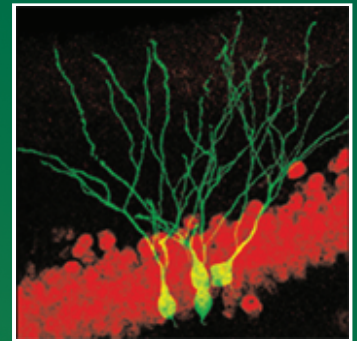
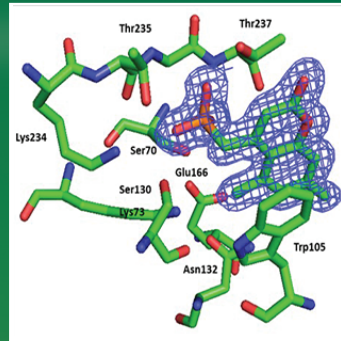
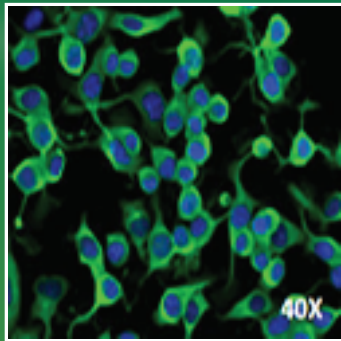


Advancing USF Innovation



Therapeutics

Neurology

Cardiology

Endocrinology

Otology

Regenerative Medicine

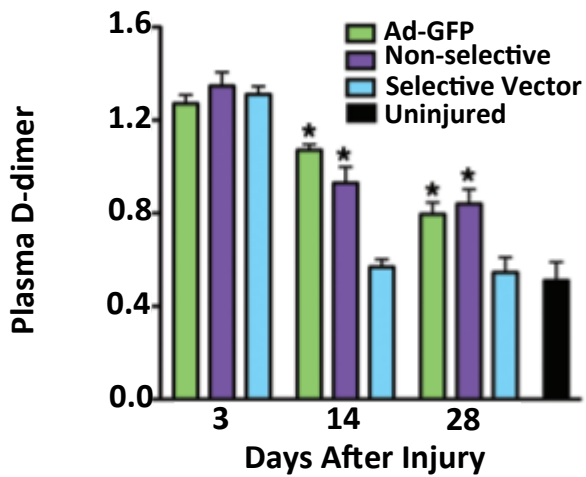


The University of South Florida (USF) Technology Transfer Office (TTO) was ranked in the Top 20 of American Universities for technology transfer by the prestigious Milken Institute. TTO endeavors to educate and promote innovation, the result of which is products, jobs and technologies utilized in the public interest. TTO's work allows for a sustained focus on transferring cutting-edge research and innovation to the commercial marketplace, generating revenue and diversifying the economy. USF is the nation's seventh leading public university in generating new United States utility patents and ranks 16th among universities worldwide in this key measure of innovation, according to the National Academy of Inventors (NAI) and the Intellectual Property Owners Association (IPO). With 96 new utility patents issued in CY 2018, USF continues to stand with some of the world's most prestigious institutions in the highly competitive arena. USF has ranked in the top 10 among public universities for U.S. patents granted for the past eight years.

The TTO negotiated 98 license and option agreements in FY 2019, and these agreements represent companies that have contracted with USF to further develop research into commercial products and to help bring USF's innovation into the marketplace.

USF facilitated the formation of seven new startup companies in FY 2019, and has facilitated the formation of 47 startup companies in the last five years. USF also had 173 disclosures in FY 2019.

Page	Area of Interest
3	Cardiology
4	Regenerative Medicine
7	Endocrinology
9	Otology
10	Synthetic Pharmaceuticals
11	Neurodegenerative and Neuropsychiatric
20	Nervous System Injury



Novel Vector Reduces Hypercoagulability and Restores EC Function In Vivo

Target Sequences for Anti-Restenotic Therapy

Incorporating Target Sequences for a Certain MicroRNA Into 3'-UTR of Gene of Interest

USF Tech ID# 13B196

Patent Pending

Therapeutic Indication: Cardiovascular disease

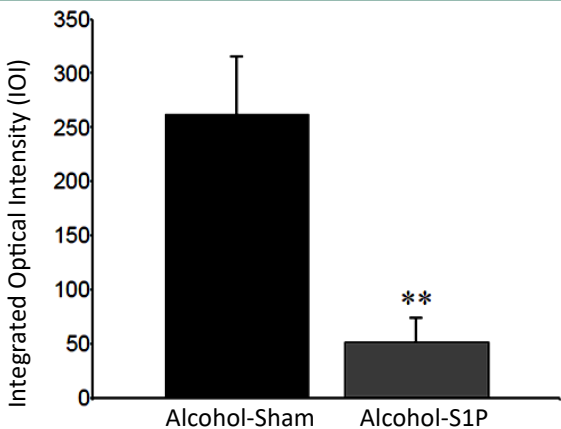
Mechanism of Action: Inhibits VSMC via overexpression of p27

State of Technology: *In vivo*

Technology Description:

Researchers at the University of South Florida have developed the first miRNA-based strategy for the prevention of restenosis, without the inhibition of reendothelialization.

USF researchers have developed the first miRNA-based strategy to selectively inhibit VSMC proliferation and migration for the prevention of restenosis, without concurrently inhibiting reendothelialization and EC function. This was achieved by the design of a novel vector that inhibits VSMCs and selectively preserving ECs. This vector was shown to reduce hypercoagulation and restore EC function in vivo. The combination of a better stent platform and biodegradable polymer with this novel strategy, has the potential to revolutionize the future of vascular interventional medicine.



Bioactive Lipid Sphingosine-1-Phosphate to Stabilize Arterial Blood Flow and Pressure

Improvement of Resuscitation Efforts in Alcohol-Intoxicated Trauma Patients

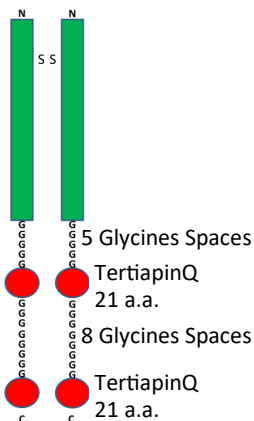
USF Tech ID# 14B170

US Patent Number 10,111,841

Therapeutic Indication: Alcohol-intoxicated trauma

Mechanism of Action: Increase in S1P/ S1P receptor antagonists

State of Technology: *In vivo*



Bioengineered Anti-IKACH Peptibodies

Safe and Atrial Specific Peptibodies for the Treatment of Chronic Atrial Fibrillation

USF Tech ID# 16B169

Patent Pending

Therapeutic Indication: Atrial fibrillation

Mechanism of Action: Inhibits acetylcholine activated inward rectifier current (IKACH)

State of Technology: *In vivo*

Reduction of Microhemorrhages in the Spinal Cord of Symptomatic ALS Mice After Intravenous Human Bone Marrow Stem Cell Transplantation Accompanies Repair of the Blood-Spinal Cord

The Effects of Intravenous Human Bone Marrow CD34+ (hBM34+) Cell Transplantation

USF Tech ID# 17A028
Patent Pending

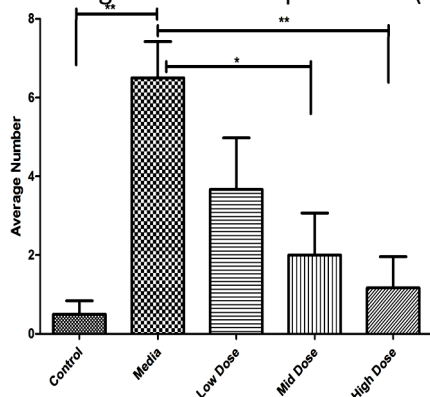
Therapeutic Indication: Blood-spinal cord barrier repair
Mechanism of Action: Bone marrow cell transplantation
State of Technology: *In vivo*

Technology Description:

Researchers at the University of South Florida have developed a potential new treatment for ALS using intravenous human bone marrow cell transplantation.

Numerous studies have shown structural and functional alterations in the blood-brain barrier (BBB) and blood-spinal cord barrier (BSCB) in both patients and mouse models, classifying ALS as a neurovascular disease. Impairment of BBB/BSCB is mainly characterized by endothelial and astrocyte end-feet degeneration as well as tight junction protein downregulation leading to increased capillary leakage. Additionally, microhemorrhages (capillary ruptures) were determined in the spinal cord parenchyma of animal models and ALS patients. Our inventors address these issues through intravenous human bone marrow cell transplantation, thus repairing BSCB integrity.

Microhemorrhages in Lumbar Spinal Cord (L3-L5)



Use of Exosomes from Adipocyte Derived Stem Cells for Healing Ischemic Wounds

Novel Method of Use of Secreted Factors to Induce Cell Migration, Cell Proliferation, and Angiogenesis

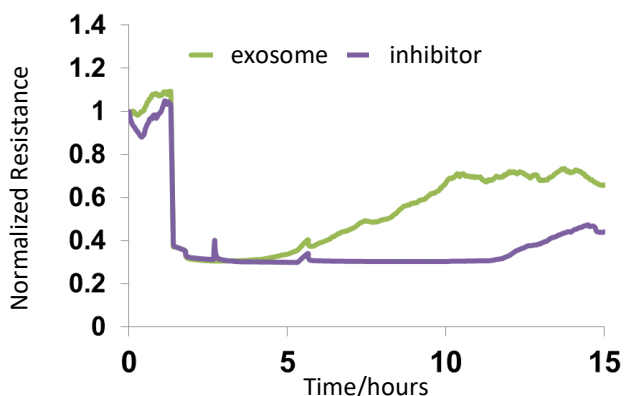
USF Tech ID# 16A081
Patent Pending

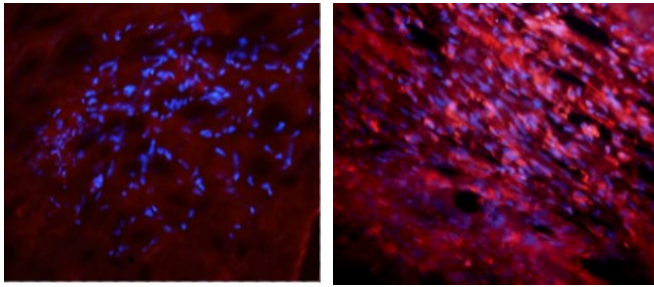
Therapeutic Indication: Ischemic wounds
Mechanism of Action: Secreted factors in exosome particles to stimulate natural repair
State of Technology: *In vivo*

Technology Description:

Researchers at the University of South Florida have discovered a novel method of treating ischemic wounds, which are notoriously difficult wounds to heal and can lead to more serious further complications.

