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<th>First Name*</th>
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<td>Svetlana</td>
<td>Egorova</td>
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Instructor

**Twitter Handle (if applicable)**

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- [ ] Genomics
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- [ ] Lung Research
- [x] Neurosciences
- [ ] Patient-Centered Outcomes/Comparative Effectiveness
- [ ] Regenerative Medicine
- [ ] Women's Health & Gender Biology

*If you selected 'other' please specify your research area:*

**Title**
Quantitative MRI study of Pineal Gland in MS

**Authors**

**PI**
Svetlana Egorova
We identified multiple sclerosis (MS) patients with magnetic resonance imaging (MRI) evidence of a large pineal cyst (≥8-10mm) from a subset of the Comprehensive Longitudinal Investigation of MS at Brigham and Women’s Hospital (CLIMB) study (n= 3/45 cohort Gilenya and n=2/23 Fatigue cohorts, n=8 other CLIMB projects). The estimated prevalence of patients with a large pineal cyst was 0.074 (95%-CI=0.024–0.163), with a female majority (85%). We compared the pineal gland volume, measured manually using 3D Slicer, as well as Expanded Disability Status Scale (EDSS) scores and MRI measures of brain atrophy and lesion volume between the group of MS patients with a large pineal cyst (n=13) and a control group (n=13) of MS patients pairwise matched for age, sex, and disease duration. The pineal gland volume of the group with pineal cysts was ten times larger than the control. We found no significant differences in EDSS and MRI measures of brain atrophy and lesion volume between the groups. However, 83% of control MS patients showed small pineal cystic changes (≤2mm) on 3T MRI and hyperintense pineal gland appearance on T2-FLAIR images.

Multiple Sclerosis (MS) is an inflammatory disease of the central nervous system that shows seasonality of disease activity, which is highest in spring and lowest in winter. Such seasonality may be explained by fluctuations in blood levels of melatonin, a hormone secreted by the pineal gland – located in the center of the brain – that regulates the body’s circadian rhythm (sleep/wakefulness) and has protective anti-inflammatory properties. Decline in melatonin production may result from changes of the pineal gland (such as calcifications and cysts) that can be detected on Magnetic Resonance Imaging (MRI). In our study, we identified a group of MS patients with large pineal cysts, a condition associated with melatonin deficiency, and therefore potentially implicated in MS disease activity. We compared physical disability status and MRI measures of inflammation and brain tissue loss between MS patients with large pineal cyst and MS patients without pineal cyst, selected from the Comprehensive Longitudinal Investigation of MS at Brigham and Women’s Hospital (CLIMB) study cohort.

Our pilot observational study suggests that quantitative assessment of pineal gland volume on MRI is feasible, and could be employed as a biomarker to investigate clinically relevant features of MS, including fatigue, sleep cycle abnormalities etc.
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- [ ] Regenerative Medicine
- [ ] Women's Health & Gender Biology

If you selected 'other' please specify your research area:

**Title**
Patient Safety Dashboard, an innovation of the Patient Safety Learning Labs (PSLL)

**Authors**
Jenzel Espares

**PI**
Dr. Jeffrey Schnipper, MD, MPH

**Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)**
During a patient’s hospital stay, documentation within the Electronic Health Record (EHR) is often “siloed” between different members of the care team. The dashboard
was built to confront this issue of isolated information, which can compromise patient safety. With relevant data compiled and visualized in one place, the objective is to propel interdisciplinary discussions and promote a high standard of patient safety. This will allow clinicians to identify high-risk states at the unit-wide and patient-specific levels so that risks can be addressed before they manifest in harm. Information in the EHR feeds into logic that has been iteratively refined and vetted with clinical leadership. If guidelines that are built into the dashboard are not met, the category will flag yellow for a “risky state” or red for “action needed”. Simultaneously, decision support will be available to advise caregivers of proper measures to take in order to resolve the issue. Previously piloted in the MICU, the dashboard is being optimized for spread to med/surg units here at BWH. The dashboard emphasizes interdisciplinary safety concerns (e.g. pain management, VTE prophylaxis, and Foley catheter use). We hypothesize that this intervention will enhance the delivery of inpatient care and improve patient outcomes.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background. *

The way that clinical staff complete their documentation in the hospital was once done on paper, but is now done on a computer and filed on an electronic health record system (EHR). While this is more convenient than before, one new problem is that members of the care team can only see the documentation that they put in. Because of this, certain areas of care fall through the cracks, and patient might end up with adverse events in the hospital that could worsen their health (e.g. hospital-acquired infections and falls). The patient safety dashboard was built to solve this problem; it gathers relevant data from the EHR for nurses, doctors, and all other hospital staff to see. Instead of just showing this data, which can be difficult to understand all at once, it uses green, yellow, and red flags to indicate which areas of patient care need to be discussed among the care team. To make things easier for hospital staff, the dashboard automatically updates right when new information is put in, and these flags change in real time. This means that they don’t have to do any extra work, and the patient receives an overall higher level of care.

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.*

With the Patient Safety Dashboard promoting transparent communication between patients, caregivers, and other care team members, it is expected that safety risks and other preventable medical harms will be decreased in BWH units that have this tool available to them.
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- Regenerative Medicine
- Trauma
- Women's Health & Gender Biology
- Other

If you selected 'other' please specify your research area:

Title*
Implementation of a Fall Prevention Intervention: Overcoming Barriers

Authors*
Matthew Paley, BSN, RN, CNRN and Zinnia Feliciano, MS, RN, AGCNS-BC, CNRN

PI*
Patricia C. Dykes PhD, RN

Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)*
Motivation: Falls during hospitalization are a leading cause of injury. Evidence-based, nurse-led interventions, such as the Fall TIPS Toolkit, have been shown to
decrease falls during hospitalization. In this project, we identified and overcame multiple barriers ensuring the successful implementation of this important patient safety intervention. Methods: The unit-based practice council designed the implementation plan for Fall TIPS that included the following: identification of barriers to implementation, designation of unit-based champions, development of staff education materials, surveillance of Fall TIPS utilization, and designation of “Fall Prevention Week”. Findings: On this neuroscience unit, nurses were concerned that the standardized Fall TIPS Toolkit would not prevent falls given the impairment of most patients, which required the tool to be amended to the needs of this population. Additional barriers identified included lack of time and materials to use the tool effectively. Overcoming these barriers resulted in long-term adherence to Fall TIPS of 82% with an overall decrease in falls and injury rates. Conclusions/Implications: Multiple strategies are required to engage staff in practice changes, including the implementation of patient safety interventions. Unit-based champions who facilitate staff buy-in and present relevant data on the practice are strategies that result in adherence to practice changes.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background. *

Falls are a common cause of injury to patients in the hospital. The Fall TIPS Toolkit has been tested and shown to reduce falls. Our practice council worked with nurses on the floor to adopt this new tool. We found several barriers to the use of Fall TIPS that we addressed. Nurses were concerned that the Fall TIPS would not prevent falls because of the specific needs of patients with neurological problems. This required the tool to be changed to fit their needs. Also, barriers identified included lack of time and materials to use the tool well. Getting past these barriers resulted in staff using the Fall TIPS Toolkit more often. Because of this, there was a decrease in falls and injury rates. Through this effort, nurses on the floor were able to use the Fall TIPS Toolkit correctly, and patients on the unit were safer.

