel SERDs and SEMs for preclinical /IND development.	Material license available	Debra Tonetti

# Oncology/Hematology/Angiogenesis

Indication	Target	Therapeutic Description	Stage of Development	Patents	Faculty
<b>Ovarian Cancer</b>	Unknown	Verticillins have shown promising anticancer qualities	Efficacy in killing ovarian cancer cell lines	Provisional Filed	Joanna Burdette
<b>Oncology, specifically Melanoma, MCL</b>	HDAC6	isoxazole and urea core hydroxamic acids as selective histone deacetylase 6 inhibitors	Hydroxamic acid HDAC6 inhibitors with a novel core	Provisional Filed	Alan Kozikowski, SS Shen & Alejandro Villagra
<b>Triple Negative Breast Cancer (TNBC)</b>	HDACs & kinases	Inhibition of specific kinases leads to increased efficacy of HDAC3 inhibitors in TNBC models	Novel HDAC inhibitor compounds are tested in cell models of triple negative breast cancer	Research tools, no patents	Pavel Pasha Petukhov & Jonna Frasor
<b>Oncology</b>	PARP agents	Cell Lines for determining PARP agents function	Research Tool to evaluate the activity of PARP inhibitors.	Material License	Lesley Hanakahi (not in the system)
<b>Melanoma, Mantle Cell Lymphoma</b>	Epigenetics: HDAC	Highly potent selective HDAC6 Inhibitors	Nexturastat series is the most advanced oncology validated HDAC inhibitor confirmed in melanoma animal models	US Patent 9,409,858 JP, CA, EP Patents	Alan Kozikowski
<b>Oncology</b>	RAD51 DNA repair pathway	Inhibitors of RAD 51 DNA repair pathway as a target for cancer therapy	Compounds are validated in prostate cancer xenograft rodent models	US Patent Pending	Alan Kozikowski & Philip Connell
<b>Uterine Fibroids</b>	Wnt signalling pathway	Methyl Jasmonate (MJ)-based compound individually or in combination with green tea extract (EGCG) and vitamin D3 for treatment/prevention of Uterine Fibroids	In vitro measurements of the MJ effect in Human leiomyoma cells  Non-hormonal treatment for the inhibition of Uterine Fibroids	US Patent Filed	Ayman Al-Hendy & Mohamed Ali

Indication	Target	Therapeutic Description	Stage of Development	Patents	Faculty
<b>Amyotrophic Lateral Sclerosis (ALS)</b>	Neuregulin Signaling	GlyB4 Fusion with Neuregulin Heparin-Targeting Domain to Block Neuregulin Signaling	Improves early chronic motor performance deficits, delays disease onset and prolongs survival in an ALS mouse model	US Patent 7,527,794 US Patent 7,994,123 EP Patent 1,824,879	Jeff Loeb
<b>Parkinson's, Other Synucleinopathies</b>	Protein Kinase C mu or Src-Family Tyrosine Kinase	Utilized a demonstrator compound as inhibitors of protein kinase C mu and src family tyrosine kinase	Early stage in vitro studies	US Patent 8,618,063	Scott Brady
<b>Alzheimer's Disease</b>	Neuregulin Signaling	Treatment with GlyB4, a potent, targeted antagonist that blocks the endogenous neuregulin signaling	Data in mouse models	PCT Patent Pending	Jeff Loeb
<b>Charcot Marie Tooth (CMT), Autism, Neuroprotection</b>	HDAC6	Nanomolar inhibitors of HDAC6 highly selective over other HDACs	Compounds were dosed into transgenic models of CMT and successfully blunted the disease in a transgenic animal model	US Patent 10,227,295 Nationalization	Alan Kozikowski
<b>Sleep Apnea</b>	Serotonin	Serotonin Receptor Antagonists +/- Selective Serotonin Reuptake Inhibitor •Ondansetron/Fluoxetine (repurposing)	Human clinical pilot showing efficacy; pre-clinical dose and dose-ratio optimized; pre-IND meeting with FDA	US Patents 6,331,536 8,512,751 EP Patent 1,833,467	David Carley & Miodrag Radulovacki
<b>Alzheimer's Disease, Multiple Sclerosis</b>	Noradrenaline	Combination of L-DOPS, carbidopa, and reboxetine	Prevents worsening of symptoms in AD and MS mouse models	US Patent 8,580,776	Doug Feinstein
<b>Depression and other neurological diseases</b>	LPC transporter at the blood brain barrier, MFSD2a	Deliver EPA to brain by transporting LPC-EPA through blood brain barrier transporter, MFSD2a	Increased level of both DHA and EPA in brain upon LPC-EPA administration in rodents.	US Patent 10,555,957	Papasani Subbaiah