Our researchers have discovered a novel method of using secreted factors, carried in exosome particles derived from human adipose derived stem cells, to stimulate the body's natural repair mechanisms. These exosomes are applied topically to the wounded area where the therapeutic factors contained in the exosomes induce cell migration, cell proliferation, and angiogenesis (the development of new blood vessels in the wounded area); all of which aid in wound healing. Treatment of ischemic wounds with these exosomes has been shown to decrease healing times significantly.





Photomicrographs *in vivo* of human heme oxygenase-1 α (hHO-1) expression in grafted vigilant stem cellsTM under ischemia.

Method for Protecting Genetically Modified Stem Cells
Tissue Specific Vigilant Stem Cells

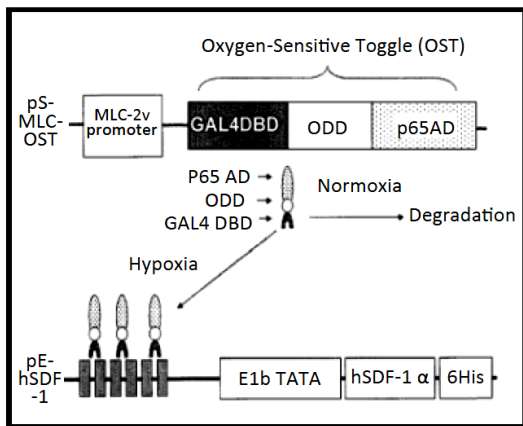
USF Tech ID# 03B057

US Patent Number: 9,040,676

Therapeutic Indication: Diabetes, cancer, stroke, atherosclerosis, cardiovascular diseases, hypoxia

Mechanism of Action: Stable vectors, gene switch/ biosensor, gene amplification system

State of Technology: *In vitro*



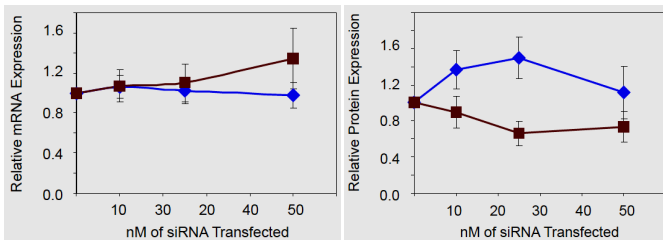
Vector Beacon and Method for Attracting Stem Cells to Sites of Injury for Tissue Repair
Vigilant Stem Cell Beacon

USF Tech ID# 03A044

US Patent Number 8,569,471

Therapeutic Indication: Injury, tissue/ organ regeneration
Mechanism of Action: Chemokine delivered to injured tissue, increase of stem cells to injury site

State of Technology: *In vitro*



siRNA Based Therapy for Nitric Oxide Modulation
Improvement of Endothelial Function

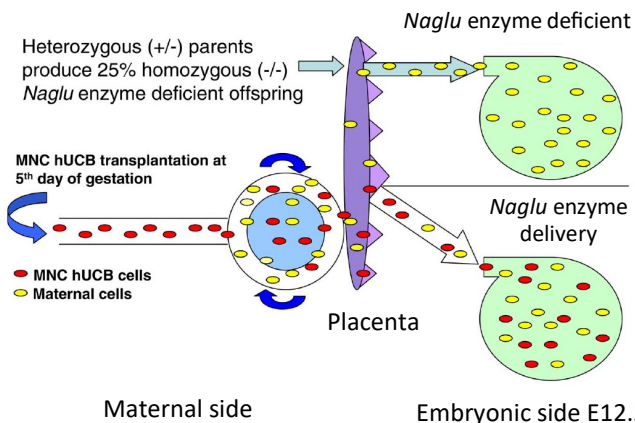
USF Tech ID# 04A060

US Patent Number: 7,718,625

Therapeutic Indication: Heart failure, hypertension, hypercholesterolemia, atherosclerosis, diabetes

Mechanism of Action: Regulation of AS expression and NO production

State of Technology: *In vitro*



Prenatal Administration of Stem Cells for Therapeutic Treatments
Effective In Utero Treatment for Congenital or Inherited Diseases Using Umbilical Cord Stem Cells

Effective In Utero Treatment for Congenital or Inherited Diseases Using Umbilical Cord Stem Cells

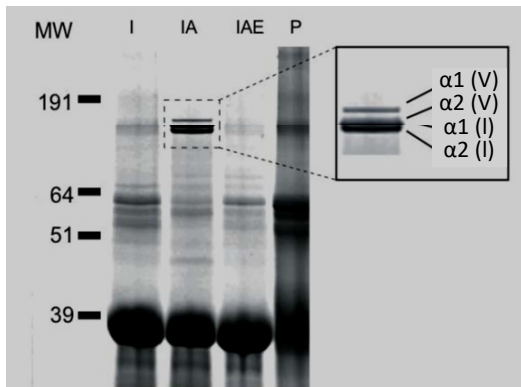
USF Tech ID# 05B116

US Patent Number: 9,173,907

Therapeutic Indication: Congenital conditions, inherited diseases

Mechanism of Action: Delivery of stem cells in utero

State of Technology: *In vivo*



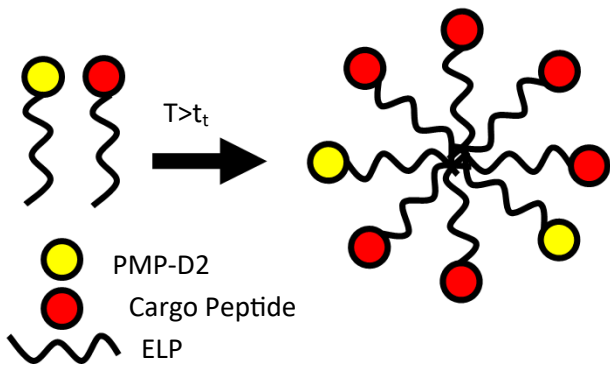
Combination of Insulin and Ascorbate to Enhance Wound Healing

Accelerated Wound Healing via Enhanced Collagen Synthesis

USF Tech ID# 06A060

US Patent Numbers: 7,834,153; 8,921,312

Therapeutic Indication: Wounds and surgical care
 Mechanism of Action: Increase in collagen synthesis
 State of Technology: *In vitro*



Protease Resistant Growth Factor Formulations for Chronic Wound Healing

Novel Formulation of Fusion Which Preserves the Bioactivity of Different Growth Factors and Functional Peptides

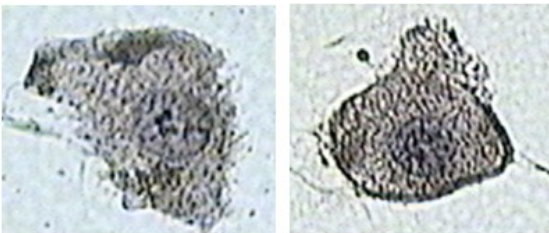
USF Tech ID# 15B151

Patent Pending

Therapeutic Indication: Chronic wounds, tissue regeneration
 Mechanism of Action: Fusion of elastase resistant peptide PMP-D2 variant to bioactive protein
 State of Technology: *In vitro*

SCA1

SCA2



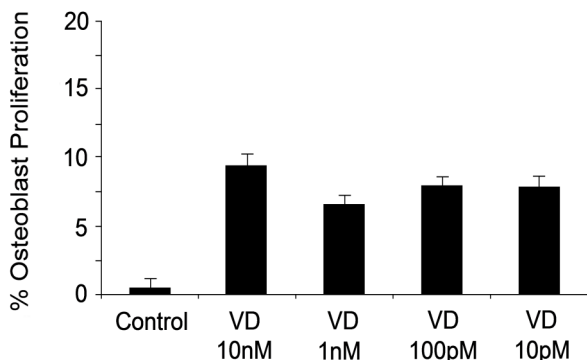
Human Mesenchymal Progenitor Cells

Simultaneously Expresses a Plurality of Genes that are Markers for Multiple Cell Lineages for Regenerative Medicine

USF Tech ID# 01B073

US Patent Numbers: 8,057,826; 7,049,072; 7,442,390

Therapeutic Indication: Graft-versus-host diseases, tissue rejection, bone marrow transplantation
 Mechanism of Action: Pluridifferentiated mesenchymal progenitor cells
 State of Technology: *In vivo*



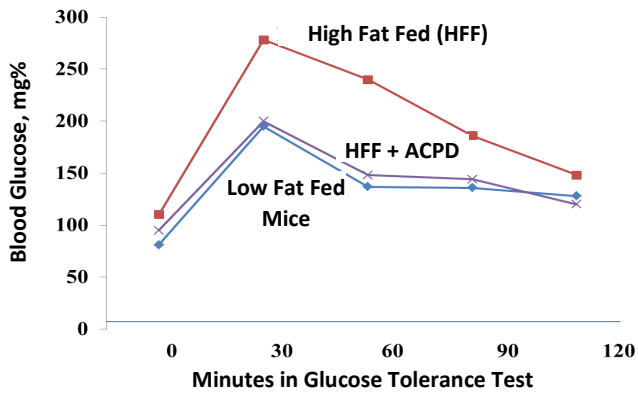
Method for Treatment of Skeletal Dysplasias via Vessel Dilator

Stimulation of Osteoblast Proliferation via Cardiac Hormone Vessel Dilator

USF Tech ID# 10A040

US Patent Number 9,956,267

Therapeutic Indication: Skeletal dysplasias, osteoporosis, achondroplasia
 Mechanism of Action: Proliferation of osteoblasts
 State of Technology: *In vitro*