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.*

In order to implement a practice change, like the Fall TIPS Toolkit, it is important to identify and address barriers from the start as well as when the intervention rolls out. This will lead to staff buy-in and its success.
Abstracts on any type of research are eligible for submission. Please select the category that most closely identifies your research, as poster locations will be assigned using this information:

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- ✅ Women's Health & Gender Biology
- ✅ Other

If you selected 'other' please specify your research area:

Diversity

Title*

Exploring Experience of Members of the BWH Department of Nursing Related to Diversity and Inclusion

Authors*

Farah Fevrin, RN, MS, Principal Investigator, Sasha Dubois, RN, MS, Co-Investigator, Neldine Alexandre, RN, BSN, Co-Investigator, Patrice K. Nicholas, DNSc, DHL (Hon.), MPH, MS, RN, ANP, FAAN, Mentor

PI*

Farah Fevrin
**Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)**

Motivation and Problem: The BWH Department of Nursing and Patient Care Services is creating a climate that supports the needs of multicultural patients and employees. Approximately 8% of the BWH nursing workforce is from underrepresented racial and ethnic groups. The development of the interview guide/questions was based on the review of the literature. While the BWH population of nurses is among the most diverse group of nurses in Boston, little is known about the perceptions of these nurses relative to diversity and inclusivity within the work environment, and how these perceptions influence patient care outcomes. Methods: This qualitative study involves focus groups of nurses from underrepresented racial and ethnic backgrounds (n=40 or until saturation is achieved). The sample is drawn using a convenience and snowball sampling techniques. A structured guide is used to facilitate the focus groups and capture the perceptions of the nurses relative to diversity and inclusivity. All focus group data are recorded and transcribed for content analysis using Atlas/ti software. Themes are identified and validated by the principal investigator and members of the research team. Results/Findings: Interviews for this project are being conducted and data analyses will be completed via qualitative methods and content analyses using Atlas.ti. Common themes will be uncovered, and described in the discussion. Data analyses will be completed in October 2016.

**Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background.**

The BWH Department of Nursing and Patient Care Services is creating a climate that supports the needs of multicultural patients and employees. Approximately 8% of the BWH nursing workforce is from underrepresented racial and ethnic groups. While the BWH population of nurses is among the most diverse group of nurses in Boston, little is known about the perceptions of these nurses relative to diversity and inclusivity within the work environment, and how these perceptions influence patient care outcomes. The BWH Department of Nursing and Patient Care Services has focused on the important work of creating a climate that supports the needs of our multicultural patients as well as our employees. The strategic initiative aims to support the goal of making all who come to BWH feel welcomed and cared for. As our patient populations and staff become increasingly diverse, it is critical to examine the experiences our BWH staff in achieving this critical goal.

**Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.**

The results of this study will inform the BWH community about the experiences of diversity and inclusion of nursing professionals from multicultural backgrounds. The findings may inform our care of patients from multicultural backgrounds and address health disparities at BWH.
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- Regenerative Medicine
- Trauma
- Women's Health & Gender Biology
- Other

If you selected 'other' please specify your research area:

Title*
Delirium: A Closer Look at Assessment and Documentation

Authors*
Hannah Fontes RN, BSN and Lindsay Whitcomb RN, BSN

PI*
Hannah Fontes RN, BSN

Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)*
MOTIVATION Hospital acquired delirium independently contributes to higher mortality rates, extended hospital stays, higher cost of care, and long term cognitive impairment. This project identified the current state of nursing assessment related to delirium with a goal to improve future practice. METHODS
We conducted an audit of 55 patient charts looking at the documentation of the level of orientation, the Richmond Agitation-Sedation Scale (RASS), and the Confusion Assessment Method (CAM). We measured the compliance with the unit standard of documentation; on admission, and every 8 hours. RESULTS Out of 55 patient charts, we found on average that 99% had level of orientation appropriately documented, 81% RASS and 60% CAM respectively. Additionally, we found that with impaired level of orientation, the CAM algorithm was not always appropriately implemented. Also, when RASS and CAM were not documented on admission, subsequent documentation was lacking. CONCLUSIONS The audit reflected a lack of compliance as far as the hospital standards of documenting orientation, RASS, and CAM. The concern is suboptimal documentation is contributing to a delay in early intervention with treatment. Additionally, the findings suggest a need to educate staff on effective assessment and documentation of their evaluation.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background. *

Some patients in the hospital become confused. When this happens, it is a serious problem. Sometimes, it can cause the patient to stay in the hospital longer. This can put the patient at risk for harm. It can also be expensive to the patient and the hospital. Our goal is to assess all patients for confusion so when it occurs, we can treat it quickly. The survey we use to determine if a patient is becoming confused is called the Confusion Assessment Method (CAM). We looked at 55 patient charts to see if the nurses were using the CAM correctly. We found that the way the CAM was recorded in patient charts was not up to hospital standards. We plan to teach our staff the proper way to perform and record the CAM. We believe that by doing this, we will see an improvement in our assessments as well as less patient confusion.

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.*

We recognize a need for staff re-education with the CAM. Our hope is that with better assessment skills and recording we will be able to help our confused patients earlier. Overall, our goal is to improve our patient outcomes.
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- Regenerative Medicine
- Women’s Health & Gender Biology
- Other

If you selected 'other' please specify your research area:

Title*
Pharmacovigilance: What Are We Talking About?

