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Innovation Summit III
November 18, 2009
4:00 - p.m. – 6:00 p.m.

Innovation Abstracts

Novel Stimulant for Sexual Desire

Barry Komisaruk
- Professor II, Department of Psychology, Rutgers University
- Adjunct Professor, Dept. Radiology, New Jersey College of Medicine, University of Medicine and Dentistry of New Jersey

Innovation Description:	Method that can identify and synthesize a genital sensory molecule that can substitute for, and/or augment, active genital stimulation toward stimulating sexual response.This innovation is an extension of a potent pain-suppressing peptide derived from a genital sensory nerve.
Market Analysis:	• Sexual dysfunction occurs in 40% of the more than 3 billion women worldwide = 1.2 billion • 8 Million Women Are Distressed By Their Lack of Sexual Desire. These include naturally-menopausal women (10% of 30 million) and surgically-menopausal women (20% of 25 million) • Application is not only to women with compromised and/or reduced sexual response, e.g., primary anorgasmia, periopheral neuropathy due to diabetes, MS, spinal cord injury, etc. as it may also intensify normal, non-pathological sexual stimulation and consequent pleasure.
Competitive Landscape:	No other molecule, substance or preparation utilizes the presently specified principle of mimicking genital sensory stimulation. Other substitute products carry untoward side effects (lowered blood pressure, hypertension, virilization, etc.) and many have failed FDA scrutiny.
Commercial Viability:	Substance expected to be derived from a natural product, not a hormone, opiate, anti-depressant, or blood vessel dilator, act at the first synapse in the spinal cord, not the brain or ovaries and sensorial, unlike any other sex substance currently under development.
Technology Rights:	No IP at this time, but based upon prior patented technology.
Status/Next Steps:	• Identify sexual response-inducing neurotransmitter estimated at 1 year with a cost of $100,000 • Verify sexual response-inducing effect and apply for patent estimated at 1 year with a cost of $115,000

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IbRiS©: Image Based Outcome Prediction for Estrogen Receptor Positive Breast Cancers

Anant Madabhushi
- Assistant Professor, Dept. of Biomedical Engineering, Rutgers University

Innovation Description:	Computerized image analysis tool of breast cancer biopsy digital images for predicting which patients will benefit from chemotherapy. IbRiS generates an objective and unbiased risk score for breast cancer in women and provides accurate prognosis (poor, intermediate and good predicted outcome) of estrogen receptor positive breast cancer, the most common type of breast cancer in women so that patient treatment can be individually tailored at a very early stage.
Market Analysis:	• 120K women in US annually diagnosed with ER+ breast cancer (Bca), 1M worldwide. Only 40-50% will benefit from adjuvant chemotherapy and should be identified prior to treatment. • Survival of ER+ BCa correlated with grade, but pathologists can't currently predict outcome and there is qualitative, subjective, inter/intra-observer variability.
Competitive Landscape:	• Genomic Health Oncotype DX® measures expression level of 21 genes in breast cancer pathology specimens. Limiting as expensive (> $4,000 per test), tissue physically shipped to specialized facility, destructive testing of biopsy tissue sample, low reproduceability and 1-2 week turnaround for results. • Omnyx, Bioimagene, Aperio, CRI have diagnostic products, not prognostic.
Commercial Viability:	• Web Portal to upload images following digitally scanning tissue • Prognostic results available at biopsy • $975/test • Quantitative, standardized score • At project conclusion, product will be ready • Expedited Regulatory Pathway; FDA 510(k) clearance – prognostic not diagnostic
Technology Rights:	Provisional patent filed February, 2009, "Image Analysis Based Recurrence Prediction of ER+ Breast Cancers"
Status/Next Steps:	• Evaluated on 41 ER+ BCa biopsies – excellent correlation with Oncotype DX® and >84% accuracy discriminating intermediate, poor, good outcomes • Optimization and evaluation in progress, prototype development to begin in 2010

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Nanolipoblockers

Prabhas Moghe
- Professor of Biomedical and Chemical/Biochemical Engineering, Rutgers University