# Neurology/Sleep Apnea

Indication	Target	Therapeutic Description	Stage of Development	Patents	Faculty
<b>Alzheimer's Disease</b>	Calpain Protease	Utilized caspase inhibitors on a rodent model of AD	Early stage in vivo studies	US patent 9,403,843 Nationalization	Greg Thatcher
<b>Tolerance resulting from chronic opioid administration</b>	Calcium Calmodulin Kinase (CaMKII)	Utilized an FDA approved drug & other preclinical compound inhibitors of CaM II kinase	Compound successfully attenuated experimentally induced nerve hypersensitivity caused by opioid drugs in preclinical models; human clinical trial validated this approach	US Patent 7,776,819	Zaijie (Jim) Wang
<b>Schizophrenia, Autism, Addiction</b>	Human 5HT2c; Serotonin Receptor	Compounds with superior safety and efficacy profile over FDA approved molecule; target is highly validated.  These compounds may induce weight loss.	Compounds were characterized for preclinical assessment safety and PK profiling package, and are being evaluated for other CNS indications	US Patents 8,492,591 8,754,132	Alan Kozikowski
<b>Metabolic and neurological disorders</b>	NAMPT activators	Enhancement of NAD through boosting of NAMPT activity or dietary supplementation alleviates AD symptoms in mice	Optimization of the hits and the assay	Provisional Filed	Rui Xiong, Gregory Thatcher, Kiira Ratia & Manel Ben Aissa
<b>Depression, Anxiety, &amp; Fear</b>	Allopregnanolone Stimulators	derivatives of the neurosteroid allopregnanolone for non-responders of SSRIs	Early stage in vivo mouse studies	US2018/039027 Nationalization US, EP, CA, and AU	Graziano Pinna
<b>PTSD, anxiety disorders, premenstrual dysphoria, &amp; impulsivity</b>	PPAR-alpha receptor	PEA induces an improvement of behavioral deficits by affecting the expression of target genes involved in cell proliferation, cell differentiation and in immune and inflammation responses	in vivo mouse models	US Patent Pending 16/014,607	Graziano Pinna & Locci Andrea

# Metabolic/Wounds

Indication	Target	Therapeutic Description	Stage of Development	Patents	Faculty
<b>Type 1 Diabetes</b>	Antigen specific regulatory T-cells	Bispecific antibody targeted to GLUT2 and CTLA4	Validated in NOD diabetes mouse model	US Patents 8,822,649 9,221,911 10,072,081	Bellur Prabhakar
<b>Asthma, Eosinophilic Esophagitis</b>	CCR3, eosinophils	Peptide therapeutic to compete against Eotaxin and other chemokines as a treatment for asthma	In vivo experiments in eosinophil mouse model	US Patent Allowed EP, CA Patents Pending	Steven Ackerman & Vadim Gaponenko
<b>Wound Healing</b>	Pro-regenerative cytokines & growth factors	Interferon gamma activated mesenchymal stem cells	Validated in primate & rodent models	US Patent 9,011,840	Amelia Bartholomew
<b>Bone regeneration</b>	Extracellular matrix	In vivo bioengineered exosome to create function/target specific and content release controlled exosome cargo	Preliminary proof of concept in rat calvarial defect model	PCT Patent Pending	Sriram Ravindran
<b>Wound Healing</b>	CCR10	Wound healing peptide with a novel target that greatly reduces healing time	in vivo diabetic mouse ( <i>db/db</i> ) model	PCT Patent Pending	Richard Minshall
<b>Obesity</b>	Human 5HT2c Serotonin Receptor	Compounds with superior safety profile over Lorcaserin (a FDA approved weight loss drug by Arena) and excellent efficacy against target receptor	Compounds were thoroughly characterized for preclinical assessment safety and PK profiling package, and are being evaluated for other CNS indications	US Patents 8,492,591 8,754,132 Patents Pending	Alan Kozikowski
<b>COPD, multiple sclerosis and diabetes</b>	Inhibitors of Keap1/Nrf2 Protein-Protein Interaction	Mechanism is validated by empirical validation in rodent	Early Preclinical study	US, EP, AU, CN, JP, CN Pending	Terry Moore
<b>Niemann-Pick</b>	TMEM 97 or NPC 1	Small peptide (5 AA)	Some animal data	PCT Patent Filed	Vinay Aakalu

# Immunology/Gene Therapy

Indication	Target	Therapeutic Description	Stage of Development	Patents	Faculty
<b>Type 1 Diabetes</b>	Antigen specific regulatory T-cells	Bispecific antibody targeted to GLUT2 and CTLA4	Validated in NOD diabetes mouse model	US Patents 8,822,649, 9,221,911, 10,072,081	Bellur Prabhakar
<b>Asthma, Eosinophilic Esophagitis</b>	CCR3, eosinophils	Peptide therapeutic to compete against Eotaxin and other chemokines as a treatment for asthma	In vivo experiments in eosinophil mouse model	US Patent Allowed EP, CA Patents Pending	Steven Ackerman & Vadim Gaponenko
<b>Rheumatoid Arthritis, Inflammatory Bowel Disease, Ulcerative colitis</b>	Epigenetics: HDAC6	HDAC6 Selective Inhibitors: nanomolar and sub nanomolar inhibitors of HDAC6	Potent HDAC6 inhibitors successfully prevented cardiac organ transplant rejection in rodent model; also prevented experimentally induced ulcerative colitis in rodents	Patents Pending	Alan Kozikowski
<b>CRISPR/Cas9</b>	DNA-editing platform	Engineered CRISPR/Cas9 plasmid for barcoding and to trace biological events and cell lineage  Artificial chromosomes: episomal plasmids that replicate with mammalian cell cycle and transmit CRISPR/Cas9 based instructions	Early preclinical stage	Nationalization and Provisional Filed	Bradley Merrill Ryan Clarke & Hannah Pennington
<b>Hematopoietic stem cell transplantation</b>	GABA receptor	Repurposed drug/ GABBR1 agonist to improve HSC transplantation efficiency	Murine tested	Provisional Filed	Owen James Tamplin
<b>Inflammation</b>	Macrophages/Respondin3 and LGR5	Activating the Respondin3-Wnt signaling pathway to treat a disease or condition characterized by excessive or unregulated inflammation	Pre-clinical testing was achieved in murine models	Provisional Filed	Asrar Malik