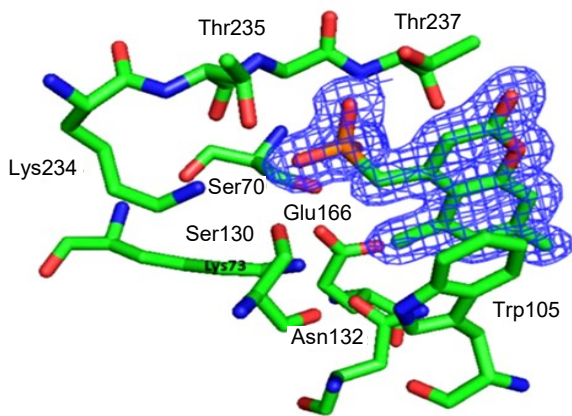


2-Acetyl-1,3-Cyclopentanedione for Metabolic Disorders

Prevents Development of Disease and Diminishes Pre-Existing Disease

USF Tech ID# 13A021
US Patent Number 9,795,584

Therapeutic Indication: Metabolic disorders, diabetes
 Mechanism of Action: Inhibits atypical PKCs, PKC-zeta, and PKC-lambda/ iota
 State of Technology: *In vivo*

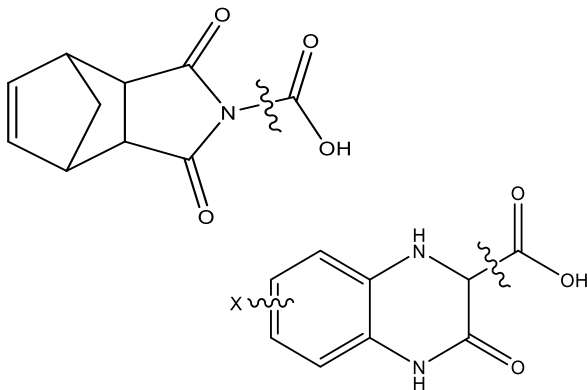


Clk1 Inhibitors for the Induction of White to Brite Adipogenesis

New Weight Loss Therapy

USF Tech ID#s 14B155 & 16A003
Patent Pending

Therapeutic Indication: Obesity, diabetes, weight related co-morbidities
 Mechanism of Action: Clk1 inhibitors
 State of Technology: *Compositions*

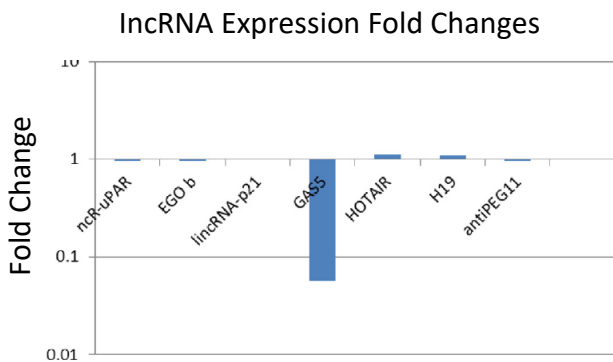


Sortilin-Bind Small Molecule Increases Glucose Uptake

Control Glucose Transport in Obese Diabetics

USF Tech ID#s 15A043 & 16A008
Patent Pending

Therapeutic indication: Diabetes, high blood glucose
 Mechanism of action: Sortilin catalyst and PKCδ I inhibitor
 State of technology: *In vitro*

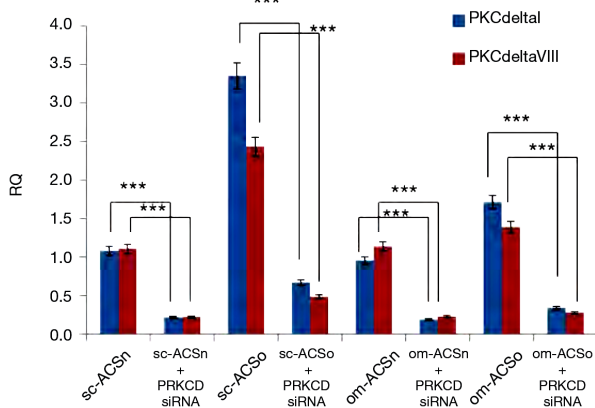


BAG5-Binding Small Molecule

Multi-Faceted and Specific Therapy

USF Tech ID# 15B184
Patent Pending

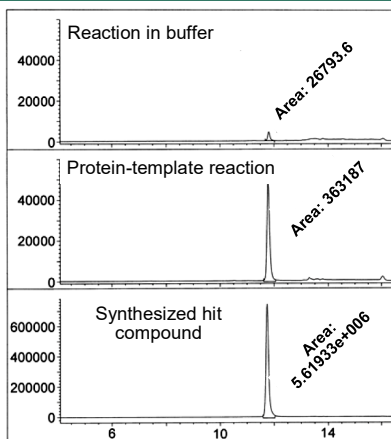
Therapeutic Indication: Diabetes mellitus
 Mechanism of Action: Stabilize and increase levels of GAS5 lncRNA
 State of Technology: *Clinical Data*



Characterization and Manipulation of Adipose Stem Cell Depots to a Metabolically Healthy State
Transforming Metabolic Dysfunction to a Metabolically Healthy State

USF Tech ID# 16A097
Patent Pending

Therapeutic indication: Metabolic diseases, obesity
 Mechanism of action: Modulate adipose stem cells
 State of technology: *In vitro*

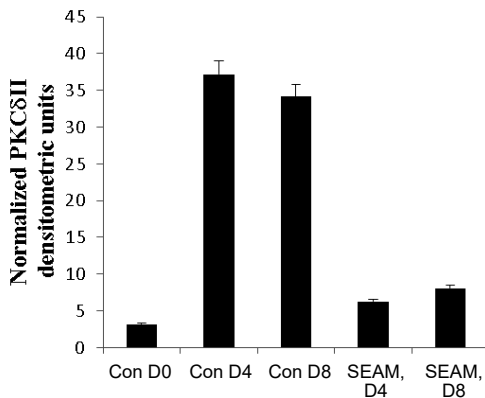


5-Aminolevulinate Synthase Inhibitors

Novel Molecules Effective Against Metabolic Disorders

USF Tech ID# 17A079
Patent Pending

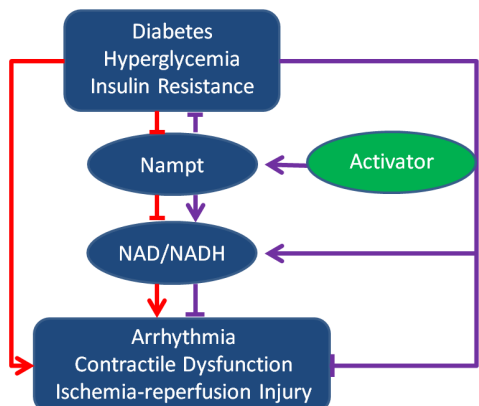
Therapeutic Indication: Metabolic disorders and heme biosynthesis disorders
 Mechanism of Action: Kinetic target-guided synthesis
 State of Technology: *In vitro*



Compositions and Methods for Adipocyte Modulation
Novel Inhibitor for Obesity Management

USF Tech ID# 13A098
US Patent Number: 9,458,086

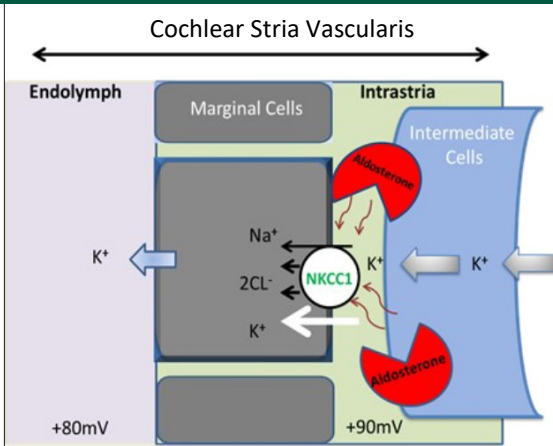
Therapeutic Indication: Obesity, diabetes, weight related co-morbidities
 Mechanism of Action: PKCdelta II inhibitors
 State of Technology: *In vitro*



Cardioprotective Activity of Nampt Activator
Nampt Activator Modulates Pyridine Nucleotides

USF Tech ID# 16A010
Patent Pending

Therapeutic Indication: Diabetes, insulin resistance, and cardiac function
 Mechanism of Action: Increase nicotinamide adenine dinucleotide (NAD) levels
 State of Technology: *In vitro*



Hormone Treatment for Age-Related Hearing Loss
Novel Use of Aldosterone

USF Tech ID# 13B200
US Patent Number 10,342,806

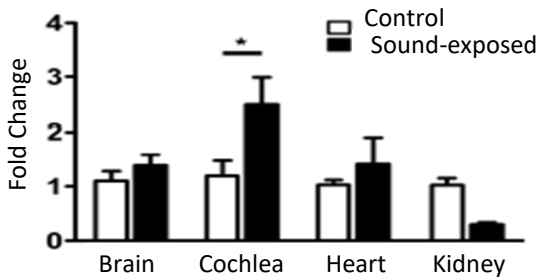
Therapeutic Indication: Age-related hearing loss
 Mechanism of Action: Maintains homeostasis for potassium and sodium through NKCC1
 State of Technology: *In vivo*



Method of Treating Debilitating Hyperacusis
A Hearing Aid Device for the Treatment of Hyperacusis

USF Tech ID# 18A104
Patent Pending

Therapeutic Indication: Hyperacusis hearing disorder treatment
 Mechanism of Action: Hearing aid with earplugs and sound generators
 State of Technology: *Prototype available*

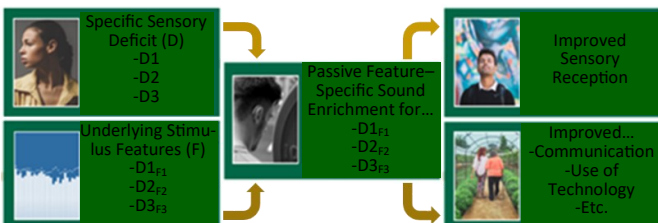


Sound exposure induced Hsp70 mRNA in the

Combinatorial Biotherapeutic and Sound Therapy
Prevention for Sensorineural Hearing Loss
Effective Combinatorial Therapy for Sensorineural Hearing Loss

USF Tech ID# 17A010
Patent Pending

Therapeutic Indication: Sensorineural hearing loss
 Mechanism of Action: Antioxidant, caspase inhibitor, neurotrophic factor in combination with preconditioned sound therapy
 State of Technology: *In vivo*



Targeted Feature-Specific Sensory Therapy
Active Sound Therapy for the Treatment of Sensory Deficits

USF Tech ID# 17A017
Patent Pending

Therapeutic Indication: Sensory deficits
 Mechanism of Action: Active sound therapy
 State of Technology: *Clinical data*



A digital microscopy image of methanol solvate, a co-crystal of quercetin and caffeine.