Innovation Description:	Synthesis of nanosized particles that bind scavenger receptors within blood vessels to reduce cholesterol accumulation and resulting atherosclerotic plaques that could lead to heart attacks and strokes. These nanoparticles are also effective agents for identifying sites of vulnerable plaques.
Market Analysis:	• Drugs: Viewed as $8 billion worldwide franchise • Stents: 615,000 stenting procedures in 2004 with stent sales of almost 2.9 billion in 2006 • Catheterizations: 1.3 million diagnostic catheterizations in 2004
Competitive Landscape:	• Limited therapeutic approaches available to reduce risk of clot formation and stabilize plaques. • Plavix - prescription medicine, platelet inhibitor; reduces the risk of a future MI or stroke; reduces clot formation but does not address vulnerable plaques; Cost > $4.00 per dose or > $1400.00 per year
Commercial Viability:	• Materials relatively inexpensive; Significant ROI. • Nanolipoblocker available via targeted administration; Injection during catheterization (immediate delivery); Controlled release from eluting stents/vascular wraps (sustained delivery) • Anticipate minimal safety concerns in vivo as biodegradable nanolipoblockers are broken down • Platform technology makes it attractive for a broad range of conditions: inflammation, thrombosis, cardiovascular disease • Potential partnership with current licensors in cardiac stents
Technology Rights:	• 6 patent portfolio
Status / Next Steps:	• In vitro testing completed and mechanism of action successfully demonstrated • In vivo testing/animal models; first evaluation completed Oct 2009; Subsequent study to examine bolus injections mimicking catheterization procedure; Vulnerable plaque model & stent elution model in animals to be tested next. Scale-up by 1Q2013. • Further pre-clinical work could be undertaken with industrial partner(s) • Ready for licensing • Federal funding to date (AHA; NIH; NSF)

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CyberBike

Stephen Smaldone
- Part-time Graduate Student in Computer Science
- Full-time Senior Project Manager in the computer data storage industry

Innovation Description:	The CyberBike promotes safe roadway cycling through the use of mobile video, audio, and motion sensors to monitor roadway conditions. • Predicts and alerts cyclist to the presence of potentially dangerous situations. • Reduces cognitive load of cyclist by handling the processing of environmental data for situational awareness. • Continuously monitors current situation to determine when to capture and transmit evidential data to safe location for later use by authorities. Capable of notifying authorities on behalf of a disabled cyclist.
Market Analysis:	• 700+ cyclist fatalities per year due to motor vehicular accidents; 44K cyclist injuries reported annually due to motor vehicular accidents; 22% of fatal accidents involved hit-and-run motorists that were never found or charged. • For each year between 2002 – 2008, between 18 – 19 million bicycles are sold domestically (per year); 72% of those can benefit from the CyberBike system and middle to high-end market not recession sensitive, according to 2008 European retail figures. o Non-recurring revenue US estimated at: $1-100B o Annual recurring revenue US estimated at: $.6-48B
Competitive Landscape:	No competitive products on the market; the closest is Cerevellum, which provides a non-predicitive, continuous rear-view image to the cyclist to detect and capture accident events, after they occur.
Commercial Viability:	• Feature-rich: provides for Automated Accident Detection, Automated Real-Time Accident Prediction, Multi-Modal Sensing, Wireless Communication, Offsite Evidence Preservation, Integrated Online Web Service and Self-Organized Multi-Cyclist Distribution • Portable, easy to manufacture/update; software-based
Technology Rights:	Provisional patent filed May 2009
Status / Next Steps:	Phase I; testing ending 3/2010 Phase II; improved prototype/enhancements ended 10/2010

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High Performance Ceramic Coating

Perumalsamy Balaguru

- Professor of Civil Engineering, Rutgers University
- Member of Rutgers' Faculty for 30 years, Program Director at NSF for 4 years, with more than 200 publications and 250 presentations including books and Key Note lectures.

