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TECHNOLOGY MANAGEMENT

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Transfection

Tech ID	2011-107	2001-066
Tech Description	**Novel Sterically Stabilized Lipid Nanoparticles for optimal siRNA and Gene Delivery:** A novel nanoparticle employing low immunogenic materials designed for targeted delivery or siRNA and larger nucleic acid payloads into mammalian cells with high transfection efficiency, and low toxicity.	**Mutations of the MDR1 P-glycoprotein that improve its ability to confer resistance to chemotherapeutic drugs:** Multidrug resistance (MDR) mutants confer resistance to certain chemotherapeutic drugs. The inventors developed a series of MDR1 mutants that confer increased resistance to certain chemotherapeutic drugs relative to the wild-type and G185V MDR1.
Applications	• Gene Therapy • Cancer Research • Orphan Gene Defects • In vivo Delivery Tool	• Gene Therapy • Cancer Research • Mutant MDR1 sequences are useful in-vitro as drug-selectable markers
Benefits	• Low immunogenicity • Targeted tissue delivery	• Protects normal cells from cancer therapeutic drugs • *May lead to the development of more effective cancer drugs*
Stage of Development	*Prototype has been tested successfully*	*Prototype has been tested*
Publication	Not published	Igor B. Roninson. The role of the MDR1 (p-glycoprotein) gene in multidrug resistance in vitro and in vivo. *Biochemical Pharmacology*. 43(1992)95-102
Patent	Patent Pending	US Utility Patent 7,309,584
Faculty	Hayat Onyuksel Fatima Khatib	Adam Ruth, Igor B. Roninson

Transfection

Tech ID	**2001-035**
Tech Description	**Candidate Target Genes for Breast Cancer Treatment:** Genes have been identified through expression selection of genetic suppressor elements (GSEs) that represent potential targets for the treatment of breast cancer. GSEs are identified as positive regulators of breast carcinoma cells. Agents which selectively inhibit such genes would be useful for the therapy of breast cancer.
Applications	• Screening System for Identification of Breast Cancer Treatments
Benefits	• Inhibits the growth of human breast carcinoma cells • Generation and delivery of gene libraries (up to 108 clones or more) to treat various tumor cells
Stage of Development	*Theoretical and experimental proof of concept*
Publication	Primiano T, Baig M, Maliyekkel A, Chang BD, Fellars S, Sadhu J, Axenovich SA, Holzmayer TA, Roninson IB. Identification of potential anticancer drug targets through the selection of growth-inhibitory genetic suppressor elements. *Cancer Cell*. 2003 Jul;4(1):41-53.
Patent	US Utility Patent 7,235,403 B2
Faculty	Igor B Roninson, Bey-Dih Chang, Thomas Primiano

Transfection

Tech ID	**2001-043**
Tech Description	**A Homologue of the Drosophila Gene PTWI:** Inventors isolated complementary DNA copies of mRNA corresponding to a human hiwi gene. Includes recombinant expression constructs that are capable of expressing the human hiwi gene in cultures of cells. Steps for culturing a mammalian cell, preferably a human leukemia cell or Hematopoietic Stem Cell (HSC) that does not express hiwi gene, are presented.
Applications	• Cell and Tissue Research • Gene Therapy
Benefits	• Hiwi gene clones may aid the study of HSC function • May lead to the development of pharmaceutical compositions
Stage of Development	*Working prototype exists*
Publication	Not published
Patent	US Patent 7612167, US Patent 6900017
Faculty	Arun Sharma, Ronald Hoffman

Transfection

Tech ID	**2004-013**
Tech Description	**The Bacterial Expression Vector for Human Group V Phospholipase A2 (hVPLA2) :** High levels of hVPLA2 are detected in different tissues and exudate under inflammatory conditions. The inventor constructed a hVPLA2 bacterial expression vector for the large scale production and purification of hVPLA2. The expression vector includes a mutant that is functionally equivalent to the wild type protein but has improved stability.
Applications	• Elucidate the structure, function and regulation of human group V PLA2 • Research acute and chronic inflammatory diseases
Benefits	• Results in an abundance of purified hVPLA2
Stage of Development	*Working prototype*
Publication	Cho, W., Digman, M., Ananthanarayanan, B., and Stahelin, R. V. Bacterial expression and purification of C1 and C2 domains of protein kinase C isoforms. *Methods Mol Biol*. 233(2003):291-298.
Patent	No patent
Faculty	Wonhwa Cho