Nutraceutical Co-Crystals

Emerging Class of Pharmaceutical Materials

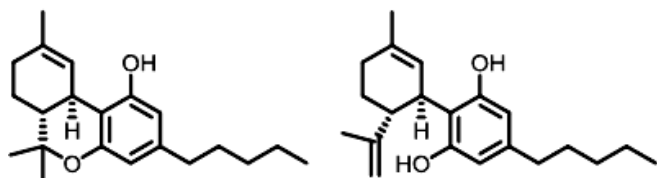
USF Tech ID# 07B114

US Patent Number 10,376,521

Therapeutic Indication: Various
 Mechanism of Action: Various
 State of Technology: *Compositions*

Technology Description:

USF inventors have developed a method to prepare and isolate co-crystals of nutraceuticals with a wide range of zwitterions and/or other compounds that contain carboxylate groups, such as sarcosine and nicotinic acid with vitamin C. This allows for the preparation of new drug formulations comprising co-crystals of active pharmaceutical ingredients with pharmaceutically acceptable guests. These co-crystals represent an emerging class of pharmaceutical materials offering the prospect of optimized chemical and physical properties such as low toxicity, enhanced stability, solubility and bioavailability.



THC

CBD

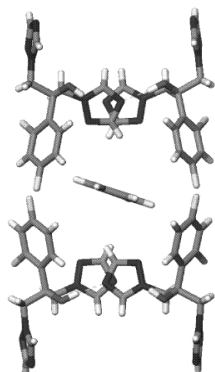
Synthesis of Cannabinoids and Novel Analogs

Control and Evaluation of Cannabinoids

USF Tech ID# 17A086

Patent Pending

Therapeutic Indication: Various
 Mechanism of Action: Antagonists of cannabinoid receptors CB1 and CB2
 State of Technology: *Compositions*



A packing diagram of fluconazole benzene solvate.

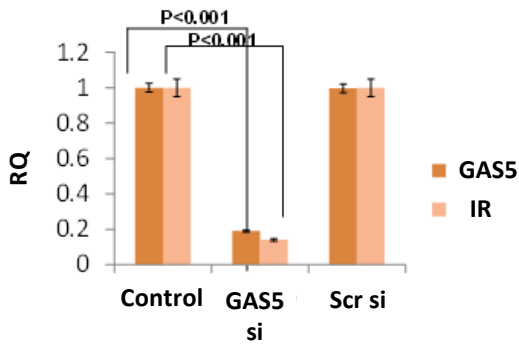
Novel Methods for Making Pharmaceutical Drug Forms

Methods of Making and Using Medicinal Compounds

USF Tech ID# 05B101

US Patent Number: 8,436,029

Therapeutic Indication: Various
 Mechanism of Action: Various
 State of Technology: *Compositions*



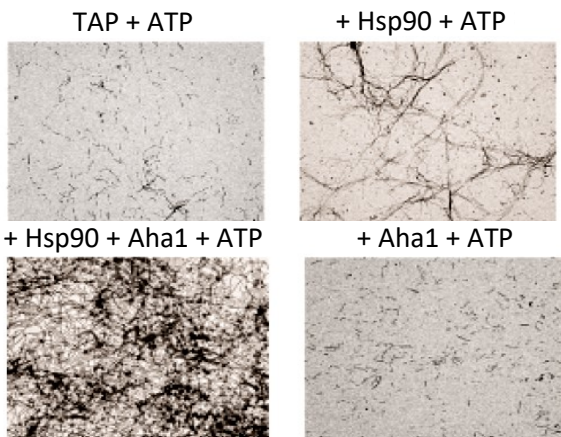
GAS5 depletion resulted in dramatic inhibition of insulin receptors.

GAS5 Mediated Metabolic Regulation in Neurodegenerative Diseases

Metabolic Approach to the Treatment of Neurodegenerative Disorders

USF Tech ID#s 17A041 & 17A043
Patent Pending

Therapeutic indication: Neurodegenerative disease
Mechanism of action: Increasing lncRNA GAS5
State of technology: *In vivo*



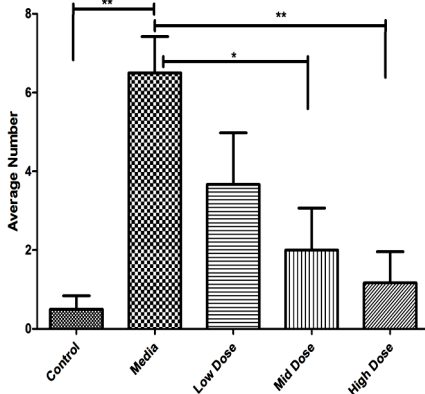
Method of Treating Pathological Tau Aggregates by Inhibiting the HSP90 Activator AHA1

Novel Drug Target for Preventing Tauopathies

USF Tech ID# 17A030
Patent Pending

Therapeutic Indication: Alzheimer's disease, tauopathies
Mechanism of Action: Inhibition of Aha-1
State of Technology: *In vivo*

Microhemorrhages in Lumbar Spinal Cord (L3-L5)

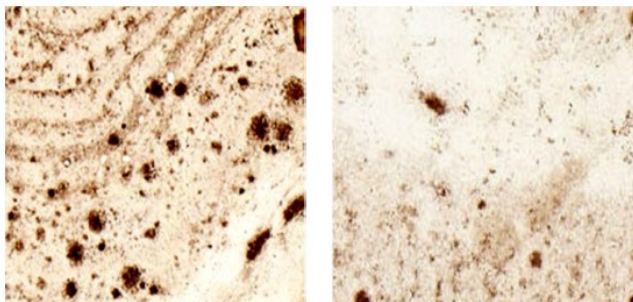


Reduction of Microhemorrhages in the Spinal Cord of Symptomatic ALS Mice After Intravenous Human Bone Marrow Stem Cell Transplantation Accompanies Repair of the Blood-Spinal Cord

The Effects of Intravenous Human Bone Marrow CD34+ (hBM34+) Cell Transplantation

USF Tech ID# 17A028
Patent Pending

Therapeutic Indication: Blood-spinal cord barrier repair
Mechanism of Action: Bone marrow cell transplantation
State of Technology: *In vivo*



Control

HW-C-9

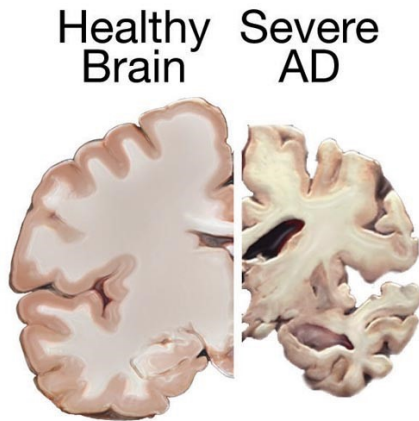
Alzheimer's afflicted mouse brain tissue: HW-C-9 disrupts the aggregation of AD causing proteins (dark spots).

Novel Compounds for the Treatment of Neurodegenerative Diseases

Disrupted Brain Plaque Formation Which is Known to Cause Alzheimer's Disease

USF Tech ID# 17B152
Patent Pending

Therapeutic indication: Neurodegenerative disease treatment
Mechanism of action: A new ligand: HW-C9 which disrupts amyloid beta peptides
State of Technology: *In vivo*



N-Amino Peptide Beta-Sheet Mimics for the Treatment of Amyloid Diseases

Disrupted Amyloid Aggregation

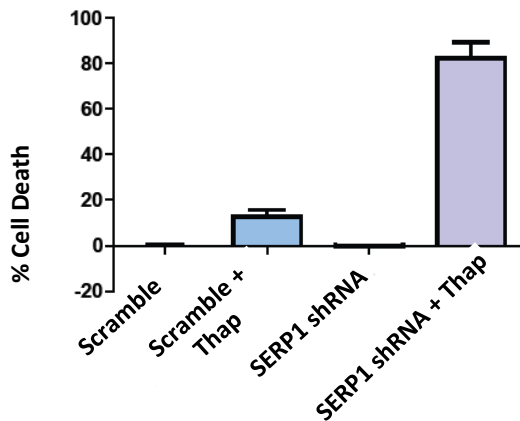
USF Tech ID# 17B153
Patent Pending

Therapeutic indication: Neurodegenerative disease treatment
Mechanism of action: Short N-aminated peptides
State of Technology: *In vitro*

Technology Description:

Researchers at the University of South Florida have developed a novel method which can disrupt beta-sheet aggregations to slow or stop the progression of various amyloid diseases including Alzheimer's and Parkinson's disease.

USF researchers have developed an innovative method to disrupt amyloid aggregation for the treatment of neurodegenerative diseases and related disorders. This invention includes the synthesis and development of short N-aminated peptides. These backbone aminated peptides mimic beta-sheet protein secondary structure and effectively disrupt beta-sheet association and aggregation events important in the progression of Alzheimer's disease, Parkinson's disease, and other related diseases.