Authors*
Theresa Fuller, Elissa Klinger

PI*
Gordon Schiff

Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)*
Motivation: The ubiquity of electronic resources available to patients and providers has led to a substantial amount of noisy but telling data. The multiplicity of drug safety terms and lack of congruent terminology between source data (patients) and analysts (drug safety experts) represents a current and future limitation in analyzing these sources of “Big Data” and reaching meaningful conclusions regarding drug safety. Methods: Medication safety terms associated with drug
surveillance were gathered through literature review. Annual publications searchable in PubMed and use of Medical Subject Headings (MeSH) were analyzed for trends by term. These were compared to use in Google searches via Google Trends. Results: Disparities in usage existed among terms. "Adverse Drug Reaction", occurred with four times the frequency of the broader term, "Adverse Drug Event". Usage of “side effects” and “adverse events” both overwhelmed more precisely defined terminology. Conclusions/implications: A search of data sources, while a limited review, showed a lack of symmetry and congruence in characterizing drug safety. There is an immediate need to create a more robust, standardized infrastructure to capitalize on electronic tools for the purposes of post market drug surveillance.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background. *

Problems that happen when taking a medication (often called "side effects") occur frequently and make it difficult to prescribe medications safely. Right now after a patient is prescribed a medication there is no structured way to follow up with that person to check for a side effect. Often patients rely on resources like internet searching to learn more about their symptoms. Unfortunately, everyone (patients, doctors, government officials, lawyers) is speaking a different language when they talk about drug related issues. That makes it very difficult to analyze big data sources like google trends efficiently, because everyone talks about these events in a different way. This case study describes the lack of symmetry across different types of people, "academics" publishing in journals, and "everyone else" (including academics) who use Google to seek information. This is of particular interest right now as tools have become electronic, creating even more sources of information.

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.*

This case study shows that terminology usage regarding drug safety is muddled and needs standardization. In order to further drug safety and optimize electronic resources, the language being used must be made clearer.
**First Name**  Krinio  
**Last Name**  Giannikou  
**Academic Degrees**  BSc, MSc, PhD  

**BWH Department**  Medicine  
**BWH Division (if applicable)**  Pulmonary and Critical Care Medicine and of Genetics  
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**BWH Title or HMS Rank (if relevant)**  Postdoctoral Research Fellow  
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- [ ] Regenerative Medicine  
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- [ ] Other  

**If you selected 'other' please specify your research area:**  

**Title**  
Whole Exome Sequencing Identifies TSC1/TSC2 Biallelic Loss as the Primary and Sufficient Driver Event for Kidney Angiomyolipoma Development  

**Authors**  
Krinio Giannikou,*1 Isabela A Malinowska,*1, Trevor J Pugh*2, Rachel Yan1, Yuen-Yi Tseng2, Coyin Oh2, Jaegil Kim2, Magdalena E Tyburczy1, Yvonne Chekaluk1, Yang Liu1, Nicola Alesi, Geraldine Finlay3, Chin-Lee. Wu4, Sabrina Signoretti1, Matthew Meyerson2, Gad Getz2, Jesse Boehm2, Elizabeth Henske 1, David J Kwiatkowski1 1 Division of Pulmonary and Critical Care Medicine  

**PI**  
David J Kwiatkowski
Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)*

Kidney angiomyolipoma is a tumor in PEComa family that occurs rarely sporadically but is common in Tuberous Sclerosis Complex (TSC) and Lymphangioleiomyomatosis (LAM). Both angiomyolipoma and LAM have mutations in TSC2 or TSC1 gene. However, the frequency and contribution of other somatic events in tumor development is unknown. We performed whole exome analysis (WES) in 32 tumors (n=30 angiomyolipoma, n=2 LAM) from 15 subjects, including three with TSC. Two germline and 23 somatic mutations in TSC2 were identified, and one germline TSC1 mutation. Twenty of 32 (62%) samples showed copy neutral LOH (CN-LOH) in TSC2 or TSC1 with at least 8 different LOH regions, and 29 of 32 (91%) had biallelic loss of TSC2 or TSC1. WES identified 78 somatic non-synonymous coding variants in 23 tumors, mainly missense with three of these genes to be known cancer associated genes (BAP1, ARHGAP35, SPEN), but with uncertain role in angiomyolipoma development. Analysis of sixteen angiomyolipomas from a TSC subject showed both second hit point mutations and CN-LOH in TSC2, many of which were distinct, indicating that they might derive independently. Our results indicate that TSC2/TSC1 alterations are the sufficient driver event in angiomyolipoma/LAM, whereas other somatic mutations likely do not contribute to tumor development.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background. *

Renal angiomyolipoma is a kidney tumor, commonly seen in individuals with Tuberous Sclerosis Complex (TSC) and those who have sporadic lymphangioleiomyomatosis (LAM), but are seen rarely in the general population. Though histologically benign, multiple, bilateral angiomyolipomas in TSC can contribute to renal dysfunction and large angiomyolipomas can lead to life-threatening hemorrhage. We performed comprehensive genome analysis in 32 tumors (n=30 angiomyolipoma, n=2 LAM) from 15 subjects, including three with TSC. We found genetic alterations in either TSC2 or TSC1 genes that are known to cause TSC, but remarkably very few (4 on average) other somatic mutations elsewhere in the protein-coding regions. Analysis of multiple angiomyolipomas from a single TSC patient showed distinct genetic aberrations in the majority of samples, indicating that most of the tumors had arisen independently. Our results indicate that genetic alterations in TSC2 and less common TSC1 are the primary and essential driver genetic events for development and progression of angiomyolipoma and suggest that other somatic mutations are rare events and likely do not contribute to tumor development. Therapeutic approaches for treatment of patients with angiomyolipoma should focus on the effects of TSC2/TSC1 loss, including but not limited to the known used drugs (e.g. rapamycin, other rapalogs).

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.*

Kidney angiomyolipomas appear to have one of the lowest somatic mutation rates ever reported for human tumors. This observed genomic stability is consistent with long-lasting responses of these tumors to treatment with rapamycin and other related drugs that inhibit mTORC1
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- Immunology/Rheumatology
- Lung Research
- Neurosciences
- Patient-Centered Outcomes/Comparative Effectiveness
- Regenerative Medicine
- Women's Health & Gender Biology

If you selected 'other' please specify your research area:

Title*
Soft tissues preconditioning mechanical forces

Authors*
Giorgio Giatsidis, MD; Liying Cheng, MD-PhD; Anthony Haddad, MD; Luca Lancerotto, MD; Hajime Matsumine, MD-PhD; Dennis P. Orgill, MD-PhD

PI*
Dennis P. Orgill, MD-PhD

Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)*
Introduction: Improving the vascularization of tissues before surgery (preconditioning) is a pivotal strategy to avoid tissue necrosis and related complications. Building on our experience in biological effects of mechanical forces, we developed and optimized a method for induction of angiogenesis in tissues. The goal of our study was to investigate whether mechanical forces can precondition tissues before surgeries in vivo, hence reducing complications associated with postsurgical tissue hypoxia. Methods: We mechanically stimulated the skin of wild-type mice with non-invasive suction, investigating in different groups a series of parameters of application including the daily frequency, the suction levels and the overall duration of treatments. Effectiveness of treatment was analyzed with histological methods. Results: Cyclical application of medium-intensity suction levels can significantly induce a sub-critical temporary ischemia in stimulated tissue which triggers a hypoxia-mediated pro-angiogenic drive. Through this approach in a limited period of time (5 days) our treatment almost doubled (1.8-fold increase) vascular density in target tissues. Lower/higher suction levels or lower/higher frequencies or duration of treatment proved to be non-effective or harmful to tissues. Conclusions: Optimized mechanical forces can effectively and non-invasively precondition tissues before surgeries in vivo. This approach has the potential to improve current clinical standards.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background.*