Transfection

Tech ID	**2006-56**
Tech Description	**siRNA that effectively down regulate IG20 splice variants:** Cancer cell survival depends on specific splice variants (SV). Deactivation of the portion of the IG20 gene responsible for the expression of a given SV could result in cancer therapy . Specific siRNA sequences have been identified that can differentially down-regulate IG20 SV expression with differential effects on spontaneous apoptosis
Applications	• Cell apoptosis research • Cancer treatment
Benefits	• Anti-sense knock down of SV is very specific • Reduced toxicity to healthy cells • May enhance the efficacy of conventional cancer treatment
Stage of Development	*Working prototype and animal model available*
Publication	Subramanian M, Pilli T, Bhattacharya P, Pacini F, Nikiforov YE, Kanteti PV, Prabhakar BS. Knockdown of IG20 gene expression renders thyroid cancer cells susceptible to apoptosis. *J Clin Endocrinol Metab*. 2009 Apr;94(4):1467-71.
Patent	US patent 20090075929A1
Faculty	Bellur S. Prabhakar, N. Mulherkar, M. Ramaswamy, D. C. Mordi

Pharmaceuticals

Tech ID	**2010-113**
Tech Description	**Phototreactive Probes for Profiling Interaction between the HDAC Ligands and the Proteins in the Histone Deacetylases Complexes:** The proposed photoreactive probes profile the interaction between HDAC ligands and their corresponding receptors on HDAC. Resulting fluorescence is a function of inhibition of HDAC. Molecular modeling and simulation tools were used to design the ligands that act as HDAC inhibitors.
Applications	• Determine HDAC receptor ligand binding • Development of new HDAC inhibitors • Cancer research • Epigenetics research
Benefits	• Eliminate the ambiguity involved with probe-SBG interactions by facilitating stable binding to the HDAC at the inhibition site
Stage of Development	*Experimental proof of concept*
Publication	He B, Velaparthi S, Pieffet G, Pennington C, Mahesh A, Holzle DL, Brunsteiner M, van Breemen R, Blond SY, Petukhov PA. Binding ensemble profiling with photoaffinity labeling (BEProFL) approach: mapping the binding poses of HDAC8 inhibitors. J Med Chem. 2009 Nov 26;52(22):7003-13.
Patent	Provisional US Utility Patent 61/587,703
Faculty	Pavel A. Petukhov

Pharmaceuticals

Tech ID	**2010-052**
Tech Description	**Novel Aspirin Analogs for the Targeted Therapy of ER+ Breast Cancer and Colon Cancer:** Novel salicylate-based analogs serve as pro-drugs for free aspirin release and quinone-methide formation. The quinone moiety can be biologically active because it can chemically modify proteins and induce reactive oxygen species (ROS) stress in breast cancer cells. Additionally, these compounds are anticipated to be effective in Colon cancer as evidenced by a recent article in the New England Journal of Medicine indicating that aspirin/salicyate therapy increases the 5-year survival rate from 76% to 97% of cancer patients having a mutation at the PIK3CA gene with the strongest effect of aspirin use in patients who had tumors with both a PIK3CA mutation and PTGS2 expression.
Applications	• Compounds are designed to treat ER+ breast cancer and are effective against cancer stem cells • Clinical studies have validated the use of salicylates in subpopulations of colorectal cancer patients
Benefits	• Novel therapeutic has the potential to treat breast and colorectal cancers • Novel salicylate analogs that target NFkB and target cancer stem cells • Analogs have a novel feature that upon bioactivation modulates inflammatory and stress-response pathways that targets both ER and NFkB related pathways.
Stage of Development	*Animal model exists; experimental proof of concept exists*
Publication	Liao, X. et al Aspirin Use, Tumor PIK3CA Mutation, and Colorectal-Cancer Survival. N Engl J Med. 2012; 367:1596-1606.
Patent	Provisional Patents 61/620,572 61/706,329
Faculty	Gregory R J Thatcher

Pharmaceuticals

Tech ID	**2010-119**
Tech Description	**Novel epoxide-based, calpain inhibitors as promising candidates for treatment of Alzheimer's Disease (AD)** Compounds were tested for inhibitory activity on calpain 1 and for selective inhibition of calpain. Most promising compounds were identified, out of which, two in particular were selected as good preclinical candidates because of their characteristics and efficacy. These compounds showed ability to restore synaptic function and memory deficits in a mouse model, the transgenic APP/PS1 mouse. These compounds were found to be not only highly potent and selective for inhibition of calpain 1, bettering the non-selective inhibition of widely known cysteine protease inhibitor E-64, but also extremely low in vivo toxicity.
Applications	• Treatment of Alzheimer's Disease • Treatment of Inflammation • Modulation of Thrombosis
Benefits	• Superior Selectivity of Calpain Inhibitors • Efficacy in Animal Models of CNS pathology
Stage of Development	*Animal studies have been conducted; experimental proof of concept exists*
Publication	N/A
Patent	Provisional Patent 61/593,664
Faculty	Gregory R J Thatcher