SERP1/RAMP4 Reduction Facilitates Tau-Mediated Toxicity

Reduced Levels of SERP1 Increases Neurotoxicity in Alzheimer's Disease and Other Tauopathies

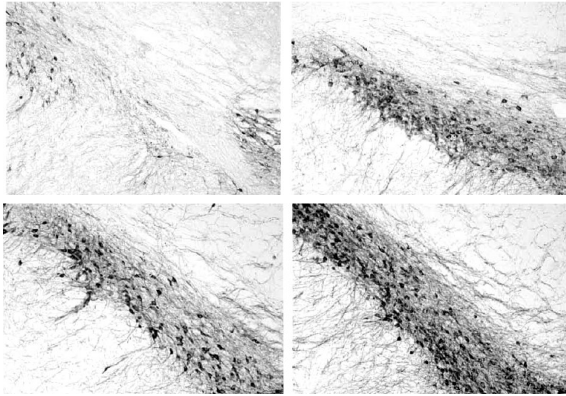
USF Tech ID# 18A089
Patent Pending

Therapeutic indication: Neurodegenerative disease treatment
Mechanism of action: Elevated SERP1 levels to preserve neurons
State of Technology: *In vivo*

Technology Description:

Researchers at the University of South Florida have discovered that reduction in Stress Associated Endoplasmic Reticulum Protein 1 (SERP1) levels increases the neurotoxicity.

Our researchers have identified that SERP1 levels are lower in Alzheimer's disease and aged tau transgenic brain tissue. SERP1 has a protective role following ER stress and the activation of the unfolded protein response. Reduced levels of SERP1 may sensitize cells to neurotoxicity and could be a mechanism by which neurons die in tauopathies. Knockdown of SERP1 significantly increases cellular toxicity in the presence of tau and ER stress in HEK cells. Elevating SERP1 levels may be therapeutically beneficial for preserving neurons in Alzheimer's disease and other tauopathies.



Recombinant Adeno-Associated Virus Expression of Fractalkine

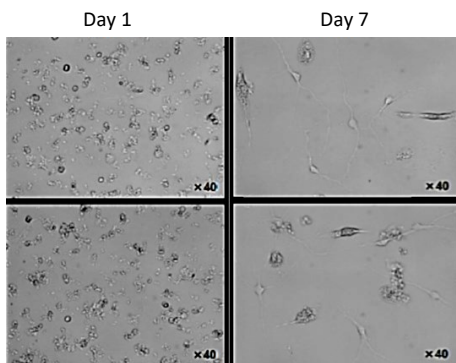
Effective Therapy for α -synuclein Mediated Neurological Diseases

USF Tech ID# 11A063
Patent Pending

Therapeutic Indication: Neurological disorders, Parkinson's disease

Mechanism of Action: Up-regulation of sFKN expression to reduce α -synuclein mediated neurodegeneration

State of Technology: *In vivo*



Amygdala derived cells exhibited more elaborate neural differentiation markers than hippocampal cells.

MicroRNAs for the Detection of Epilepsy and Selection Tool for Stem Cells

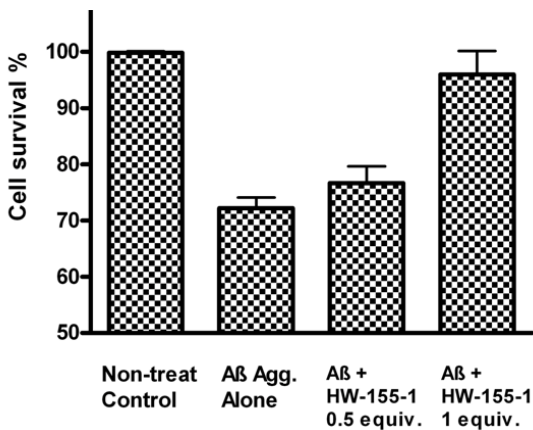
Novel Biomarker for Research and Clinical Applications

USF Tech ID# 11B148
US Patent Number 10,357,517

Therapeutic Indication: Epilepsy

Mechanism of Action: Biomarker

State of Technology: *Clinical samples*



Inhibition of A β Protein Aggregations

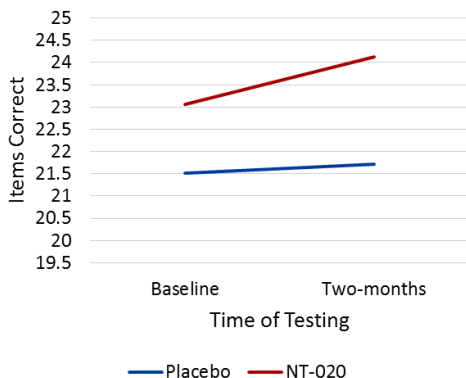
Novel Drug Candidate and Shortened Approach

USF Tech ID# 13A078
US Patent Numbers: 9,645,155; 10,022,420

Therapeutic Indication: Alzheimer's disease

Mechanism of Action: Disassembles A β aggregation and removes toxicity of A β 42 aggregates

State of Technology: *In vitro*



NT-020 (NutraStem®) Increases Memory in Elderly Patients

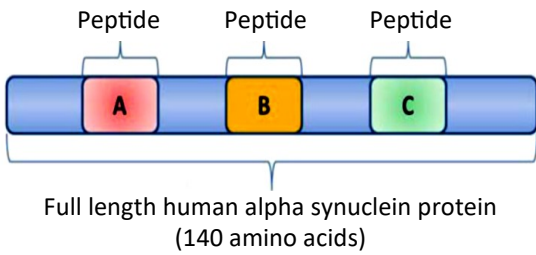
Method of Improving Cognitive Function

USF Tech ID# 13A086
US Patent Number 9,827,285

Therapeutic Indication: Neurodegenerative diseases

Mechanism of Action: Stimulate human bone marrow cell proliferation, increase stem cell function and homing of stem cells to injury

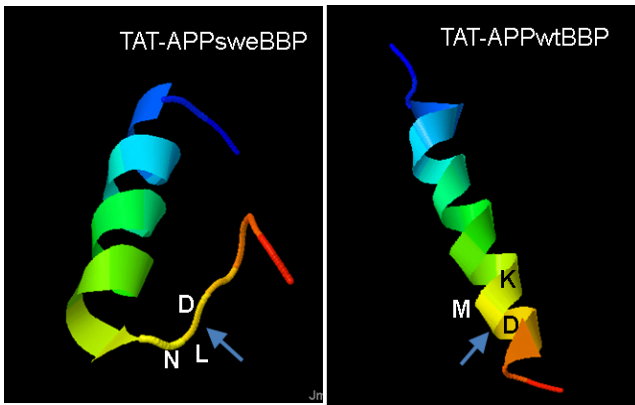
State of Technology: *Clinical Data*



Epitopes of Alpha Synuclein for Vaccine and Antibody Development Against Parkinson's Disease
Vaccine for Both Treatment and Prevention of Parkinson's

USF Tech ID# 13B124
US Patent Number 10,155,030

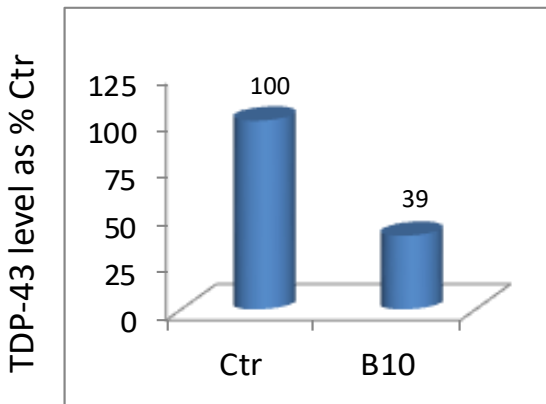
Therapeutic Indication: Parkinson's disease
 Mechanism of Action: Dendritic cell-based vaccine
 State of Technology: *In vivo*



Amyloid Precursor Protein (APP) Based (β -Secretase) Inhibitor Peptides
Swedish Mutant Peptides and Swedish Mutant Fusion Peptides Containing Tat Transduction Domain

USF Tech ID# 13B144
US Patent Number 9,926,354

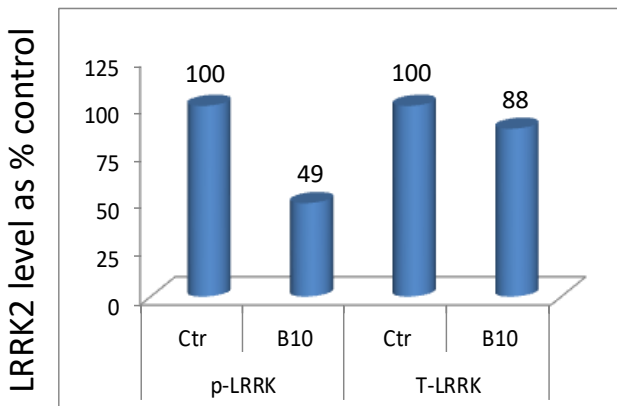
Therapeutic Indication: Alzheimer's disease, HAND, Lewy body dementia, CAA, MCI, neurodegeneration
 Mechanism of Action: Attenuate A β production
 State of Technology: *In vitro*



Hexachlorophene for the Treatment of ALS and Related Disorders
Decrease in Endogenous and Overexpressed TDP-43 Accumulation

USF Tech ID# 13B176
US Patent Number 9,844,519

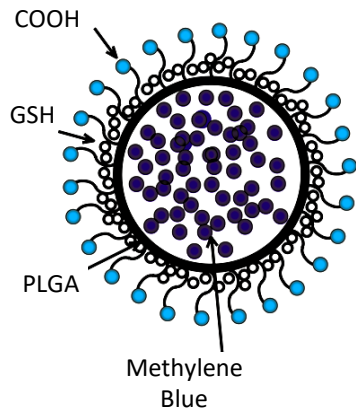
Therapeutic Indication: ALS, neurodegenerative diseases
 Mechanism of Action: Reduction in TDP-43 levels
 State of Technology: *In vitro*



Hexachlorophene for the Treatment of Parkinson's Disease and Neurodegenerative Disorders
Novel Method of Decreasing LRRK2 Protein Levels

USF Tech ID# 13B177
US Patent Number: 9,750,753

Therapeutic Indication: Parkinson's disease, neurodegenerative diseases
 Mechanism of Action: Reduction in LRRK2 protein levels
 State of Technology: *In vitro*