Delivery of adequate metabolic supply to tissues is a cornerstone of reconstructive surgery. Plastic surgeons rely on tissue blood perfusion to facilitate tissue survival. However, very few strategies to improve blood perfusion of soft tissues before surgery ("tissue preconditioning") are currently clinically available. Mechanical forces offers interesting opportunities to challenge this unmet need. Application of suction to skin has shown to increase blood perfusion to underlying tissues. The purpose of this preclinical study is to optimize the therapeutic regimen of mechanical forces to improve blood perfusion to tissues before surgery. By doing so, we aim to define sufficient biological evidence to guide clinical application and offer novel, cost-effective and safe strategies for soft tissue preconditioning in reconstructive surgeries.

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.*

Improving the vascularization of tissues before surgery can reduce infection, delayed healing, fistula formation, or even surgery failure. Until today no effective, reliable, non-invasive methods for achieving this goal have been developed. Our studies challenge this problem offering an innovative, practical solution.
Atrial Fibrillation, Cardiac Symptoms, and Anxiety

Atrial Fibrillation (AF) is the most common cardiac rhythm disorder and is associated with poorer quality of life and elevated rates of anxiety. Despite growing evidence suggesting a pressing need to treat anxiety and improve quality of life...
Mindfulness-based behavioral treatments offer promise in this regard. In this study, a mindfulness-based cognitive-behavioral intervention was evaluated for patients with AF and elevated anxiety (N = 8; 100% Caucasian; 12.5% Hispanic; Mean age = 60). The intervention included a total of 8 hours of individual therapy, and was comprised of four empirically supported cognitive-behavioral strategies: psychoeducation, mindfulness, interoceptive exposure, and skills generalization. Only one patient discontinued before completing the treatment protocol. Sensitivity to anxiety (measured via Anxiety Sensitivity Index) significantly improved from pre- (M = 32.6; SD = 13.6) to post-intervention (M = 18.00; SD = 12.2) (p = .02).

Findings will be discussed in terms of clinical implications of cognitive-behavioral interventions in the management of AF.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background. *

Atrial Fibrillation (AF) is the most common cardiac rhythm disorder and is associated with poorer quality of life and elevated rates of anxiety, with higher anxiety associated with more severe AF symptoms. Growing evidence suggests a need to treat anxiety and improve quality of life among AF patients, yet little evidence exists about how to accomplish this. In this study, we evaluated a behavioral intervention in patients with AF and elevated anxiety, aimed at reducing anxiety and AF symptoms, and improving quality of life. The intervention included 4-5 individualized therapy sessions totaling 8 hours of therapy. The intervention was comprised of four established behavioral strategies: education about anxiety and AF, training in mindfulness (a particular way of paying attention), exposure to feared physical symptoms or situations, and application of skills learned in treatment. We found a significant improvement in anxiety when comparing patients pre- and post-intervention. Findings will be discussed in terms of clinical implications of behavioral interventions in the management of AF.

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.*

Findings from this research suggest that cognitive-behavioral strategies shown to be efficacious in treating other anxious populations were also effective in improving anxiety among patients with Atrial Fibrillation (AF). This finding is important given the association between anxiety and AF symptom severity. Additional results from validated QoL measures will be analyzed to help us further understand the association between anxiety, AF symptoms and quality of life.
First Name*       Last Name*       Academic Degrees*
Navin            Gupta            MD

BWH Department*  BWH Division (if applicable)  BWH ID Number
Medicine         Renal Medicine

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BWH Title or HMS Rank (if relevant)*  Twitter Handle (if applicable)
Renal Fellow

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If you selected 'other' please specify your research area:

Title*
Directed Differentiation of Human Pluripotent Stem Cells to Ureteric Bud

Authors*       PI*
Navin Gupta, Sarah Hill, Albert Lam, Joseph Bonventre, Ryuji Morizane
Ryuji Morizane

Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)*
Given the increasing prevalence of End-Stage Renal Disease and paucity of transplantable organs, there is a growing need for alternative forms of renal
replacement therapy. Directed differentiation of human pluripotent stem cells (hPSCs) to kidney epithelia represents a novel approach for kidney regenerative medicine. Developmental biology experiments demonstrate that renal epithelia derive from two populations of cells, the ureteric bud (UB) and metanephric mesenchyme (MM). In a Nature Biotechnology article, our lab generated nephron organoids through efficient induction of nephron progenitor cells (NPCs) of the MM. However, such organoids lack the distal nephron’s collecting system, which derives from the UB. The UB is an outpouching of the Wolffian duct (WD), which derives from the anterior intermediate mesoderm (aIM). Here, we offer a seven day, 4-step directed differentiation protocol of hPSCs in vitro that mirrors mammalian UB development in vivo. Using a combination of CHIR99021 and dorsomorphin, we first generate T(brachury)+ mesendoderm with 80-90% efficiency. Next, we generate PAX2+ LHX1+ GATA3+ WT-1+ HOXB4+ FOXF1- aIM using a combination of retinoic acid, BMP4, and FGF2. Thereafter, we induce mesenchymal-to-epithelial transition with noggin to form putative WD. Treatment of WD with GDNF demonstrated upregulation of SALL4, consistent with the generation of UB.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background. *

The number of people with terminal kidney failure is rising and treatment consists of dialysis or kidney transplantation. Dialysis is associated with a shorter lifespan and a poorer quality of life. Kidney transplantation is generally a better treatment modality, but the demand for transplantable kidneys far exceeds the supply. Considerable research is being done towards the development of a bioartificial kidney as a regenerative medicine strategy. For various reasons, which include scalability and methods to reduce organ rejection, human stem cells have been identified as the optimal cell source for bioartificial organs. Kidney developmental research serves as a guide to creating kidney tissue from human stem cells. Two populations of cells have been identified to contribute to formation of the nephron, which is the smallest single unit in the kidney. One of these important cell populations is known as the ureteric bud, which ultimately forms the urinary collecting system of the kidney. Directed differentiation refers to the use of growth factors to stimulate stem cells to specialize into specific adult cells. In our study, we developed a directed differentiation protocol that uses specific combinations of growth factors at specific time points to induce cells of the kidney collecting system.