Peptides

Tech ID	**1996-041**
Tech Description	**Parasite Protein with Anti-inflammatory and Immunomodulatory Effects:** The inventor synthesized a parasite-derived protein that is believed function as an anti-inflammatory protein especially when the inflammation occurs in the skin. The invention identifies and characterizes a protein (Sm 16.8) present in S. mansoni, a parasite.
Applications	• Inflammation reduction • Research ICAM-1 activity
Benefits	• May reduce the side effects associated with some anti-inflammatory therapies
Stage of Development	*The protein has been identified and characterized in the laboratory*
Publication	Ramaswamy K, Salafsky B, Potluri S, He YX, Li JW, Shibuya T. Secretion of an anti-inflammatory, immunomodulatory factor by Schistosomulae of Schistosoma mansoni. J Inflamm. 1995-1996;46(1):13-22.
Patent	US Utility Patent 6,372,219 B1
Faculty	Kalyanasund Ramaswamy, Bernard Salafsky, Takeshi Shibuya

Peptides

Tech ID	**2004-037**
Tech Description	**Membrane Permeable Inhibitors of the Functions of the Platelet Adhesion Receptor, Glycoprotein Ib-IX Complex, and 14-3-3 Proteins:** The inventor presents a collection of antithrombotic peptides that inhibit the binding of plasma protein von Willebrand factor (vWF) to receptor GPIb-IX. vWF-GPIb-IX binding plays a critical role in thrombosis and hemostasis, particularly in arteries and capillaries. The peptide combination also inhibits the binding of GPIb-IX to 14-3-3.
Applications	• Thrombosis treatment and prevention • Cancer treatment
Benefits	• Proteins are less immunogenic due to smaller size • Effects are irreversible
Stage of Development	*Supporting in vitro data*
Publication	Dai K., Bodnar R., Berndt M. C., and Du X. A critical role for 14-3-3zeta protein in regulating the VWF binding function of platelet glycoprotein Ib-IX and its therapeutic implications. *Blood*. 2005 Sep 15;106(6):1975-81. Du, Xiaoping and Ginsberg, Mark H. Signaling and Platelet Adhesion. *Advances in Molecular and Cell Biology*. 1999; Volume 28, Pages 269-301.
Patent	US Utility Patent 8,173,595
Faculty	Xiaoping Du

Peptides

Tech ID	**2002-072**
Tech Description	**Engineered Human Deoxycytidine Kinase (dCK) Mutants as Phosphorylation Catalysts:** Inventors have developed a number of deoxycytidine kinase (dCK) mutants designed to be highly efficient phosphorylation catalysts. These enhanced enzymes have demonstrated activity for phosphorylation of physiological and non-physiological nucleoside substrates, including thymidine-based analogs. The engineered enzymes are applicable to a wider range of compounds than thymidine kinase 1 (TK1) and are more robust than thymidine kinase 2 (TK2). These enzymes may also be useful in the preparation of 32P-labeled compounds.
Applications	• Catalysts for phosphorylation
Benefits	• High catalytic efficiency • Increased utility and stability over current nucleoside phosphorylation agents • Enzymes synthesized in gram quantities • May be useful in 32P-labeling
Stage of Development	*Experimental proof of concept exists ; in vitro studies have been conducted*
Publication	Hazra S, Sabini E, Ort S, Konrad M, Lavie A. Extending thymidine kinase activity to the catalytic repertoire of human deoxycytidine kinase. Biochemistry. 2009 Feb 17;48(6):1256-63. Hazra S, Ort S, Konrad M, Lavie A. Structural and kinetic characterization of human deoxycytidine kinase variants able to phosphorylate 5-substituted deoxycytidine and thymidine analogues . Biochemistry. 2010 Aug 10;49(31):6784-90.
Patent	US Patent 7,419,811 US Patent 7,858,745 Pending: 12/993,660
Faculty	Arnon Lavie, Manfred Konrad, Farhad Ravandi

Peptides

Tech ID	**2008-008**
Tech Description	**Novel Peptide Inhibitors of Protein Synthesis, Methods of Identifying and their Use:** This invention is the discovery of peptides that inhibit protein synthesis by targeting novel sites on ribosome. These peptides exhibit synergy with existing antibiotics that if linked together can lead to the production of more potent antibiotics and novel combination therapies. Some peptides displayed the characteristic of increasing protein synthesis - useful to enhance the yield in cases where the efficiency of synthesis is poor
Applications	• Drug screening • Antibiotic development • Anticancer medicines
Benefits	• Drug screening • Antibiotic development • Anticancer medicines
Stage of Development	*Supporting in vitro data*
Publication	Llano-Sotelo B, Klepacki D, Mankin AS. Selection of small peptides, inhibitors of translation. *J Mol Biol*. 2009 Sep 4; 391(5): 813-9.
Patent	Patent pending
Faculty	Beatriz Llano-Sotelo