Improved Methylene Blue Delivery to the Brain with Use of Nanoparticles

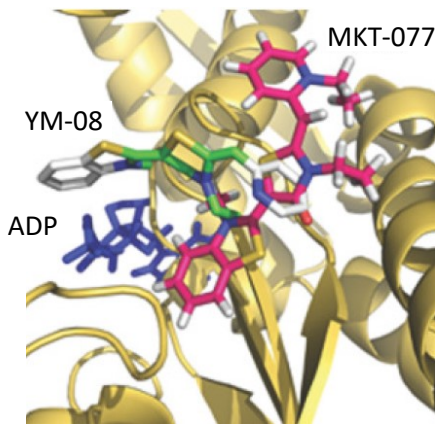
Methylene Blue Loaded Nanoparticles for More Effective Treatment

USF Tech ID# 13B188
Patent Pending

Therapeutic Indication: Alzheimer's disease, neurodegenerative diseases

Mechanism of Action: Improves BBB permeation

State of Technology: *In vitro*



Hsc70 Inhibitor Effects and Mechanisms

Novel Methods of Inhibiting Tau Protein Aggregate

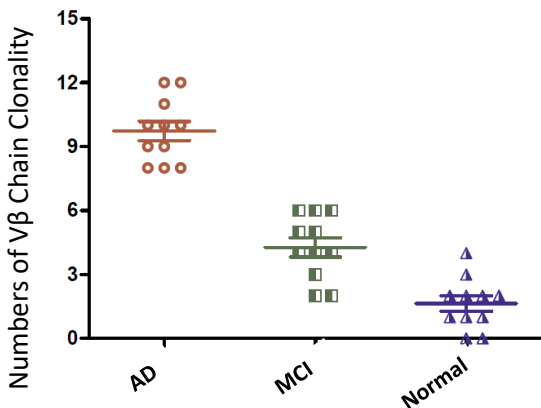
USF Tech ID# 14A021

US Patent Numbers: 9,642,842; 9,808,448

Therapeutic Indication: Alzheimer's disease, neurodegeneration diseases, cancer

Mechanism of Action: Reduction in tau levels and accumulation via Hsc70 inhibition

State of Technology: *In vitro*



TCR Clonality Biomarker

Novel Method Using Immune Cell Characteristics to Screen for Alzheimer's Disease and Neurodegenerative Diseases

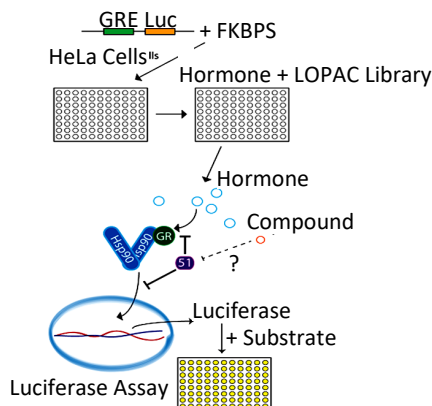
USF Tech ID# 09A047

US Patent Number: 8,383,347

Therapeutic Indication: Alzheimer's disease, neurodegenerative diseases

Mechanism of Action: Identifies changes in adaptive immune system

State of Technology: *In vivo*



Discovery of Novel Inhibitors of the Inhibitors of the FKBP51 Protein from a High-throughput Drug Screen

First Treatment to Target Inhibition of FKBP51

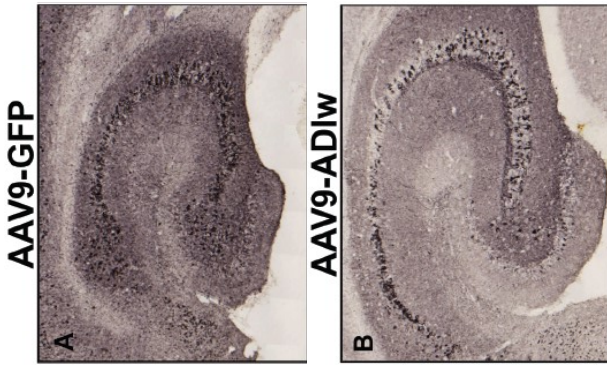
USF Tech ID# 15A031

US Patent Number: 9,399,039; 9,962,379

Therapeutic Indication: PTSD, anxiety disorders, Alzheimer's disease

Mechanism of Action: Inhibition of FKBP51 protein

State of Technology: *In vitro*

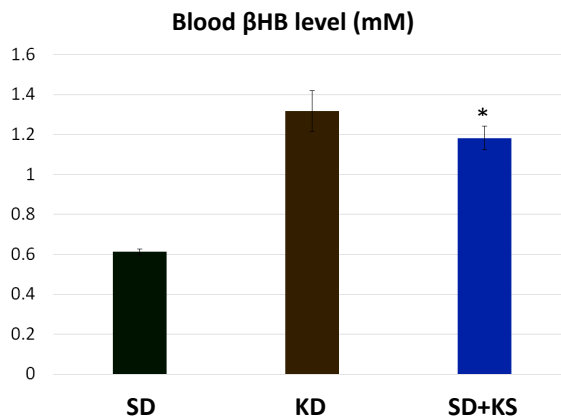


Identification Arginine Deiminase Gene Therapy for Disordered Proteins

New Treatment for Neurodegenerative Diseases

USF Tech ID# 15A023
US Patent Number 10,435,682

Therapeutic Indication: Protein aggregation disorders
 Mechanism of Action: Arginine metabolism and processing
 State of Technology: *In vivo*

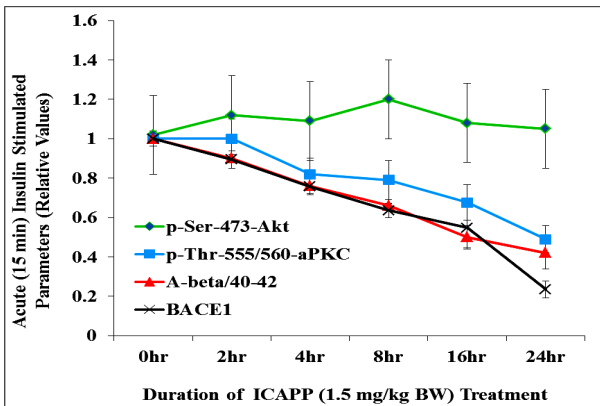


Improved Motor Function with Ketone Supplementation

Ketone Supplementation Without Dietary Restriction

USF Tech ID# 16A019
Patent Pending

Therapeutic Indication: Motor function
 Mechanism of Action: Elevates blood ketone levels
 State of Technology: *In vivo*

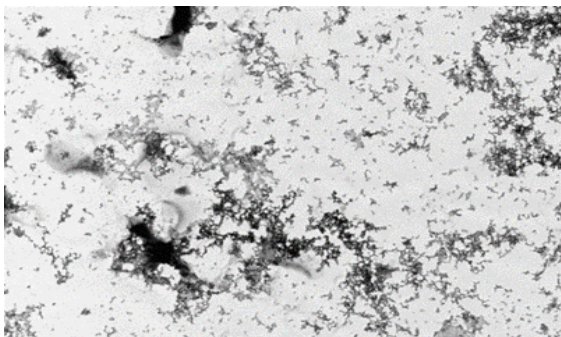


ICAPP and Other aPKC Inhibitors for Treatment of Neurodegenerative Conditions Diseases and Disorders

Effective Treatment of Neurodegenerative Diseases

USF Tech ID# 16A048
Patent Pending

Therapeutic Indication: Alzheimer's Disease, Amyloidopathies
 Mechanism of Action: Inhibits Insulin-stimulated aPKC Activity and Aβ Production
 State of Technology: *In vivo*



A transition electron microscope image of amyloid aggregates after treatment.

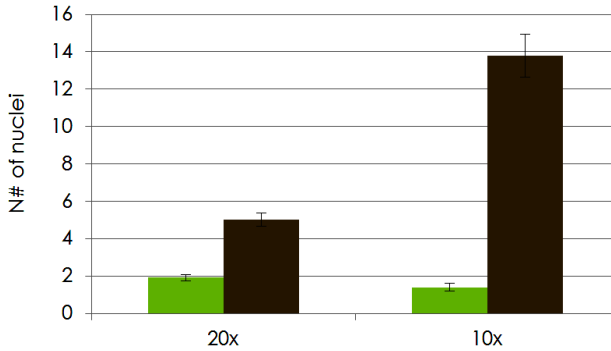
Inhibition of Aggregation of Amyloidosis Using Cactus Extracts from the Opuntia Ficus Indica

Novel Alzheimer's Disease Treatment

USF Tech ID# 16A068
US Patent Number 10,391,135

Therapeutic Indication: Alzheimer's Disease, Tauopathies
 Mechanism of Action: Inhibits formation of amyloid β-protein fibrils
 State of Technology: *In vitro*

Number of nuclei

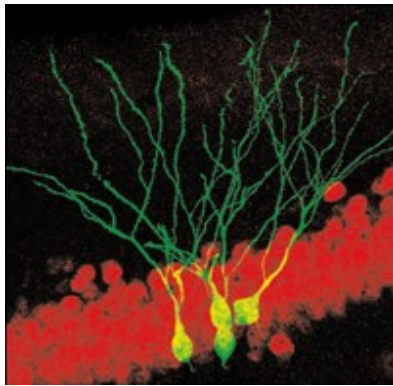


Improving Neural Cell Regeneration and Migration with Ketones

Novel Treatment of Neural Cell Injuries and Diseases

USF Tech ID# 16B128
Patent Pending

Therapeutic Indication: Neurodegeneration, neural cell injuries and diseases
 Mechanism of Action: Increases neural cell regeneration and migration
 State of Technology: *In vitro*