# Cardio-Pulmonary

Indication	Target	Therapeutic Description	Stage of Development	Patents	Faculty
<b>Thrombosis, blood disorders, cancer</b>	Platelet Adhesion Receptor Inhibitors	Inhibitory peptides of the interaction between 14-3-3 Protein and Glycoprotein Ib-IX Complex	In vitro and early in vivo studies	US Patent 8,173,595	Xiaoping Du
<b>Asthma</b>	CSF1R inhibitor repositioned as Inhalable, small molecule treatment for asthma	Targeting early phase of asthma pathogenesis to treat disease rather than simply treating symptoms	Efficacy in mouse models	PCT Patent Pending	Gye Young Park & Hyung-Geun Moom
<b>Sudden Cardiac Arrest</b>	Phosphatase inhibitors	Peptide that mimics cooling for neuroprotection	Efficacy in mouse and pig models	US Allowed EU, JP, AU, and CA Patents Pending	Terry Vanden Hoek, Jing Li, and Xiangdong Zhu
<b>Thrombosis, sepsis</b>	Von Willebrand factor	Inhibitory peptide	In vitro and early in vivo studies	US Patent 9,796,757	Richard Minshall
<b>Pulmonary Arterial Hypertension</b>	Visfatin/Pbef/ Nampt inhibition	Small molecule Inhibitors	Small molecules show efficacy against NAMPT Enzymatic activity	US Pending	Tom Driver
<b>Ischemic cardiovascular diseases</b>	Autologous endothelial cells	Method to produce autologous human endothelial cells from human postnatal dermal fibroblasts	In vitro and early in vivo studies in rodent models	US Patent 10,023,842	Changwon Park
<b>Acute Respiratory Distress Syndrome / Vascular leakage</b>	End Binding Protein (EB3) inhibitors	Inhibitory peptide	In vitro studies and in vivo studies in rodent models	Provisional Filed	Yulia Komarova
<b>Fibrosis /Osteogenesis</b>	Cell therapy	Alginate coated mesenchymal stromal cell transplantation	In vivo studies in rodent models	Provisional Filed	Jae-Won Shin
<b>Pulmonary Arterial Hypertension</b>	Nrf2-KEAP	Small molecules impacting Nrf2-KEAP interaction	Small molecules show efficacy in wound healing proof of concept -target engagement model.	PCT Pending	Terry Moore



# Anti-Infectives

Indication	Target	Therapeutic Description	Stage of Development	Patents	Faculty
<b>Lymphatic filariasis</b>	Tetravalent filarial surface proteins	Vaccine (Purified Protein and/or DNA)	Proof of Principle studies in a primate model of infection ongoing	US Patent 10,072,054 EP Allowed Nationalization CN ZL201180064793.8 more patents pending	Ramaswamy Kalyanasundaram
<b>Hepatitis C</b>	NPC1L1	Ezetimibe (Zetia – repurposed)	In vivo validation in a mouse model of HCV infection	US Patents 8,673,288 9,034,863	Susan Uprichard
<b>Dental Caries/Biofilm inhibition</b>	Bacterial pathogens that produce a biofilm matrix	Cerium (IV) nanoparticles that behave as biofilm inhibitors against the bacteria but not lethal to the cells at lower concentration.	Early stage, in vitro validation and cell toxicity evaluation	US Patent 10,835,556	Russell Pesavento
<b>Herpes</b>	Viral binding and cell entry	Inhibitory peptide	In vivo validation in a mouse model of HSV infection	US Patent 9,464,113	Deepak Shukla
<b>Herpes</b>	Multiple	Live Attenuated HSV Vaccine	Fine tuning of attenuation profile underway	US Patent 8,765,444	Bin He
<b>Ebola</b>	Ebola virus reagent	Synthetic Ebola glycoprotein cell line and drug screen	Used in drug discovery	Material License Available	Lijun Rong
<b>Herpes</b>	HSV-1 and HSV-2	DECON particles	In vivo mouse data	PCT Patent Pending	Deepak Shukla, Teja Yadavalli
<b>Antibiotics discovery</b>	Research tool device	agar-flip plate for high-throughput discovery of antibiotics	Plates fabricated and in use in research	Provisional filed	Sang Hyun Cho, Scott Franzblau, Brian Murphy, Jeongho Lee & Rui Ma