Peptides

Tech ID	2008-088
Tech Description	**Inhibitors of the platelet integrin aIIbB3 interaction with Src family of kinase:** Therapeutic peptide that provides a new approach to selectively inhibit platelet-rich arterial thrombosis with less bleeding complications. The invention comprises a peptide that inhibits integrin a2B3 interaction with Src kinases.
Applications	• Anti-thrombotic therapy • Development of inhibitors of interaction between Src and integrin
Benefits	• Potentially more effective anti-thrombotic therapy
Stage of Development	*Experiments are planned*
Publication	Xi, X., Bodnar, R. J., Li, Z., Lam, S. C., and Du X. Critical roles for the COOH-terminal NITY and RGT sequences of the integrin beta3 cytoplasmic domain in inside-out and outside-in signaling. J Cell Biol. 2003 Jul 21;162(2):329-39.
Patent	Patent pending
Faculty	Xiaoping Du

Peptides

Tech ID	**2008-119**
Tech Description	**Inhibition of G protein signaling by drugs representing the Switch Regions of the G-Alpha subunits:** The inventors present cell membrane permeable peptides which represent switch I and II regions of the alpha subunit of G protein. The peptides have been shown to inhibit PAR 1, PAR 4, ADR and TPR mediated platelet aggregation in vitro. Theoretically, reagents could be designed against the switch regions of all G protein alpha subunits.
Applications	• G-protein signaling research • Treatment for G-protein related diseases • Anticoagulant
Benefits	• May potentially target all classes of GPCR signaling • Treatments can be effective even when G-protein coupled receptors (GPCRs) are damaged/mutated
Stage of Development	*Experimental proof of concept exists; a working prototype exists*
Publication	Jin-Sheng Huang, Lanlan Dong, Tohru Kozasa, and Guy C. Le Breton. Signaling through Gα13 Switch Region I Is Essential for Protease-activated Receptor 1-mediated Human Platelet Shape Change, Aggregation, and Secretion. *J. Biol. Chem.* 282 (2007) 10210-10222.
Patent	Patent pending
Faculty	Guy LeBreton, Jin Sheng Huang, Fozia Mir, Fadi Khasawneh, Srinivasan Subhasini

Peptides

Tech ID	**2009-013**
Tech Description	**The use of inhibitors of platelet glycoprotein Ib-IX complex in treating sepsis-related thrombosis, DIC and thrombocytopenia:** Under high shear rate flow conditions, platelet adhesion in blood vessels depends on interaction between von Willebrand factor (vWF) and the platelet glycoprotein Ib-IX-V complex (GPIb-IX-V). The proposed technology uses inhibitors to manipulate the intracellular signaling molecules involved in vWV - GPIb-IX-V binding.
Applications	• Thrombosis treatment • Sepsis treatment
Benefits	• May reduce mortality associated with sepsis-induced thrombosis and thrombocytopenia
Stage of Development	*Supporting in vivo data from animals*
Publication	Yuan, Y., Zhang ,W., Yan, R., Liao, Y., Zhao, L., Ruan, C., Du, X., and Dai, K. Identification of a novel 14-3-3zeta binding site within the cytoplasmic domain of platelet glycoprotein Ibalpha that plays a key role in regulating the von Willebrand factor binding function of glycoprotein Ib-IX. *Circulation Research*. 2009 Dec 4;105(12):1177-85.
Patent	No patents
Faculty	Xiaoping Du

Peptides

Tech ID	**2010-061**
Tech Description	**IP3R derivative peptide prevents inflammation-induced pulmonary vascular leakage and lethality in sepsis:** This technology comprises a peptide derived from the IP3 receptor found on the endoplasmic reticulum. Data indicates that the peptide inhibits interaction between the IP3 receptor and EB3, a microtubule binding protein. The release of Ca+2 is regulated by this interaction. Pulmonary vascular leakage and sepsis are markedly reduced under this regulation.
Applications	• Sepsis Treatment • Edema Treatment • Acute Lung Injury (ALI) Treatment
Benefits	• This new tactic could represent a breakthrough in the treatment of sepsis, ALI, and chronic vascular leakage.
Stage of Development	*Supporting in vivo data from animals*
Publication	Komarova Y. A., Mehta D., and Malik, A. B. Dual regulation of endothelial junctional permeability. *Sci STKE*. 2007 Nov 13;2007(412):re8.
Patent	Provisional US Utility PCT/US12/42118
Faculty	Yulia Komarova

Peptides

Tech ID	2010-072
Tech Description	**Inhibitors of integrin-Gα13 interaction:** A certain G protein subunit binds to the cytoplasmic domain of integrin b subunits. This G protein subunit binding inhibits platelet aggregation and integrin outside-in signaling leading to platelet granule secretion, aggregation, and cell spreading. Those mechanisms are critical in thrombosis, hemostasis, cell migration, cancer development and inflammatory response.
Applications	• Thrombosis Treatment • Cancer Treatment • Inflammation Treatment
Benefits	• Prevention of thrombosis • Novel method of inhibition of integrin for anti-thrombotic therapy
Stage of Development	*Supporting data from animal studies*
Publication	Gong, H., Shen, B., Flevaris, P., Chow, C., Lam, S. C., Voyno-Yasenetskaya, T. A., Kozasa, T., and Du, X. G protein subunit Galpha13 binds to integrin alphaIIbbeta3 and mediates integrin "outside-in" signaling. *Science*. 2010 Jan 15;327(5963):340-3.
Patent	Patent pending
Faculty	Xiaoping Du