Neurogenesis in the Adult Mouse Hippocampus

Methods of Treating Cognitive Impairment

Novel Methods to Improve Cognitive Function

USF Tech ID# 09A020
US Patent Numbers: 9,682,124; 9,132,168; 9,700,597

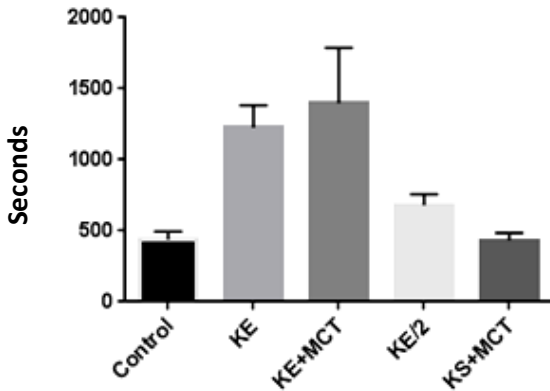
Therapeutic Indication: Alzheimer's disease
 Mechanism of Action: GM-CSF and G-CSF to reduce pathological processes
 State of Technology: *Early Clinical*

Strategic Treatment of CNS Oxygen Toxicity Seizures

Ketogenic Treatment of CNS Oxygen Toxicity Seizures

USF Tech ID# 16B138
Patent Pending

Therapeutic Indication: Central nervous system oxygen toxicity
 Mechanism of Action: Reverse the metabolic dysregulation and oxidative stress
 State of Technology: *In vivo*

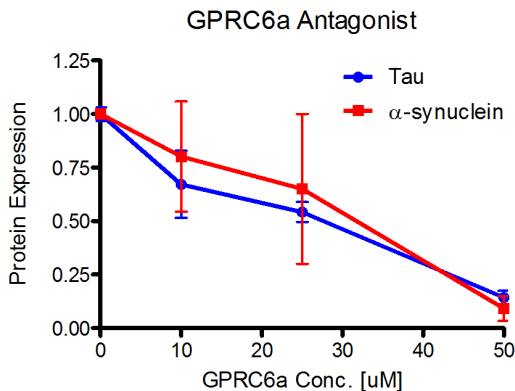


Exploiting Allosteric Antagonists to GPRC6a to Mitigate Proteinopathies

A Reduction in Morbidity and Mortality from Proteinopathies

USF Tech ID# 16B142
Patent Pending

Therapeutic Indication: Neurodegenerative diseases; synucleinopathies, tauopathies
 Mechanism of Action: Target GPRC6a and promote the clearance of various forms of tau and alpha synuclein
 State of Technology: *In vitro*





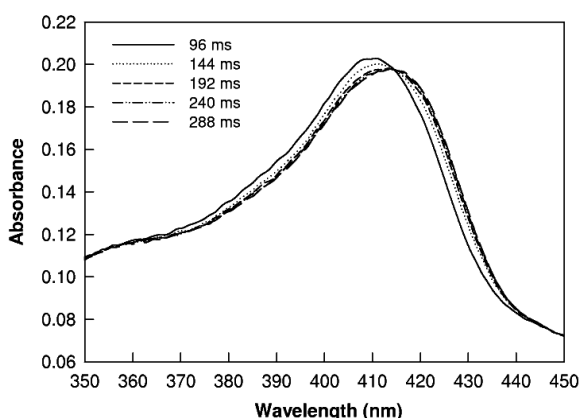
Bayberry Extracts and Myricanol Derivatives for Alzheimer's Disease

Multiple Compositions Reduce Levels of Microtubule Associated Protein Tau

USF Tech ID#s 10A056 & 11B190

US Patent Number: 8,940,945; 9,206,103; 9,598,338

Therapeutic Indication: Alzheimer's disease
 Mechanism of Action: Reduction of Tau
 State of Technology: *In vitro*



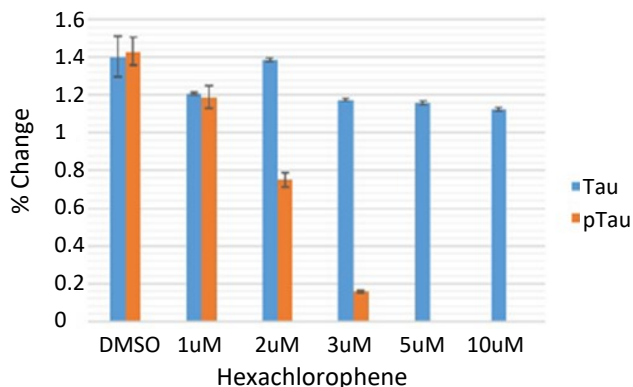
Cell Modeling of Heme Deficiency Using Ferrochelatase Mutations

Ferrochelatase Variants with Resistance to NMPP Inhibition Without Interrupting Heme Synthesis

USF Tech ID# 06A045

US Patent Numbers: 8,748,172; 8,586,530

Therapeutic Indication: Alzheimer's disease, frataxin-deficiency mediated diseases
 Mechanism of Action: Resistance to NMPP inhibition
 State of Technology: *In vitro*



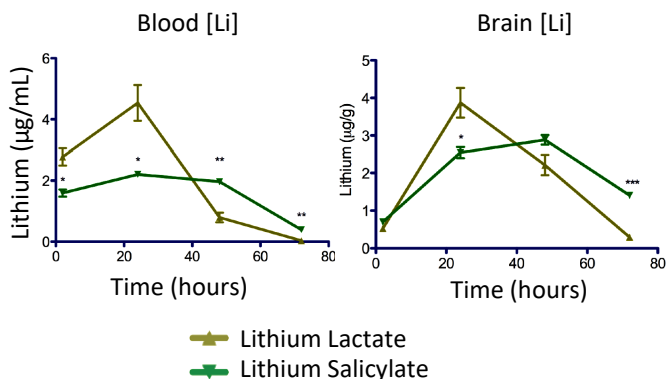
Hexachlorophene, A Potential Therapeutic Agent for Treatment of Alzheimer's Disease and Other Tauopathies

Role of Hexachlorophene in Significantly Reducing Tau Levels for Alzheimer's Disease Treatment

USF Tech ID# 17A032

US Patent Number 10,272,052

Therapeutic Indication: Alzheimer's disease, tauopathies
 Mechanism of Action: Down regulation of phosphorylated tau
 State of Technology: *In vitro*



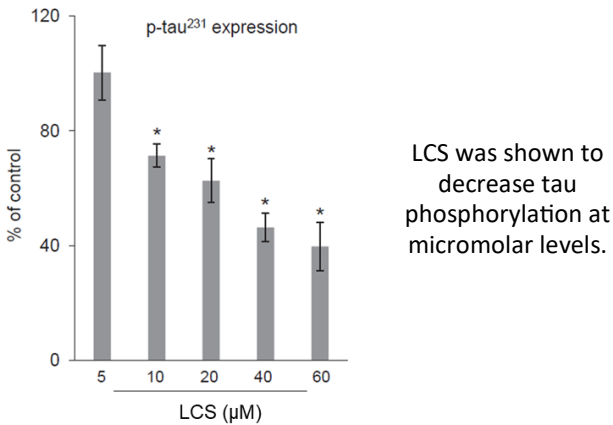
Lithium Salicylate as an Alternative Salt

Improved Pharmacokinetics; Outperforms FDA Approved Lithium Therapies

USF Tech ID#s 13B166 & 14A039

US Patent Numbers: 9,744,189; 9,662,351

Therapeutic Indication: Neuropsychiatric diseases
 Mechanism of Action: Produces elevated lithium plasma and brain levels without peak and rapid elimination
 State of Technology: *In vivo*

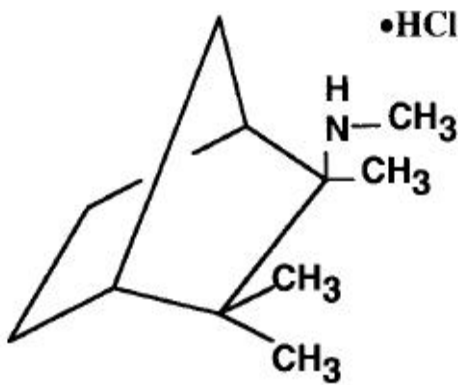


Lithium Compositions

Use of the Lithium Salt of Cholesterol Sulfate (LCS) for Preventing and Treating Alzheimer's Disease, Suicidal Ideation, Bipolar Disorder, Traumatic Brain Injury, Radiation Induced Brain Injury and Autism

USF Tech ID# 18A013
Patent Pending

Therapeutic Indication: Neurodegenerative and neuropsychiatric disorders
 Mechanism of Action: Increased delivery through blood brain barrier (BBB)
 State of Technology: *In vivo*

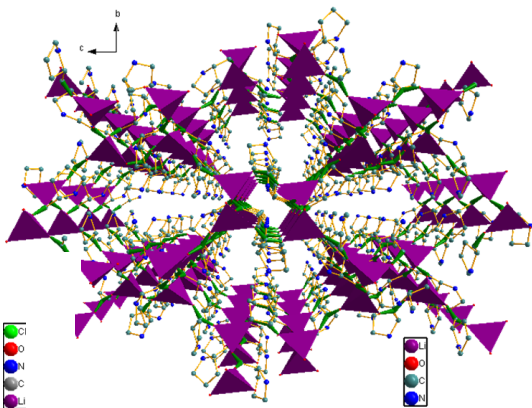


Treatment of Suicidal Ideation and Behavior

Decrease Suicidal Ideation and Behavior in the Absence of Major Depression

USF Tech ID# 09B110
US Patent Numbers: 9,180,191

Therapeutic Indication: Suicidality
 Mechanism of Action: Inhibition of nAChRs
 State of Technology: *Preclinical Data*

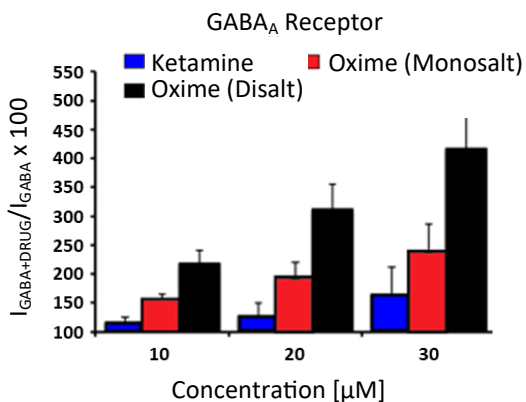


Lithium Compositions as Pharmaceuticals

Are Able to Penetrate the Blood Brain Barrier and Exert Therapeutic Effects on the CNS

USF Tech ID# 11A015
US Patent Number: 10,130,708

Therapeutic Indication: Suicidality and CNS diseases
 Mechanism of Action: Penetrate Blood Brain Barrier
 State of Technology: *Compositions*

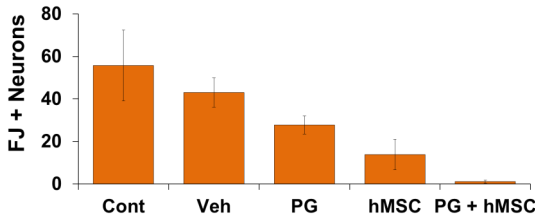


Novel Ketamine Analogs

Ketamine Analogs with Unique Analgesic Properties Effective at 1/10 the Induction Dose

USF Tech ID# 11A044
US Patent Number: 9,073,819

Therapeutic Indication: Phantom pain, epilepsy, and depression
 Mechanism of Action: Block NMDA receptors and selectively modulate GABA_A receptors
 State of Technology: *In vivo, compositions*



Combined treatment with the drug molecule and hMSCs significantly reduce neuronal degeneration.