# Anti-Infectives

Indication	Target	Therapeutic Description	Stage of Development	Patents	Faculty
<b>Tuberculosis</b>	ClpC1/P1/P2 complex	Rufomycin analogs with anti-tuberculosis activity	In-vitro testing	Provisional filed	Scott Franzblau
<b>TB</b>	Multiple	Macrolides and small molecule antibiotics	In vitro validation	US Patent 9,090,667 CN, JP, KR, EP Patents Issued IN Patent Pending	Scott Franzblau
<b>TB and Cystic Fibrosis Pathogens</b>	Multiple	Small molecule therapeutics	Animal data available for best lead molecule against XDR and MDR TB	US Patent Pending	Alan Kozikowski, William Bishai & Laurent Kremer
<b>Ebola</b>	Ebola virus	Small molecule anti-virals	In vitro validation	Provisional filed	Rui Xiong, Lijun Rong, Irina Gaisina
<b>MRSA</b>	vraSR Operon	Small molecule inhibitors of MRSA related OPERON.	In vitro cellular demonstration of technology	US Patent 9,675,592	Mike E Johnson, Robert Daum & Susan Boyle-Vavra
<b>MERS Virus, SARS</b>	Papain-like Viral Protease	Inhibitors of Viral replication against the Middle East Respiratory Syndrome virus	Early stage program with viable hit to	Material License	Mike E Johnson
<b>Influenza</b>	Undefined target	Potential treatment for H5N1 infection	In vivo testing of top hit compounds	Provisional filed	Gregory Thatcher, Irina Gaisina, Lijun Rong & Norton Peet
<b>DENGUE VIRUS</b>	Dengue Virus	Dengue virus vaccine	In vivo testing	Provisional filed	Justin Richner
<b>Covid-19</b>	PL-Pro Protease inhibitor	Small molecule inhibitors human Covid-19 virus	Compounds proved effective in cellular assays showing suppression of viral replication	Provisional filed	Gregory Thatcher, Rui Xiong, Kiira Ratia

# Drug Delivery

Indication	Target	Therapeutic Description	Stage of Development	Patents	Faculty
<b>Herpes</b>	HSV-1 and HSV-2	DECON particles	In vivo mouse data	PCT Patent Pending	Deepak Shukla, Teja Yadavalli
<b>Drug Delivery</b>	Opioid Receptors	Dermorphinin Analogues for the Target-Delivery of Novel Therapies for Pain and Opioid Addiction	Effective delivery in rodent models	US Patent 7,776,819	Jim ZaiJie Wang
<b>Drug Delivery</b>	Endothelial cells	Myeloperoxidase-derived peptide	Validation of specific delivery of peptidelinked compounds into sub-endothelial spaces in mouse models	US Patent 7,429,563	Chinnaswamy Tiruppathi & Asrar Malik
<b>Drug Delivery</b>	Non-specific	Toroidal-spiral design allows for two different drugs to be released at two different rates	No animal data to date	US Patents 8,852,645 9,974,839	Ludwig Nitsche & Ying Liu
<b>Drug Delivery</b>	Non-specific	Nano-hybrid delivery system for anticancer, anti-viral and anti-angiogenic agents	No animal data to date	US Patent 9,168,225	Seungpyo Hong

Indication	Target	Therapeutic Description	Stage of Development	Patents	Faculty
Drug Delivery	Dermal delivery	Hydrogel to treat wound healing	Proof of concept in animals shows efficacy of repurposed FDA-approved drug to facilitate wound healing in diabetic animal model. Human clinical trial in preparation	Provisional Patent in preparation	Al Mancini, Tim Koh, Paul Pluta
Drug Delivery	Extracellular matrix	In vivo bioengineered exosome to create function/target specific and content release controlled exosome cargo	Preliminary proof of concept in rat calvarial defect model	US, EP, CA, AU Pending	Sriram Ravindran
Drug Delivery	Zwitterionic polyethylenimine (PEI), polyaziridine or polyoxazoline for protein conjugation	Polymer conjugation to increase half life and reduce renal clearance and immune response, without compromising the characteristics of the protein	Early proof of concept	PCT Patent Pending	Gang Cheng
Drug Delivery	Non-specific	Continuous, scalable production of polymeric particles with novel heterogenous structures for cell and gene therapy	Prototype	Provisional Filed	Ying Liu
Drug Delivery	Non-specific	Method to transport extracellular vesicles through tissues by water permeation	Ex vivo- lung tissue	Provisional Filed	Stephen Lenzini

# Diagnostics

Disease/Condition	Target/Marker	Stage of Development	Patents	Faculty
<b>Epilepsy</b>	Metabolite expression profile using MRI Spectroscopy	Identified in human epileptic brain tissue	US Patent Pending	Jeff Loeb
<b>Pancreatic Cancer</b>	PCR-based assay using multiple data-driven targets to create an optimized model that can predict IPMN with high-malignant potential with up to 86% accuracy	Assay run on multinational human pancreatic cancer cyst fluid	Nationalization	Ajay Maker
<b>Breast Cancer</b>	Estrogen receptor binding agent	In vitro development in progress	US patent pending	Stephen DiMagno Gregory Thatcher Debra Tonetti
<b>Rheumatoid Arthritis</b>	Several Biomarkers	Patient Data from 41 year community based, case-control cohort study	Not yet filed	Edward Barbour
<b>Bioanalysis and Imaging/Time-resolved fluorescence</b>	Metal chelators	Working prototype	Nationalization	Lawrence Miller Ali Mohamadi
<b>uterine carcinoma diagnostics</b>	Molecular Bio-imaging Probe for Non-Invasive Differentiation between Human Leiomyoma versus Leiomyosarcoma	Animal study has been conducted	US Patent Pending	Ayman Al-Hendy & Natalia Garcia
<b>Idiopathic Pulmonary Fibrosis</b>	Peripheral blood biomarkers	Validated in a small set of human samples	US Patent 10,036,069	Joe Garcia