Stem Cells

Tech ID	2011-001	2012-162
Tech Description	A novel human prostate cancer model using adult prostate stem/progenitor cells	Directed Differentiation of Human Embryonic Stem Cells into Prostate Tissue
Applications	• Model for human prostate cancer initiation and progression from normal prostate stem/progenitor cells	• Vast research applications in prostate health and morphology
Benefits	• System for studying prostate cancer	• Study model for differentiation of stem cells into prostate cells
Stage of Development	*Animal studies have been conducted; proof of concept exists; animal model exists*	*Proof of concept exists ; animal model exists; working prototype exists*
Publication	N/A	N/A
Patent	No patents	No patents
Faculty	Gail Prins	Gail Prins

Stem Cells

Tech ID	**2002-037**
Tech Description	**Novel Inhibitors of Animal Cell Motility and Growth:** Inventors identified an oxazolidinone containing compound that inhibits cell motility and cell proliferation in a mammalian cell culture system. Data indicates that the compound inhibits cell sheet migration during wound closure in Madin-Darby Canine Kidney (MDCK) epithelial cell monolayers.
Applications	• Cancer treatment development • Cell migration inhibition • Compound screening
Benefits	• Non-toxic at certain concentrations • May contribute to more effective treatment of cancer • May aid understanding and control of cell signaling pathways leading to cell migration
Stage of Development	*Compound identified; known mechanism of action*
Publication	Mc Henry KT, Ankala SV, Ghosh AK, Fenteany G. A non-antibacterial oxazolidinone derivative that inhibits epithelial cell sheet migration. Chembiochem. 2002 Nov 4;3(11):1105-11
Patent	US Patent 7390826
Faculty	Arun Ghosh, Gabriel Fenteany, Kevin McHenry, Sudha Ankala

Stem Cells

Tech ID	**2003-033**
Tech Description	**Reprogramming And Expansion Of Primitive Hematopoetic Progenitor Cells In Vitro:** This invention presents a means of growing and expanding HSCs in cell culture while suppressing differentiation but retains the self-renewing capability of HSCs. Cells grown in accordance with this invention have been demonstrated to be capable of engraftment or for use in restoration of immune function.
Applications	• Stem Cell Transplants • Cell Culture
Benefits	• These cells retain the self-renewal and multi-potential capabilities of HSCs are capable of engraftment and of self-sustaining restoration of immune function.
Stage of Development	*In vitro prototype*
Publication	Abbasian J, Mahmud D, Mahmud N, Chunduri S, Araki H, Reddy P, Hoffman R, Arpinati M, Ferrara JL, Rondelli D. Allogeneic T cells induce rapid CD34+ cell differentiation into CD11c+CD86+ cells with direct and indirect antigen-presenting function. Blood. 2006 Jul 1;108(1):203-8.
Patent	Patent pending
Faculty	Nadim Mahmud

Stem Cells

Tech ID	**2004-017**
Tech Description	**Role of IG20 splice variants in cell growth and death:** Inventors identified that IG20, a pro-apoptosis splice variant, can upregulate tumor necrosis factor-alpha (TNF-α) induced apoptosis. The IG20 gene encodes at least four splice variants, including DENN-SV and IG20. It has been proven that cells transfected with the DENN-SV cDNA showed increased resistance to TNF-α and TRAIL (TNF-Related Apoptosis Inducing Ligand, Apo2 Ligand).
Applications	• Chemotherapy • Radiation Therapy
Benefits	• Non toxic approach • Enhancement of cell-proliferation and cell death • Makes cell more resistant to TNF-α, TRAIL
Stage of Development	*The invention is in its early stages of development for cancer therapy application*
Publication	Prabhakar BS, Mulherkar N, Prasad KV. Role of IG20 splice variants in TRAIL resistance. *Clin Cancer Res.* 2008 Jan 15;14(2):347-51.
Patent	Patent Pending
Faculty	Prabhakar BS, Elena E Fimona, Adeeb Al-Zoubi, Madhu Ramaswamy, G.S. Seetharamaiah, Osvaldo Martinez, Shashi Kaithamana, Nirupama Mulhelkar