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.*

Directed differentiation of human pluripotent stem cells to kidney epithelia represents a novel approach for kidney regenerative medicine. We developed a protocol to generate cells of the kidney collecting system, for use in congenital disease modeling and bioartificial kidney development.
First Name*        Last Name*        Academic Degrees*
Kate                Hoffman            BSN, RN

BWH Department*  BWH Division (if applicable)  BWH ID Number
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- [ ] Women's Health & Gender Biology

If you selected 'other' please specify your research area:

Title*
TIVA Needleless Blood Draw Study

Authors*
Deborah F. Mulloy, PhD, RN, CNOR, PI, Stanley Ashley, MD, Co-I,
Susan M. Lee, PhD, RN, CNP, CO-I, Kate Hoffman, BSN, RN, Study Coordinator

PI*
Deborah F. Mulloy, PhD,
RN, CNOR

Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)*
Motivation/Problem Statement Drawing blood is one of the most common medical procedures in the world. Hospitalized patients routinely undergo blood draws...
through venipuncture, which is painful and anxiety-producing. The aim of this study was to evaluate the ability of TIVA, a needle-free blood collection device, to collect blood from a multi-day indwelling peripheral intravenous catheter. Methods This non-blinded randomized controlled study involved 150 postoperative gastrointestinal surgical patients. Subjects in the control group (n=75) maintained a peripheral intravenous catheter that the study nurse assessed daily. Subjects in the intervention group (n=75) maintained a peripheral intravenous catheter that the study nurse used to perform daily blood draws using TIVA and completed satisfaction surveys. Results/Findings Preliminary findings show that TIVA is 81% successful in collecting sufficient blood samples, produces results with low hemolysis levels, and poses no increased risk of phlebitis or intravenous catheter dislodgement. Patients are highly satisfied with TIVA. Data continues to be collected and analyzed. Final results will be available for the poster presentation. Conclusions/Implications The use of TIVA produces accurate blood results, does not alter intravenous catheter integrity, and improves patient satisfaction. The cost/benefit ratio of TIVA needs to be further explored before implementing usage at a hospital-wide level.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background. *

Hospitalized patients often have their blood drawn multiple times per day. The standard procedure for drawing blood is to use a needle to puncture the skin and collect the blood. These needlesticks cause patients pain and anxiety. This study looked at TIVA, a needle-free blood draw device, which collects blood from patients’ intravenous catheters. Blood was drawn daily after surgery from patients’ intravenous catheters using TIVA. We found that TIVA collects accurate blood samples, does not put patients at an increased risk for infection, and does not hurt the intravenous catheter. Patients reported that they would rather have their blood drawn with TIVA than with a needle.

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.*

The implications are that TIVA may be able to help hospitals improve patient satisfaction, reduce healthcare worker needlestick injuries, and cut costs.
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- Women's Health & Gender Biology

If you selected 'other' please specify your research area:

Title*
The role of miR-135a in ischemic vascular diseases

Authors*
Basak Icli, Denizhan Ozdemir, Giorgio Giatsidis, Trevon Waters, Dennis Orgill, and Mark W. Feinberg

PI*
Mark Feinberg

Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)*
Development of new blood vessels is critical for tissue repair in response to injury in ischemic cardiovascular diseases such as myocardial infarction (MI), peripheral artery disease (PAD), or diabetic wound healing. MicroRNAs (miRNAs) are small,
single-stranded, non-coding RNAs that regulate the expression of target genes in a variety of pathophysiological processes including cardiovascular disease. Using a microarray profiling approach, we identified that miR-135a (miR-135a-3p) expression was significantly increased in plasma of patients with acute coronary syndromes (ACS) compared to healthy controls, and decreased in response to proangiogenic stimuli (e.g. VEGF, bFGF) in endothelial cells in vitro. Furthermore, in response to acute myocardial infarction (MI) in mice, miR-135a-3p expression was significantly increased in the ischemic zone (apex) compared to sham controls. Functionally, overexpression of miR-135a-3p markedly inhibits endothelial cell growth, migration, NO release, and network-tube formation, whereas miR-135-3p inhibition had the opposite effect. Mechanistically, in the presence of VEGF, miR-135a-3p overexpression in ECs decreased Akt- and eNOS phosphorylation whereas inhibition had the opposite effects. In-vivo inhibition of miR-135a-3p using LNA-anti-miR-135a-3p significantly increased wound healing in diabetic db/db mice. Elucidation of the role of miR-135a-3p in angiogenesis may provide a novel therapeutic approach to treat ischemic cardiovascular diseases.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background. *

Patients with type 2 diabetes mellitus (T2D) are frequently afflicted with ischemic diseases adversely affecting the heart, leg, or wound healing. Impaired blood vessel formation (angiogenesis) as a consequence of T2D can significantly delay wound healing. Here we show that neutralization of microRNA-135a (miR-135a), a small non-coding RNA, promotes cell growth and angiogenesis in cell culture conditions. In mouse model of diabetes, inhibition of miR-135a promotes wound healing post skin injury. Based on these observations, we hypothesize that miR-135a may serve as a critical regulator of pathological angiogenesis and propose to study the effect of miR-135a neutralization on the development and progression of diabetic ischemic diseases.

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.*

Examination of the role of miR-135a in the diabetic endothelial cells may provide novel and effective treatment strategies to target endothelial cell dysfunction and microvascular complications associated with diabetes.
**First Name**
Mohammad

**Last Name**
Islam

**Academic Degrees**
PhD

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Postdoctoral Associate

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**If you selected 'other' please specify your research area:**

**Title**
Systemic restoration of PTEN function in PTEN-null prostate cancer using mRNA nanoparticle for highly effective tumor suppression

**Authors**
Mohammad Ariful Islam, Yingjie Xu, Harshal Zope, Emma Ressor, Wuji Cao, Omid C. Farokhzad*, Bruce R. Zetter*, Jinjun Shi*

**PI**
Omid C. Farokhzad

**Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)**
Restoring the PTEN (phosphatase and tensin homolog on chromosome ten) gene function in PTEN-null prostate cancer (PCa) holds great potential in tumor
suppression, since PTEN is the most frequently mutated gene in PCa, and ~50% of metastatic castration resistance PCa (mCRPCa) involves PTEN loss. Delivering PTEN mRNA to PCa could become a viable treatment strategy, since mRNA is a potent therapeutic molecule with fast gene expression and predictable kinetics without needing to cross the nuclear barrier. Here, we make modified PTEN mRNA and systemically deliver it to PTEN-null PCa by developing a new generation hybrid mRNA nanoparticle platform having polymer/cationic lipid core coated with lipid-PEG. The NP shows suitable physicochemical properties, enhanced stability, minimal toxicity, increased circulation, and exhibits remarkably high mRNA transfection in PCa cells (>96%) and expression in PCa-xenograft tumor. With mRNA delivery strategy, we for the first time successfully confirm PTEN restoration in PTEN-null PCa and delineate its marked tumor suppression mechanism by downregulating the PI3K/Akt/mTOR pathway and enhancing apoptosis, as evidenced by inhibition of tumor progression in vitro and in vivo. We expect this approach of restoring mRNA-based tumor suppressors to be of high interest in developing new cancer therapeutics and thusly effective clinical treatments.

**Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background.**

Restoring the PTEN (phosphatase and tensin homolog on chromosome ten) gene function in PTEN-deficient prostate cancer (PCa) to suppress tumor growth has enormous potential since PTEN is the most frequently changed gene in PCa and a majority (~50%) of the metastatic castrate-resistant PCa (mCRPCa) involves PTEN loss. Thusly, delivering the PTEN gene to PCa, especially in the form of messenger ribonucleic acid (mRNA) may be an effective treatment method since mRNA is able to quickly express PTEN protein without needing to cross nucleus. To achieve that herein we make PTEN mRNA and deliver it via intravenous injection using a polymer/lipid NP platform. The NP has favorable physicochemical properties including enhanced PTEN mRNA stability with minimal toxicity, increased retention in the blood and optimal gene expression. Successful restoration of the PTEN gene in PCa cells utilizing mRNA NP may confirm the PTEN-related mechanism of tumor suppression which causes programmed cell death and prevents cancer cell growth pathway, as evidenced by the drastic inhibition of tumor progression both in cell culture and animal tumor model. This new approach of mRNA-based tumor-suppressor is expected to be of high interest for the development of new cancer therapeutics and effective clinical treatments.

**Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.**

This is a unique approach of reactivating mRNA-based tumor suppressor function in cancer cells by intravenous administration of a novel PTEN mRNA nanoparticle system, which gives the hope to develop new cancer therapeutics and effective clinical method for cancer treatment.
First Name*  Kimbely
Last Name*  Johnson
Academic Degrees*  Ph.D.

BWH Department*  Orthopedic Surgery

BWH Division (if applicable)  

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Twitter Handle (if applicable)

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Title*
A novel role for a fish venom protein in salamander limb regeneration.

Authors*

PI*
Jessica Whited

Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)*
Limb loss afflicts nearly 2 million Americans, and while prostheses are increasingly sophisticated, they cannot replace full functionality. In contrast, axolotl salamander limbs completely regenerate following amputation. During axolotl limb regeneration a wound epithelium (WE) first grows over the amputated stump. The WE is proposed to promote cellular activation of a progenitor-rich blastema structure, which will ultimately differentiate to replace the missing limb tissues. We demonstrate that the amputation induces systemic cell cycle activation in locations distal to the amputation plane, while the WE maintains cell cycle activation locally within the blastema. Through RNA-seq, we have identified natterin, a putative pore-forming toxin and kinogenase, as the highest expressed gene in the WE. Epidermal natterin expression is induced distally in regenerating axolotl limbs, suggesting a role in the systemic activation response. Overexpression of Natterin in unamputated limbs is sufficient to induce cell cycle activation, while inhibition of Natterin through use of kinogenase inhibitors reduces blastema formation and impedes limb outgrowth. We hypothesize Natterin operates within the interface of local and systemic responses to regeneration, and may be a key molecule in understanding the differences between regeneration-competent species and mammals.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background. *

Amputation of an arm or leg is permanent in humans, resulting in severe scars, recurrent pain, and prosthetic use if available. Salamanders, however, have similar arms and legs to us that, when amputated, can perfectly regrow back into a functional limb. Following amputation in the axolotl salamander, a special skin grows over the stump called the “wound epidermis” (WE). This skin sends signals to the underlying arm tissue to instruct it to replace the rest of the limb. We identified that this signaling not only happens at the site of amputation, but also travels throughout the axolotl’s body as an “alert” signal. We found that a specific gene, natterin, is highest in the WE and present in the skin throughout the salamander following amputation, suggesting an involvement in the body-wide alert signal. Expressing Natterin in uninjured axolotls was able to activate cells as if regeneration was occurring. Inhibiting Natterin through function-blocking drugs reduced limb regrowth after amputation, confirming its requirement in limb regeneration. Therefore, Natterin may be a key player in the steps to promote scar-free, perfect limb regeneration, and studying WE related genes may provide key insight into our lack of regenerative capacity.

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research. *

Amputation, through medical intervention or trauma, results in irreplaceable loss of extremities that afflicts nearly 2 million Americans to date. Understanding how other species perfectly replace lost tissues will provide insight into better healing and ultimately regeneration of human tissues.
First Name* Heidi

Last Name* Kuang

Academic Degrees* BSc. (in progress)

BWH Department* Medicine

BWH Division (if applicable) Renal

BWH ID Number

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BWH Title or HMS Rank (if relevant)* Research Trainee

Twitter Handle (if applicable)

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Biomedical Research

Title*
A Small-Molecule Screen for Enhanced Homing of Systemically Infused Cells

Authors*
Heidi Kuang, Oren Levy, Luke J. Mortensen, Gerald Boquet, Zhixiang Tong, Christelle Perrault, Brigitte Benhamou, Jidong Zhang, Tara Stratton, Edward Han, Helia Safaee, Juliet Musabeyezu, Zijiang Yang, Marie-Christine Multon, Jonathan Rothblatt, Jean-Francois Deleuze, Charles P. Lin, and Jeffrey M. Karp

PI* Jeffrey M. Karp
A major challenge towards developing effective cell-based therapies is the poor homing of systemically infused cells to disease sites. Herein, we screened 9,000 signal transduction modulators to identify hits that increase mesenchymal stromal cell (MSC) surface expression of the key homing ligand, CD11a. Pretreatment of MSCs with the kinase inhibitor Ro-31-8425, an identified hit from this screen, increased MSC firm adhesion to an ICAM-1-coated substrate in-vitro, and promoted targeted delivery of systemically administered MSCs to inflamed sites in-vivo in a CD11a-dependent manner. This resulted in an augmented anti-inflammatory response triggered by the infused cells. This represents a new strategy for engineering cell homing to enhance therapeutic efficacy and validates CD11a/ICAM-1 as a potential target. Altogether, this multi-step screening process may significantly improve the clinical outcome of cell-based therapies.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background. *

A major challenge towards developing effective cell-based therapies is the poor homing of systemically infused cells to disease sites. In our experiment, we screened 9,000 signal transduction modulators for their ability to increase the expression of CD11a, an important cell surface homing ligand that bind to intercellular adhesion molecule 1 and enhance homing, on mesenchymal stromal cell (MSC) surface. Our screen identified Ro-31-8425 as the most potent compound that increased CD11a expression on MSC surface. Pretreating MSCs with Ro-31-8425 increased adhesion of MSCs to an ICAM-1-coated surface and enhanced targeting of MSCs to inflamed sites in a murine model, in a CD11a-dependent manner. The MSCs that were systemically infused into the murine model also elicited an anti-inflammatory response at the inflamed site.