Disease/Condition	Target/Marker	Stage of Development	Patents	Faculty
<b>Cancer</b>	Transcriptome analytics to predict disease progression and determine personalized therapeutics	Validated in human breast cancer	US Patent Pending	Yves Lussier
<b>Radiation-induced gastrointestinal injury</b>	Reactive oxygen species	Validated in a mouse model	US Patent 9,643,985	Marcelo Bonini
<b>Metastatic cancer</b>	Biomimetic device for capturing Circulating Tumor Cells and cancer stem cells	Validated using both human primary cancer cells and cell lines	Nationalization	Howard Ozer
<b>Cellular Lipids</b>	In Situ Quantitative imaging with specific molecular sensors for detection from Cholesterol to Cancer	Demonstration of several in situ molecular sensors	Material License	Wonhwa Cho
<b>Dry Eye Disease, Sjogren's GVHD</b>	Histatin Biomarkers	Validated in a mouse model	PCT Patent Pending	Vinay Aakalu, Sandeep Jain
<b>Diagnostic imaging</b>	Chelating agent for use in diagnostic imaging and radioimmunotherapy	Ongoing mouse in vivo study	Provisional Filed	Duncan Wardrop Lawrence Miller
<b>Point-of-Care Diagnostic</b>	in vitro data of multiple bacteria types	Novel Surface Chemistry of Filter Paper in Point-of-Care Detection/ Working prototype	Provisional Filed	Yajing Song/ Peter Gyarmati
<b>Peptide Biomarkers</b>	Dry eye Syndrome diagnostic and also therapeutic	biomarker, diagnostic, and potentially therapeutic, for ophthalmic or other system diseases especially those associated with inflammation, derangement in immunity, oncologic changes, infection, and wounding	US, EP, Japan Patent Pending	Vinay Aakalu & Sandeep Jain

# Ophthalmology

Disease/Condition	Target	Target/Marker	Stage of Development	Patents	Faculty
<b>Dry eye, retinopathy, angiogenesis</b>	VEGF Activation	Fusion peptide inhibitor based on Histaminesm. Applications in wound healing, metal ion chelation, anti-inflammatory effects and angiogenesis	In vitro data, In vivo data in mouse	PCT Patent Pending	Vinay Aakalu
<b>MEK inhibitors</b>	MEK inhibitors for corneal scarring and neovascularization	Therapeutic targeting Aniridia associated with PAX6 deficiency	In vivo mouse data	PCT Patent Pending	Ali Djallilian
<b>Peptide Therapeutic</b>	Functional Pentapeptide for Treatment and Diagnosis of Human Disease	A new pentapeptide compound that enhances epithelial wound healing (multiple surfaces) and is positively associated with the histatin peptide-family to promote similar effects	In vivo mouse data	Provisional Filed	Vinay Aakalu
<b>DNAase</b>	Dry eye disease	Tear deficient dry eye disease	Phase I/II human clinical trial completed	Nationalization US Patent 9,867,871 10,328,129	Sandeep Jain
<b>Repurposed FDA approved therateutic</b>	Dry eye disease	Novel Target in Eye	Investigator initiated IND	PCT Patent Pending	Sandeep Jain
<b>Corneal Scarring, Ocular Angiogenesis</b>	PAX 6	MEK inhibitors can limit the corneal scarring, opacification and neovascularization in severe corneal injury and disease	in vivo murine model	Provisional filed	Ali Djallilian

Disease/Condition	Target	Target/Marker	Stage of Development	Patents	Faculty
<b>Peptide Biomarkers</b>	Dry eye Syndrome diagnostic and also therapeutic	Biomarker, diagnostic, and potentially therapeutic, for ophthalmic or other system diseases especially those associated with inflammation, derangement in immunity, oncologic changes, infection, and wounding	Some animal data	PCT Patent Pending	Vinay Aakalu & Sandeep Jain
<b>Ocular surface toxicity</b>	BAK chronic accumulation	BAK accumulation on the ocular surface	Animal data	Provisional Filed	Ali Djalilian
<b>Tumor &amp; Ocular Angiogenesis</b>	selective VEGF regulation through KAI	Peptide based inhibitor of VEGF activation	In vitro validation and early in vivo studies in a mouse lung cancer model	Nationalization	Kaori Yamada & Asrar Malik
<b>Diabetic Retinopathy</b>	NAMPT enzymatic activation to increase concentration of NAD in the eye.	Decrease in NAD+ levels is attributed to an imbalance between NAD+ synthesis and consumption given that the expression and activity of enzymes critical to NAD+ synthesis decline with increasing age despite the fact that the obligatory requirement for NAD+ remains high	Compounds have been biochemically confirmed to increase enzymatic Kcat for NAD+ production	Provisional Filed	Kiira Ratia Greg Thatcher and A. Kazlauskas



# Ophthalmology Devices

Device	Function	Stage of Development	Patents	Faculty
<b>Corneal Blindness</b>	Medical Device	Device for projection onto retina from corneal blindness	Nationalization	Mark Rosenblatt, Charles Yu
<b>Ophthalmology</b>	Intra-vitreous injections	Prototype, animal data	Provisional Filed	Yannek Leiderman
<b>AI Classification of Diseases</b>	artificial intelligence classification methodology to differentiate between normal and diseased states of ocular conditions	Clinical data	PCT Patent Pending	Xincheng Yao
<b>Non-contact non-mydratric fundus camera Ultra wide angle</b>	By freeing the pupil for collecting imaging light only, trans-pars-planar illumination enables >200ofundus view in single-shot images	Prototype, some human data	Nationalization	Xincheng Yao
<b>Multimodal OCT for concurrent imaging of retinal neural activity and vascular hemodynamics</b>	Fosters the study of neurovascular coupling mechanisms in the retina, providing a new method for retinal disease detection and diagnosis.	Prototype	Nationalization	Xincheng Yao
<b>Miniaturized indirect ophthalmoscopy</b>	Miniaturized indirect ophthalmoscopy for wide-field fundus photography.	Prototype, some human data	Nationalization	Xincheng Yao
<b>Novel Keratoprotheses</b>	Sutureless Keratoprosthesis with flexible component for treatment of corneal blindness	Numerous prototypes, rabbit data	Nationalization	Mark Rosenblatt Charles Yu