Cell Culture

Tech ID	2007-035	2000-016
Tech Description	**Bone marrow derived endothelial progenitor cells and their use for cell based therapies and regenerative medicine:** Endothelial Progenitor Cells (EPC) express a subset of integrins and fibronectin, proteins that make them adhesion-competent cells. Addition of EPC to endothelial cells-activates Rho GTPase to promote cell retraction. This event allows EPCs to interact with underlying extracellular matrix proteins that result in EPC integrin ligation, processes that promotes wound repair.	**Microtextured Polymeric Platforms for Cellular Attachment**
Applications	• Regenerative and reparative medicine • Wound healing	• Novel methods and compositions for the growth of muscle cells in vitro.
Benefits	• Cell-based therapy for regenerative and reparative medicine including ARDS and ALI • Neovascularization of ischemic tissues.	• The membrane facilitate s the production of adherent and oriented cells that phenotypically resemble cells in vivo.
Stage of Development	*In vivo studies*	*Process has been shown to be effective at producing cells*
Publication	Wary KK, Vogel SM, Garrean S, Zhao YD, Malik AB. *Stem Cells*. 2009 Dec;27(12):3112-20.	N/A
Patent	Patent Pending	U.S. Utility Patent 6,942,873 U.S. Utility Patent 7,695,967
Faculty	Kishore Wary	Brenda Russell

Cell Culture

Tech ID	2000-028	2002-049
Tech Description	**GG-AD [rat decidual cell line:** Cell line generated from rat decidual tissue cells that decidualize in the antimesometrial region. This cell line serves as a model to study the expression and regulation of various genes specific to the antimesometrial decidual cells	**GG-CL [rat luteal cell line]:** Luteal cell line developed by transformation of large luteal cells through infection with a temperature-sensitive simian virus. Cell line serves as a model by which to study the expression and regulation of various genes specific to luteal cells.
Applications	• Studies of the expression and regulation of genes in antimesometrial decidual cells	• Studies of the expression and regulation of genes in luteal cells
Benefits	• Ability to study a variety of genes with the cell culture	• Ability to study a wide range of gene expression and regulation in the luteal cell culture
Stage of Development	*Product exists and is developed*	*Product exists and is developed*
Publication	Srivastava RK, et al. *Endocrinology*. 1995; 136(5):1913-1919	Sugino N, et al. . *Endocrinology*. 1998; 139(4):1936-1942
Patent	No patents	No patents
Faculty	Dr. Geula Gibori	Dr. Geula Gibori

Cell Culture

Tech ID	**2012-009** **2012-012**	**2011-018**
Tech Description	Microfluidic device platform capable of interfacing with commercially available perfusion systems to more accurately control and model hypoxic conditions in neuronal tissue and pancreatic islets. Working prototype has been demonstrated in in vitro environments to model hypoxic conditions in stroke and diabetes.	**SafV-2 has been modified to propagate in mammalian cells.**
Applications	• Stroke modeling • Islet transplantation modeling • Screening tool for diabetes therapeutics	• Animal or cell culture systems that propagate SafV-2
Benefits	• Improved accuracy for oxygen modulation and control • Targeted control of oxygen concentrations • Platform can be extended to model hypoxia for other biological tissues	• Enables immunological and epidemiological study of SafV-2 infection in humans
Stage of Development	*Working protype exists*	*Developed material available*
Publication	N/A	N/A
Patent	DF124/PPA (App. No. 61/617,189)	No patents
Faculty	David Eddington	Guofei Zhou

Cell Culture

Tech ID	**2016-059**
Tech Description	**Estrogen Receptor Positive Breast Cancer Line Model for endogenous tamoxifen resistance** UIC researchers have developed several relevant breast cancer cell lines useful in investigating the antitumor effects of novel Estrogen Receptor anti-cancer agents. Among these, a specially modified MCF7-TAM1 cell line shows an endogenous resistance to tamoxifen. The cells also exhibit an increased expression of Protein Kinase C alpha (PKCα) which is an important player in tamoxifen resistant breast cancer. The cell line has been used in in-vitro studies as well as to generate in-vivo mouse xenograft tumor models. The culture conditions, morphology and growth behavior of the cell line is well characterized and they have been authenticated using short tandem repeat (STR) and ATCC analysis. These cells have been designed to test and validate novel therapeutics for tamoxifen resistant breast cancer.
Applications	• To study the biology of clinically relevant breast cancer. • To examine effects of novel drugs to treat tamoxifen resistant breast cancer • Evaluate relative efficacy of new cancer drugs against ER+ tamoxifen resistant breast cancer
Benefits	• These cells exhibit endogenous resistance to tamoxifen • They exhibit a stable and robust expression of PKCα endogenously • They are ready to use for drug discovery and validation studies • Proven in Xenograft murine studies
Stage of Development	*Stable Cell Lines*
Publication	Novel Selective Estrogen Receptor Downregulators (SERDs) Developed against Treatment-Resistant Breast Cancer. J Med Chem. 2017 Feb 10
Patent	No patents
Faculty	Debra Tonetti and Mary Ellen Molloy