Innovation Description:	A high performance ceramic coating that offers thefollowing attributes: cannot be scratched with metals • graffiti resistant • mold resistant • self-cleaning • destroys indoor pollutants • heat resistant • non-toxic • conventional application • compatible with concrete, steel, timber and clay bricks.
Market Analysis:	• Potential market application in transportation structures (graffiti resistance/bridges), buildings (mold/fire-proofing), pipelines (friction reduction), and others. • "Green" paint market share increasing • US paint market=$23B; $4.4B for specialty coatings, projected market is (conservatively) 8% of $4.4B annual US market=$252M
Competitive Landscape:	No other product offers all of these features.
Commercial Viability:	Competitive price point of $60/gal., simple application, non-toxic/"green" product, maintenance-free due to self-cleaning properties, health benefits relative to mold-resistance.
Technology Rights:	• Patent pending, filed June 2008, "Low-temperature cure inorganic compositions" • Patent pending, filed March 2007, "Moldable and low-temperature cure high-temperature composites"
Status/Next Steps:	Technology licensing

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Controlled Hepatocyte Production

Timothy Maguire
- Scientist, Microfluidic Drug Screening Systems, Hurel Corporation
- Rutgers University CIVET Entrepreneur-in-Residence

Innovation Description:	Controlled system to provide a robust hepatocyte population for use in in-vitro drug screening systems and bioartifical livers. Application to companies that provide cryo-preserved human hepatocytes.
Market Analysis:	• Drug Metabolism/Toxicology: 20 large pharma companies; $24M per year • FDA safety assessment; $2M per year • Academic labs; $11M per year • Potential to replace animal testing; $1.3B per year
Competitive Landscape:	• In Vitrogen, Celsis, Lonza offer fresh human hepatocytes, cryopreserved human hepatocytes; *suboptimal donors, lot variation, poor in vivo – in vitro correlation* • ATCC offers cell lines; *poor in vivo – in vitro correlation, limited in cellular function* • Gerone, Yecuris offer stem cell products; *mixed cell populations, recovery of hepatocytes is difficult, limited to lab scale*
Commercial Viability:	• Hepatocytes derived from alginate encapsulated stem cells, with high yield percentage • Allows for change in FDA guidelines to enable larger pharma adoption • Scalable, making it amenable to the large scale bioprocessing needed to create clinical treatments • Allows for maintenance of mature cellular function upon completion of differentiation • Extendable to all stem cell types (both adult and embryonic) • System easily modified to derive other important cell types
Technology Rights:	Patent pending, filed 09/2006
Status/Next Steps:	• Current proof of concept (PoC) demonstrated with murine embryonic stem cells, establishing PoC with human embryonic stem cells • Scale-up by 1Q2013

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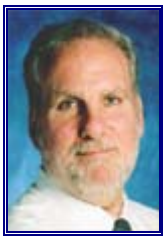
Automated Venipuncture Device



Martin Yarmush
- Director, Center for Innovative Ventures of Emerging Technologies, Rutgers University
- Paul and Mary Monroe Chair of Science and Engineering, Biomedical Engineering, Rutgers University

Innovation Description:	Fully automated venipuncture device combining a novel NIR imaging technique to generate a 3D map of subcutaneous veins in real time, combined with a computer-controlled, robotically driven needle in a compact form that allows for portable, safe and accurate application essentially anywhere.
Market Analysis:	• Hospitals: 5K in US, estimated market of $1.25B • Diagnostic Centers: 5.5K in US, estimated market of $1.12B • Emergency Medical Personnel (armed forces, EMT) • Private Practices/Doctors/Veterinarians • Research Animal Facilities • Point of Care (visiting nurse, patient administration)
Competitive Landscape:	• Current methods use cumbersome and non-portable devices for both the viewing and robotics. As ease of use and medical accuracy are experienced, commercial use and application will grow and expand. • Luminetx's Veinviewer: o No depth representation of the veins o Venipuncture is performed manually
Commercial Viability:	Estimated 1B venipunctures performed annually. 90% of inpatients require peripheral IV access; 25% require central venous access with average of 2.4 attempts prior to successful catheter placement. The automated venipuncture device: • Removes all human error associated with venipuncture • Reduces cost and allows for portability as all functionality resides on the same device
Technology Rights:	Patent pending, filed 10/2009
Status/Next Steps:	Prototype in process, 3Q2011 demonstrate PoC on phantom limb, 4Q2012 demonstrate animal PoC, 1Q2014 Product launch.