# Ophthalmology Devices

Device	Function	Stage of Development	Patents	Faculty
<b>Vision Restoration System</b>	A system for projecting electronic visual information into the eye. May be fixated in the lens capsule, haptics, or sutures to the eye wall	Prototype	Nationalization	Mark Rosenblatt Charles Yu
<b>Optical coherence tomography angiography</b>	OCT feature analysis guided artery-vein differentiation in OCTA	Method of using OCT intensity feature analysis to guide artery-vein differentiation in optical coherence tomography angiography.	PCT Patent Pending	Xincheng Yao
<b>Microsurgery OCT guidance</b>	Optical Coherence Tomography Image-Guided Microsurgery of the Eye	A beta prototype model for a microsurgical guidance system with feedback to the surgeon to direct modulation of the position and function of microsurgical instrumentation	PCT Patent Pending	Yannek Leiderman
<b>Transcorneal Telescope</b>	Visual aid for vision impairment due to eye diseases	Prototype being developed	US Patent 8,506,626	Jose de la Cruz
<b>Contrast Sensitivity Chart</b>	diagnostic tool for assessing contrast sensitivity in a subject	Prototype, human data	US Patent Pending	Jason McAnany
<b>Ptosis Detection</b>	AI software for detecting and diagnosing ptosis	Human data	Provisional Filed	Darvin Yi

# Medical Devices

Device	Function	Stage of Development	Patents	Faculty
<b>Spinal surgical implant</b>	A surgical implant for use in patients needing surgical correction of deformity of the spine	Prototypes developed	PCT Patent Pending	Sergey Neckrysh
<b>Catheters</b>	Catheter head design for use in the suprachoroidal space	The complete navigational system was tested in various models to demonstrate functionality, including tip articulation, obstacle maneuvering and avoidance, and targeted delivery of a payload.	PTC Patent Pending	Anthony Felder
<b>Spine</b>	Method and device for delivering solution to posterolateral fusion: Medicant delivery in a fenestrated rod of the posterolateral fusion fixation system	Device build and physically tested	US Patent Pending	Ankit Mehta & Philip Ostrov
<b>Stroke Rehab</b>	A Soft Exoskeletal Network of Elastic, Nonlinear Torque Field Generators for Neurorehabilitation	simple, customizable tool capable of providing assistive torques to patients with motor deficits	PCT Patent Pending	James Patton
<b>Operating table Patient Stabilizer</b>	Operating table for procedures in the Trendelenburg position to reduce stress on nerves and prevent musculoskeletal injury	Prototype	US, EP, AU Pending	Michael Young
<b>Ankle Stroke Rehab Device</b>	Affordable at-home digital rehabilitation device for post-stroke ankle recovery.	Prototype	PCT Patent Pending	Sangeetha Madhavan
<b>Urine Flow Meter</b>	Automated Urineometer for ICO	Prototype	US Patent Pending	Michael Young etc
<b>Extendable Intravenous Catheter</b>	A catheter designed for pediatric patients	Prototype being developed	US Patent 9,517,324	Girish Desphande
<b>Catheter tubing</b>	Biocompatible, non-biodegradable and antifouling polyurethane	In vitro/early in-vivo	PCT Patent Pending	Gang Cheng

# Medical Devices

Device	Function	Stage of Development	Patents	Faculty
<b>Device for insertion of spinal cord stimulation paddle electrodes</b>	This device decreases pressure on the midline spinal structures, primarily the spinal cord, and instead main pressure points will be at the lateral aspects of the spinal canal, away from the spinal cord itself	Theoretical concept exists	US Patent 9,351,752	Konstantin Slavin
<b>Type I Diabetes</b>	Novel islet transport	Mathematical Model	Algorithm	Jose Oberholzer
<b>Jaw-Thrust and Immobilization Device</b>	A device to open and maintain an airway in an unconscious patient without any continuous attention	Tested using a human patient simulator in an obstructed airway state	US Patent 9,125,745	Girish Desphande
<b>Endotracheal tube</b>	A two port endotracheal tube designed to decrease the incidence of unplanned extubations with (1) a straight port used during intubation for suction tubing and introduction of other instruments (e.g., bronchoscope, in-line suction, or endotracheal tube exchanger devices) and (2) a distal (curved port) used for connecting endotracheal tube to a ventilator and sensors used for end-tidal CO2 measurement	Fully-functional prototype being tested in mannequin models	US Patent 8,991,396	Girish Desphande
<b>Medical Imaging</b>	Tagging distance dependent Z-spectral (TADDZ) MRI for B0-corrected arterial spin labeling (ASL) imaging	The imaging method has been tested	Issued US patent	Kejia Cai
<b>Rapid Pathogen ID</b>	Instrument free detection of pathogens from small blood sample	Prototype, testing against human disease samples underway	PCT Filed	Peter Gyarmati
<b>Pressure-indicating material</b>	Medical device-related pressure injury prevention pressure-indicating material	Prototype	Provisional Filed	Song Youngkwan