Cell Culture

Tech ID	**2016-058**
Tech Description	**Estrogen Receptor Breast Cancer Cell Model for PKC alpha over-expression and Tamoxifen resistance** UIC researchers have developed several clinically relevant breast cancer cell lines in order to investigate the efficacy of novel anti-tumor drugs. The MCF7-PKCa cell line was engineered to exogenously overexpress Protein Kinase C alpha (PKCα) which rendered it resistant to tamoxifen. A control cell line has also been generated as a negative control with normal PKCα expression which is sensitive to Tamoxifen The cell lines have been used in in-vitro studies as well as to generate in-vivo mouse xenograft tumor models. The culture conditions, morphology and growth behavior of the cell lines are well characterized and they have been authenticated using short tandem repeat (STR) and ATCC analysis. These cell lines have been designed to test and validate novel therapeutics for tamoxifen resistant breast cancer. They are co-owned by UIC and Northwestern University.
Applications	• To study the biology of clinically relevant breast cancer. • To examine effects of novel drugs to treat tamoxifen resistant breast cancer • Evaluate relative efficacy of new cancer drugs against ER+ tamoxifen resistant breast cancer
Benefits	• These cells exhibit endogenous resistance to tamoxifen • The PKCα over-expression renders them tamoxifen resistant which is a clinically relevant cell model • They are ready to use for drug discovery and validation studies • Proven in Xenograft murine studies
Stage of Development	*Stable Cell Lines*
Publication	Novel Selective Estrogen Receptor Downregulators (SERDs) Developed against Treatment-Resistant Breast Cancer. J Med Chem. 2017 Feb 10
Patent	No patents
Faculty	Debra Tonetti and Mary Ellen Molloy

Cell Culture

Tech ID	**2015-068**
Tech Description	**Glioma Cell Line Murine ALKO (astrocyte LKB1 knock out)** Mouse ALKO cells (astrocyte LKB1 knock out) were prepared by treating astrocytes harboring a floxed version of the LKB1 gene with Adeno Associated Virus expressing the bacterial Cre-recombinase. After several passages, the resulting cells show anchorage independent growth, have a doubling time of less than 24 hr, lose expression of the astrocyte marker GFAP (Glial fibrillary acidic protein), and gain expression of stem cell markers including Sox2 and Oct4. These cells may be useful as a model for gliomas or for stem cell research. Liver kinase B1 (LKB1, also referred to as Serine/threonine-protein kinase STK11, Renal carcinoma antigen NY-REN-19) is a tumor suppressor serine/threonine-protein kinase that controls the activity of a large number of protein kinases including AMP-activated protein kinase (AMPK) family members, thereby playing a role in various processes such as cell metabolism, cell polarity, and apoptosis.
Applications	• To study the biology of clinically relevant cancer cells like : glioma glioblastoma, astroglial, astrocyte • To examine effects of novel drugs to treat subtypes of cancers listed above.
Benefits	• Model for gliomas or for stem cell research • Fast doubling time • They are ready to use for drug discovery and validation studies • Will form spheroids in neural stem cell media • Stable cell lines displaying some stem cell phenotype.
Stage of Development	*Stable Cell Lines*
Publication	Douglas Feinstein Laboratory UIC
Patent	No patents
Faculty	Doug Feinstein

Cell Culture

Tech ID	**2011-151**
Tech Description	**SafV-1 has been modified to propagate in mammalian cells**
Applications	• Animal or cell culture systems that propagate SafV-1
Benefits	• Enables immunological and epidemiological study of SafV-1 infection in humans
Stage of Development	*Developed material available*
Publication	N/A
Patent	No patents
Faculty	Guofei Zhou

Biomaterials

Tech ID	2005-068	2009-038
Tech Description	**Fibrous Protein Fusions and Use Thereof in the Formation of Advanced Organic/Inorganic Composite Materials:** Various domains of dentin matrix protein 1 were fused to polypeptide domains coding for spider silk. These fusion proteins can be used for in-vitro and in-vivo mineralization experiments to form hydroxyapatite, which is the main inorganic component in teeth and bones.	**Stimuli-Responsive Poly(methyl methacrylate/N-isopropylacrylamide Co-polymer with Enhanced Longevity in Water for Non-woven Applications:** The inventor presents a temperature and pH responsive copolymer,poly(methylmethacrylate/Nisopropylacrylamide) [P(MMA/NIPAM)]. It is sufficiently stable in water and can be easily processed into non-woven or oriented mats using standard processing.
Applications	• Dentistry Biomaterial • Orthopedic Biomaterial	• Drug Delivery • Protein and DNA Purification • Tissue Engineering • Disposable Wipes
Benefits	• Long term strength and elasticity in biomedical applications	• Mass producible • Non-toxic
Stage of Development	*Experimental and theoretical proof of concept*	*Working prototype exists*
Publication	Huang, J., Wong, C., George, A., and Kaplan, D. L. *Biomaterials*. 28(2007)2358-2367.	Zhang, Yiyun and Yarin, Alexander L. *J. Mater. Chem*. 19(2009)4732–4739
Patent	US Patent 7,960,509 (Issued), US Patent 8,129,141 (Issued), US Patent Pending	Patent pending
Faculty	Anne George	A. L. Yarin, Yiyun Zhang