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.*

This multi-step screening process effectively validated CD11a/ICAM-1 as potential targets for engineering strategies to enhance cell homing and improve the clinical outcome of cell-based therapies.
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- Regenerative Medicine
- Women's Health & Gender Biology

If you selected 'other' please specify your research area: 

Title* 
A prodrug-doped cellular Trojan Horse for the potential treatment of prostate cancer 

Authors* 
Hao Yue Lan ; Oren Levy ; W. Nathaniel Brennen ; Edward Han ; David Marc Rosen ; Juliet Musabeyezu ; Helia Safaee ; Sudhir Ranganath ; Jessica Ngai ; Martina Heinelt ; Yuka Milton ; Hao Wang ; Sachin H. Bhagchandani ; Nitin Joshi ; Neil Bhowmick ; Samuel R. Denmeade ; John T. Isaacs ; Jeffrey M. Karp 

PI* 
Jeffrey M. Karp
There is a major need for a systemic delivery platform that efficiently targets anti-cancer drugs to sites of disseminated prostate cancer while minimizing host toxicity. In this proof-of-principle study, human mesenchymal stem cells (MSCs) were loaded with poly(lactic-co-glycolic acid) (PLGA) microparticles (MPs) that encapsulate G114, a prostate specific antigen (PSA)-activated prodrug. G114-particles were internalized by MSCs, followed by the release of G114 as an intact prodrug from loaded cells. Moreover, G114 released from G114 MP-loaded MSCs selectively induced death of the PSA-secreting PCa cell line, LNCaP. Finally, G114 MP-loaded MSCs inhibited tumor growth when used in proof-of-concept co-inoculation studies with CWR22 PCa xenografts, suggesting that cell-based delivery of G114 did not compromise the potency of this pro-drug in-vitro or in-vivo. We envision that upon achieving efficient homing of systemically infused MSCs to cancer sites, this MSC-based platform may be developed into an effective, systemic ‘Trojan Horse’ therapy for targeted delivery of therapeutic agents to sites of metastatic PCa.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background. *

Mortality from prostate cancer (PCa) remains a significant healthcare problem among men, mainly due to the lack of effective strategies allowing for the targeted delivery of anti-cancer drugs to sites of cancer metastasis. In order to address this issue, we developed a particle-in-a-cell delivery platform, where human mesenchymal stem cells (MSCs) were engineered with poly(lactic-co-glycolic acid) (PLGA) microparticles (MPs) loaded with the prodrug G114, which gets activated by the prostate specific antigen (PSA) secreted by PCa cells. G114 was efficiently encapsulated into MPs, which were subsequently internalized by MSCs. These cellular carriers of MPs showed sustained release of the intact prodrug, which selectively killed the PSA-secreting PCa cell line, LNCaP, in-vitro after being converted into the active drug moiety. Furthermore, G114 MP-loaded-MSCs induced an anti-tumor effect in in-vivo experiments. Altogether, the findings of this study illustrate the promise of MP-laden cells as drug transport vehicles that confer selectivity towards the killing of PCa cells.

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.*

Once efficient targeting of systemically infused MSCs to sites of disseminated PCa can be achieved, this cell-based platform has the potential to be translated to the clinic as a systemic treatment for metastatic PCa with minimal host toxicity.
First Name*  
Stephania

Last Name*  
Libreros Ruiz

Academic Degrees*  
Ph.D.

BWH Department*  
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BWH Division (if applicable)  
Center for Experimental Therapeutics and Reperfusion Injury

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Postdoctoral Fellow

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Inflammation
Pharmacology

Title*  
Resolvin D2 Novel Receptor Axis in Sepsis

Authors*  
Stephania Libreros, Nan Chiang, Xavier de la Rosa, and Charles N. Serhan

PI*  
Charles N Serhan

Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)*  

No abstract body provided in the image.
Resolution of acute inflammation is an active process governed by specialized pro-resolving mediators (SPM) including resolvin D2 (RvD2) that activates a cell surface G protein–coupled receptor (GPCR), GPR18/DRV2. Here, we investigated RvD2-DRV2-dependent resolution mechanisms using DRV2-deficient mice (DRV2-KO). In polymicrobial sepsis initiated by cecal ligation and puncture (CLP), RvD2 (~2.7 nmol/mouse) significantly increased survival (>50%) of wild-type (WT), reduced hypothermia and bacterial titers compared to vehicle-treated CLP mice that succumbed at 48h. Protection by RvD2 was abolished in DRV2-KO mice. Mass spectrometry-based lipid mediator metabololipidomics demonstrated that DRV2-KO infectious exudates gave higher pro-inflammatory leukotriene (LT) B4 and pro-coagulating thromboxane (TX) B2, as well as lower SPM, including RvD1 and RvD3, compared to WT. RvD2-DRV2-initiated intracellular signals were investigated using mass cytometry (CyTOF) which demonstrated that RvD2 enhanced phosphorylation of CREB, ERK and STAT3 that were absent in DRV2-KO macrophages. Monitored by real-time imaging, RvD2-DRV2 interaction significantly enhanced phagocytosis of live E. coli, an action dependent on PKA and STAT3 in macrophages. We identified an RvD2-DRV2 axis that activates intracellular signaling pathways, increasing phagocytosis-mediated bacterial clearance, survival and organ protection. Moreover, these results provide evidence for RvD2-DRV2 and their downstream pathways in pathophysiology of sepsis and infectious diseases.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background.

Sepsis is the leading cause of death in patients with infectious diseases, caused by overwhelming immune response to infection leading to widespread inflammation, organ failure and septic shock. It remains as unmet clinical challenge with high mortality rates and increasing incidence despite the advances in modern medicine such antibiotics and insensitive care. Our laboratory discovered a novel superfamily of bioactive mediators from DHA and EPA, called D and E series Resolvins that stimulate resolution of inflammation. Resolvins, including Resolvin D2 (RvD2), potently reduced inflammation by activating novel Pro-resolving pathways and stimulates the body own anti-microbial mechanisms. Resolvin D2 activates cell surface receptor, GPR18/DRV2. Here, we investigated RvD2-receptor-dependent resolution circuit using genetically engineered receptor deficient mice (DRV2-KO). Resolvin D2 significantly increased survival (>50%) of wild-type (WT) and reduced bacterial counts compared to controls. Survival by Resolvin D2 was lost in receptor deficient mice (DRV2-KO). Using metabololipidomics profiling, we identified in WT exudates higher levels of Resolvins and lower levels of pro-inflammatory mediators compared to receptor deficient mice (DRV2-KO). We identified novel signals that activate resolution to control local inflammation and infection by stimulating the body own endogenous resolving mechanism.