# Medical Imaging

Device	Function	Stage of Development	Patents	Faculty
<b>Large Memory Storage And Retrieval (LAMSTAR) neural network (NN)</b>	A method that predicts the occurrence of individual episodes of obstructive apnea during sleep, and which can be integrated into current CPAP systems to reduce occurrences of apnea episodes	Human trials have been conducted.	US Patent 8,775,340	Jonathon Waxman, David Carley & Daniel Graupe
<b>Medical Imaging</b>	Tagging distance dependent Z-spectral (TADDZ) MRI for B0-corrected arterial spin labeling (ASL) imaging		Issued patent	Kejia Cai
<b>Medical Imaging</b>	Methods for Reducing Fold-Over Artifacts in Magnetic Resonance Imaging		US Patent 8847594	Joe Zhou
<b>Medical Imaging</b>	Rapid MRI with High Motion Tolerance		US Patent 9,645,211	Joe Zhou
<b>Medical Imaging</b>	Time-Efficient Phase Error Correction in EPI-PROPELLER		US Patent 9,612,307	Joe Zhou
<b>Medical Imaging</b>	Method for Reducing Image Distortion in Echo Planar MRI		US Patent 9,797,970	Joe Zhou

Title	Target or Indication	Description	Stage of Development	Intellectual Property	Faculty
<b>Fit-N Strong</b>	Osteoarthritis	An evidence-based exercise program to treat osteoarthritis. This program is currently being taught in almost 100 sites in 24 states.	<a href="https://www.fitandstrong.org/">https://www.fitandstrong.org/</a>	Copyright	Susan Hughes
<b>DEEP</b>	Diabetes	This is a diabetes education and self-management program endorsed by CMS	Commercially deployed <a href="https://mwlato.uic.edu/deep-program/">https://mwlato.uic.edu/deep-program/</a>	Copyright	Amparo Castillo
<b>My IDEA</b>	Drug-Eluting Stent	My IDEA: Patient-Centered Tablet Application for Improving Medication Adherence after a Drug-Eluting Stent	Clinical trials with patients have been conducted. <a href="https://www.frontiersin.org/articles/10.3389/fpubh.2016.00272/full">https://www.frontiersin.org/articles/10.3389/fpubh.2016.00272/full</a>	Copyright	Andrew Boyd
<b>CATCH-IT</b>	Adolescent depression	Evidence based computerized cognitive behavioral therapy for depressed adolescents	Clinical trials with patients have been conducted. <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6290998/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6290998/</a>	Copyright	Benjamin Van Voorhees
<b>LUPUS- PRO</b>	SLE Lupus	<a href="#">Patient Reported Outcomes Questionnaire</a>	Used by pharmaceutical and clinical units to gauge disease severity <a href="http://www.lupuspro.com/information.html">http://www.lupuspro.com/information.html</a>	Copyright	Alan Simon Pickard Meenakshi Jolly
<b>Medicinal Cannabis Technical Manuals</b>	Medical Marijuana/Cannabis	Laboratory protocols describing the processing of medical cannabinoid products	Turn-key validated protocols	Copyright	Jennifer Bash
<b>LEAD Experience</b>	Legislative Education & Advocacy Development	Interdisciplinary software (learning module) designed to teach health policy to medical students	2 week program that has already been rolled out in some states	Copyright	James Ronayne
<b>Academic Detailing Surveys</b>	Opioid Death Prevention Counselling	Academic Detailing: a comprehensive and novel method of educational outreach designed to arm providers with current evidenced-based information through individual face to face interactions between PharmD professionals and patients.	Available for Licensing from UIC	Copyright	Simon Pickard and Todd Lee

# Startups

Company	Technology	Website	Type	Faculty
<b>5by5</b>	Novel Surgical Stations		Device	Pier Giulianotti
<b>Actuate Therapeutics</b>	Highly Selective GSK3 inhibitors for Oncology and CNS indications	<a href="https://actuatetherapeutics.com">https://actuatetherapeutics.com</a>	Therapeutic	Alan Kozikowski
<b>Advaite</b>	Anti-inflammatory in ocular surface diseases	<a href="http://advaite.com/">http://advaite.com/</a>	Therapeutic	Sandeep Jain
<b>Bright Minds Biosciences</b>	Novel biased agonists of the human 5HT2c receptor targeting mutiple CNS indications	<a href="https://brightmindsbio.com/">https://brightmindsbio.com/</a>	Therapeutic	Alan Kozikowski
<b>Capio Biosciences</b>	Circulating tumor cell capture device for diagnostic applications. Successfully raised \$2M in start up funding.	<a href="http://www.capiobiosciences.com/">http://www.capiobiosciences.com/</a>	Diagnostic	Seungpyo Hong
<b>Cell Biologics</b>	Therapeutics for treating sepsis and other pulmonary indications; primary cultured cells and cell culture products	<a href="http://www.cellbiologics.com">http://www.cellbiologics.com</a>	Therapeutic & Reagents	Asrar Malik
<b>Cellgorithmics</b>	Biotech developing a proprietary CRISPR/Cas9 based, genetic programming platform technology that converts cells into biological computers using DNA based instructions that read like lines of codecompany leveraging next generation CRISPR in therapeutics and food science.	<a href="http://cellgorithm.com/">http://cellgorithm.com/</a>	Therapeutic & Food Science	Brad Merrill and Ryan Clarke
<b>Drax Therapeutics</b>	Biotechnology company developing small molecule inhibitors of NAMPT as disease modifying therapeutics for Pulmonary Arterial Hypertension.	<a href="https://research.impact.iu.edu/our-strengths/innovation-commercialization/ico-pipeline.html">https://research.impact.iu.edu/our-strengths/innovation-commercialization/ico-pipeline.html</a>	Therapeutic	Tom Driver and Roberto Machado
<b>DuPage Medical</b>	Peptide based anti-thrombotics that don't cause bleeding		Therapeutic	Xiaoping Du
<b>Dystrogen Therapeutics</b>	Chimeric Cell Therapy for Treating Muscular Dystrophy including Duchenne Muscular Dystrophy (DMD)	<a href="http://dystrogen.com/">http://dystrogen.com/</a>	Therapeutic	Maria Seimionow