Biomaterials

Tech ID	2012-017
Tech Description	**Secondary Metabolite Fractionated libraries from crude extracts of marine-derived Actinomycete bacteria:** The fraction library in this technology consists of fractions of secondary metabolites from marine-derived actinomycete bacteria. These bacterial strains were collected in Massachusetts, San Diego, and the Florida Keys under the appropriate collection permits. Each strain was grown in liquid culture, extracted with resin, and separated into four fractions upon elution over silica gel cartridges.
Applications	• Biomedical agent • Agricultural agent
Benefits	• A novel secondary metabolites from marine-derived actinomycete strains
Stage of Development	*Theoretical concept; experiments are planned but do not exist at this time*
Publication	Not published
Patent	Patent Pending
Faculty	Brian Murphy

Bioinformatics

Tech ID	**2006-106**
Tech Description	**Innovative Computational Techniques for Identification of Novel T-Cell Epitopes:** The inventor developed a novel algorithm to identify new T-cell epitopes. Identification of the variable length of each epitope aids the prediction of the binding ability of epitopes to MHC class II molecules.
Applications	• Vaccine Development
Benefits	• Supports the discovery of novel MHC class II molecules for use in vaccine development • More efficient process • Uses both information from epitopes and non-epitopes
Stage of Development	*The working prototype demonstrates accuracy of prediction that is competitive compared to the advanced predictors.*
Publication	Huang, L. and Dai, Y. J *Bioinform Comput Biol*. 2006 Feb;4(1):93-107.
Patent	Copyrighted
Faculty	Yang Dai

Imaging

Tech ID	**2010-022**
Tech Description	**In Situ Quantitative Imaging of Cellular Lipids Using Specific Molecular Sensors:** This imaging method allows for real-time lipid quantification in live cells. A prototype sensor designed for phosphatidylinositol-4,5-bisphosphate allows for robust quantitative determination of spatiotemporal fluctuation of PtdIns(4,5)P2 in mammalian cells by ratiometric analysis. This new strategy can also be applied to in situ quantification of other membrane lipids.
Applications	• Lipid Detection Kit • Diagnostic Tool
Benefits	• Real-time lipid quantification in live cells
Stage of Development	*Working prototype*
Publication	Y. Yoon, PJ Lee, S. Kurilova and W. Cho. In situ quantitative imaging of cellular lipids using molecular sensors. *Nature Chemistry*, October 9, 2011; 3(11): 868-874.
Patent	Patent pending
Faculty	Wonhwa Cho

Drug Screen

Tech ID	**2007-003**
Tech Description	**A Cell-based System for High Throughput Screening of Inhibitors Against Oncogenic Transcription Factors**
Applications	• Screening for inhibitors of oncogenic transcription factors
Benefits	• Potential for identification of inhibitors of oncogenic transcription factors
Stage of Development	*Proof of concept is displayed by protoype*
Publication	N/A
Patent	U.S. Utility Patent 8,029,980
Faculty	Andrei L. Gartel

Animal Models

Tech ID	2011-024	2012-049
Tech Description	Mice lacking a functional ApoE gene are unable to produce a key glycoprotein, apoE (apolipoprotein E), which is essential for lipid transport and metabolism. The mice are healthy when born, but have up to five times higher total cholesterol levels and a markedly altered plasma lipid profile (high LDL, low HDL) compared to normal mice (low LDL, high HDL).	Researchers in Pediatrics at UIC have developed an animal model by crossing two strains of mice with conditional transgenes. Mice expressing floxed Von Hippel-Lindau protein (VHL) from Jackson Labs (B6.129S4(C)-Vhltm1Jae/J) were bred with animals expressing a fibroblast specific promotor driving Cre (Fsp-Cre) obtained from Ohio State University. Resulting offspring Fsp-VHL+/- and Fsp-VHL-/- were completely viable and fertile.
Applications	• Mouse disease model for studying regulatory T cells in atherosclerosis.	• Novel constitutive animal model for PAH.
Benefits	• ApoE knockout mice rapidly develop atherosclerotic lesions • Utilizing a Foxp3 modification in these mice enables direct and specific fluorescent visualization of regulatory T cells in atherosclerotic relevant tissues. • Enables isolation of regulatory T cells using fluorescence.	• Recapitulates stereotypical PAH pathologies • Mice exhibit stereotypical PAH symptoms including increased hematocrit, RBC, HGB and enlarged right ventricle volume.
Stage of Development	*Animal model exists*	*Animal model exists*
Publication	N/A	N/A
Patent	No patents	No patents
Faculty	Guoxing Sheng	Guofei Zhou