Combination Therapy for Traumatic Brain Injury

Cell and Drug Treatment for TBI and Related Diseases

USF Tech ID# 17A078

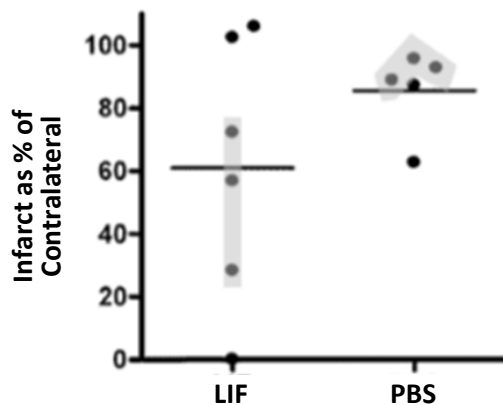
Patent Pending

Therapeutic Indication: Traumatic brain injury
 Mechanism of Action: Reduction in TBI induced neuro-degeneration and CCL20 expression
 State of Technology: *In vivo*

Technology Description:

USF scientists have discovered an effective method treating TBI using a combinatorial therapy comprised of an existing drug molecule together with human mesenchymal stem cells (hMSC). This combinatorial therapy resulted in a significant reduction in TBI induced neurodegeneration and CCL20 expression in the brain that was much greater than either treatment alone.

This combinatorial therapy has a more pronounced effect than existing TBI treatments and has the potential to alleviate many of the devastating effects of TBI and greatly improve patient quality of life.



LIF Protein Therapy for Stroke

Novel Therapeutic Approach To Treat Stroke

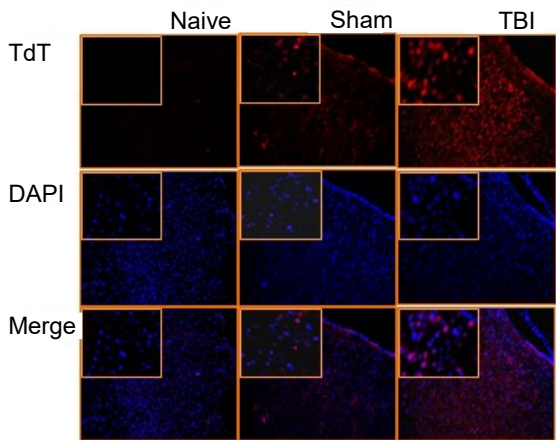
USF Tech ID# 10A012

US Patent Number: 9,795,652

Therapeutic Indication: Stroke
 Mechanism of Action: Protective of oligodendrocytes
 State of Technology: *In vitro*

Technology Description:

USF researchers have found that the systematic infusion of human umbilical cord blood (HUCB) cells 24 to 48 hours after a stroke is an effective treatment in animal models, decreasing injury to the brain by 80%. HUCB cells are known to contain leukemia inhibitory factor (LIF), which has ischemia-reducing properties. Cultures treated with HUCB cells showed an increase in gene expression associated with OL functions. Furthermore, endogenous antioxidant protein expression in OLs and neurons were upregulated with HUCB administration. The application of HUCB cells and the induced upregulation of these key antioxidants may be used as a therapy for stroke victims. Furthermore, LIF may be utilized clinically to potentially expand the therapeutic window for stroke treatment, thereby increasing patient access to post-stroke treatment.



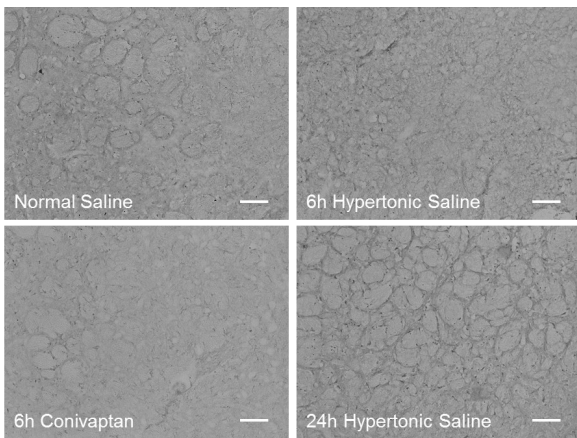
Multilayered Multifunctional Magnetic Micelle Nanoparticles for DNA Delivery

Theranostic Nanoparticles for Gene and Drug Delivery for TBI

USF Tech ID# 12A020

US Patent Number: 9,782,494

Therapeutic Indication: Traumatic brain injury
 Mechanism of Action: Delivery; drug and gene
 State of Technology: *In vivo*



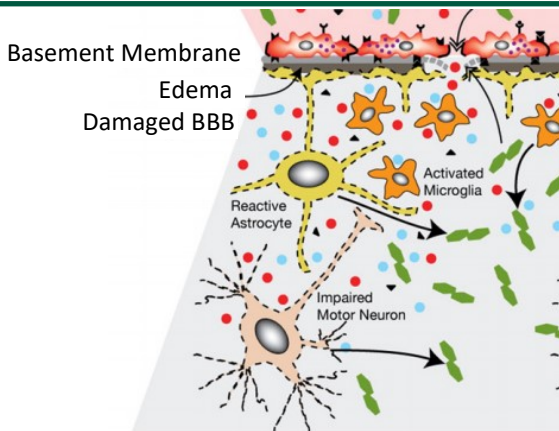
Conivaptan as a Treatment for Stroke

FDA-Approved Therapeutic Agent for Stroke

USF Tech ID# 12A055

US Patent Number: 10,328,083

Therapeutic Indication: Stroke
 Mechanism of Action: Decreases neural infarct size, edema and neuroinflammation
 State of Technology: *In vivo*



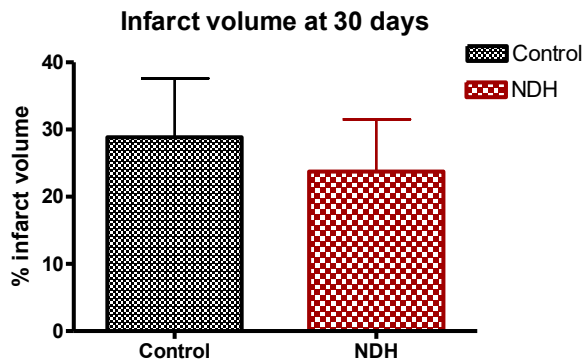
Neurodegenerative Disease Treatment with Umbilical Cord Blood

Potential Treatment of ALS

USF Tech ID# 07B119

Patent Pending

Therapeutic Indication: Amyotrophic lateral sclerosis
 Mechanism of Action: Cell replacement; delay disease progression, reversal of symptoms
 State of Technology: *In vivo models*



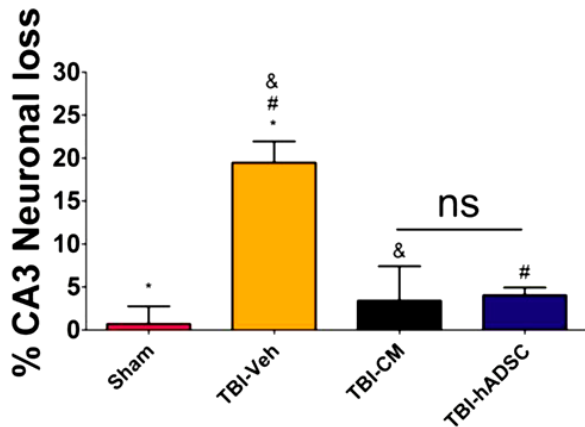
Novel Treatment for Stroke at Delayed Time Points

Novel and Effective Treatment for Stroke

USF Tech ID# 12A015

US Patent Number: 9,636,311

Therapeutic Indication: Stroke
 Mechanism of Action: Neural protection
 State of Technology: *In vivo models*

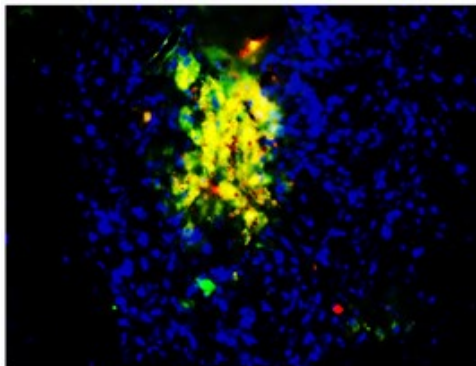


Treatment of Traumatic Brain Injury Through the Use of Long Noncoding RNAs
Innovative New Therapy

USF Tech ID# 13B194
US Patent Number: 9,822,359

Therapeutic Indication: Traumatic brain injury
Mechanism of Action: Improve certain motor, cognitive, and histological deficits related to TBI and other related diseases

State of Technology: *In vivo*



Menstrual blood-derived stem cell grafts detected in the ischemic penumbra near the necrotic core.

Stem Cells From Menstrual Blood for the Treatment of Stroke
Autologous Stem Cell Source

USF Tech ID# 08B121
US Patent Number: 9,044,431

Therapeutic Indication: Ischemic stroke
Mechanism of Action: Cell transplantation; bystander effect
State of Technology: *In vivo models*



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