Company	Technology	Website	Type	Faculty
<b>Enzyme by Design</b>	Safer asparaginase proteins that have been designed to minimize glutaminase activity for treating cancer	<a href="https://www.enzymebydesign.com/">https://www.enzymebydesign.com/</a>	Therapeutic	Arnon Lavie
<b>EpiDestiny</b>	Decitabine formulation for treating blood related cancers and indications including sickle cell anemia		Therapeutic	Yogen Sauntharajah & Joe DeSimone
<b>FertilityABC</b>	Software (app) for primary care physicians, their patients, and Resident physicians to provide guidance on methods besides in vitro fertilization to increase opportunity/likelihood for pregnancy		Software Application	John Holden
<b>Immersive Touch</b>	Simulation based surgical training and exploration which immerses surgeons in a digitally replicated operating environment with high-fidelity 3D virtual anatomies and haptic instrument replicates	<a href="http://www.immersivetouch.com">http://www.immersivetouch.com</a>	Software	Pat Banerjee
<b>Jivana Biotechnology</b>	siRNA technology targeting breast, lung, and liver cancer	<a href="http://www.jivanabiotech.com">http://www.jivanabiotech.com</a>	Therapeutic	Bellur Prabhakar
<b>Keywise Inc.</b>	A smartphone application that enables monitoring of non-verbal speech using keyboard dynamics, meta-data, and related mobile sensor information to infer the users' neuropsychological state	<a href="https://keywise.tech/">https://keywise.tech/</a>	Health IT Software	Alex Leow Olusola Ajilore Faraz Hussain
<b>Laurel Therapeutics</b>	Peptide based therapy for treating diseases associated with ocular angiogenesis		Therapeutic	Yulia Komarova & Asrar Malik
<b>Nano Biotherapeutics Inc.</b>	Diagnosing or Treating Neutrophil-Mediated Inflammatory Disease		Therapeutic	Asrar Malik
<b>NS Intelligence IP</b>	Non-contact videoplethysmograph (VPG) measure of human arterial pulse using a digital camera		Diagnostic	Stephen Porges
<b>Ocugen</b>	Ocular graft versus host disease	<a href="https://ocugen.com/">https://ocugen.com/</a>	Therapeutic	Sandeep Jain



Company	Technology	Website	Type	Faculty
<b>PAX Neuroscience</b>	Blood based test for evaluating antidepressant efficacy and diagnosing depression	<a href="http://www.paxneuroscience.com">http://www.paxneuroscience.com</a>	Diagnostic	Mark Rasenick
<b>RespireRX</b>	Novel drug therapies for sleep apnea, drug-induced respiratory depression, and other brain-mediated breathing disorders	<a href="http://www.respirerx.com/">http://www.respirerx.com/</a>	Therapeutic	David Carley
<b>Revivo Therapeutics</b>	Novel methylthiazoles for CNS indications with the lead molecule well tolerated in a Phase 1 study in healthy volunteers	<a href="http://www.revivotherapeutics.com/">http://www.revivotherapeutics.com/</a>	Therapeutic	Greg Thatcher
<b>SENEX Bio</b>	Biotechnology company pivoting on development of novel kinase inhibitors for oncology, Senex is developing highly selective small-molecule inhibitors of this protein for the treatment of presently incurable types of prostate cancer, breast cancer and leukemia	<a href="https://senexbio.com/">https://senexbio.com/</a>	Therapeutic	Igor Roninson and Karthik Gopalakrishnan
<b>Tianhe Stem Cell Biotechnologies</b>	Stem Cell Educator Therapy is a treatment of autoimmune related diseases using stem cells drawn from human umbilical-cord blood	<a href="http://www.tianhecell.com">http://www.tianhecell.com</a>	Device & Therapeutic	Yong Zhao
<b>TTC Oncology</b>	Clinical stage hormone receptor modulators for treating cancer	<a href="https://www.ttconcolgy.com/">https://www.ttconcolgy.com/</a>	Therapeutic	Greg Thatcher
<b>Yaso Biotech</b>	Therapeutic and prophylactic agent for sexually transmitted viral pathogens with contraceptive properties	<a href="http://www.yasotherapeutics.com/">http://www.yasotherapeutics.com/</a>	Therapeutic	Alex Krunic & Don Waller