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.

Sepsis is leading causes of death worldwide. Our novel findings provide evidence that activation of novel resolving pathways that could lead to the control sepsis by using a receptor specific agent rather than anti-inflammatory drugs that eventually become immunosuppressive.
Abstracts on any type of research are eligible for submission. Please select the category that most closely identifies your research, as poster locations will be assigned using this information:

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If you selected 'other' please specify your research area:
Informatics

Title*
Rule-based Information Extraction using Canary

Authors*
Shervin Malmasi, Alexander Turchin

PI*
Alexander Turchin

Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)*
Narrative clinical data (e.g. provider notes) contains vast amounts of information that could be used in clinical research by employing natural language processing (NLP) technology. Nevertheless, it remains underutilized, in part because the technical skills required for the development or use of NLP software are a major
barrier for medical researchers wishing to employ these methods. To remedy this situation, we have developed Canary, a free and open source solution designed for users without NLP or software engineering experience. The software allows users to model their target information using lexicons and grammar rules, ranging from simple to complex. It was designed to be fast and work out of the box via a user-friendly graphical interface. The software runs on any contemporary Windows-based computer and supports both 64-bit architecture and parallel processing. Canary takes as input plain-text files (that can be exported from most EMR systems) and outputs delimited files that can be imported into any analytical package. Canary supports language models that can extract individual concepts (e.g. "Patient continues to smoke."), concept-value pairs (e.g. Blood pressure is 120/70) as well as concepts distributed across sentences (e.g. "Tried Lipitor. Had muscle aches again."). Canary is available free of charge upon request.

**Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background.**

Electronic Health Records (EHR) have been widely adopted in the last two decades, containing vast amounts of patient information. This has greatly increased the amount of digital data available to researchers, enabling them to analyze this data in order to formulate and answer sophisticated research questions. However, while some of this information is available as structured data (e.g. checkboxes/predefined forms), the great majority is stored as unstructured data, such as free text written by care providers. Given that these free-text notes contain vital clinical data, this has led to the development of computational methods to process and mine them for information of interest. But this is challenging as the expressive nature of human language means that there are many ways to describe the same medical phenomena, such as experiencing a side effect from a medication. Target topics may also be spread across multiple sentences or be affected by acronyms and spelling errors. We present "Canary", a free information extraction tool designed to address these challenges. A key advantage is that it is a GUI-based software not requiring a technical background. It is designed to enable clinical researchers to extract information from narrative documents without significant time or financial burdens.

**Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.**

Canary is a free software that allows users without technical background to extract information from narrative electronic documents. Canary could be used to process data for thousands of patients to obtain information for quality measurement, population management or clinical research.
Abstracts on any type of research are eligible for submission. Please select the category that most closely identifies your research, as poster locations will be assigned using this information:

- Bioinformatics
- Biomedical Imaging
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- Pregnancy & Fertility
- Regenerative Medicine
- Trauma
- Women's Health & Gender Biology
- Other

If you selected 'other' please specify your research area:

Title*
Guide to Eating After Surgery

Authors*
Alexia Marcous, Jeanne Praetsch, Emily Blake

PI*
Alexia Marcous

Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)*
Problem Statement Eating inappropriately after surgery may cause uncomfortable digestive symptoms or complications, which can contribute to longer hospital stays. However, many patients often do not receive or follow consistent and appropriate
recommendations for what to eat after surgery. The goal of this quality improvement project was to develop and consistently provide appropriate dietary recommendations in a way that encourages compliance and helps avoid post-surgical complications that prolong recovery. Methods We consulted the nutrition service to provide appropriate suggestions for what to eat after surgery. We also collected information that patients should consistently receive regarding appropriate portions, hydration, and other factors that help avoid negative digestive symptoms and complications. Results We compiled these suggestions and information into a brochure to distribute with the food menu given to patients when their diet is advanced to solid foods. We educated nurses on the brochure, including and when and how to distribute it. Conclusions We plan to assess the impact of this brochure by measuring nursing adherence to the process change and patient compliance with the recommendations. We will look for changes in the report of negative digestive symptoms and associated complications, and will examine the impact on the length of hospital stay.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background. *

How you eat after surgery is important. Patients who eat the wrong way can have nausea, bloating and constipation. These problems can make patients stay in the hospital longer. However, not all patients are taught how to eat after surgery. Also, patients who are taught still make mistakes. The goal of this project is to provide a guide on how to eat after surgery. To make the guide, we asked the nutrition service for suggestions on what to eat. We also collected our verbal instructions on how to eat. We chose fonts that were easy to read, and used pictures to help patients remember the information. We asked for feedback from the care team on the design and content. We taught nurses about the guide, including when and how to use it. To measure our success, we will confirm that nurses are giving patients the guide. Then we will check if these patients have fewer complications. Finally we will see if more of these patients leave the hospital on schedule.

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.*

The clinical implications of this Quality Improvement project are that patients may experience fewer and/or less severe GI symptoms after surgery, resulting in fewer instances of extended hospital stays caused by these symptoms.
Abstracts on any type of research are eligible for submission. Please select the category that most closely identifies your research, as poster locations will be assigned using this information:

- Bioinformatics
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- Other

If you selected 'other' please specify your research area:
Psychiatric
Neuromodulation

Title*
Modulating Acute Pain Tolerability with tDCS Targeting Left Dorsolateral Prefrontal Cortex

Authors*
Mariano TY, van’t Wout M, Garnaat SL, Rasmussen SA, Greenberg BD

PI*
Mariano TY

Abstract Body (MUST be limited to 200 words, anything beyond 200 words will be truncated for print)*
Pain remains a critical challenge to medicine. Current treatments target nociception, rather than the affective “suffering” component of pain. Dorsolateral prefrontal cortex (DLPFC) has been implicated in these cognitive aspects of pain processing. tDCS can noninvasively modulate cortical activity. We therefore hypothesized that anodal (activating) tDCS over left DLPFC should increase tolerability of acute painful stimuli as compared to cathodal (inhibitory) tDCS. Forty tDCS-naive healthy volunteers received anodal and cathodal stimulation targeting left DLPFC in two randomized and counterbalanced sessions. During stimulation, each participant performed cold pressor (CP) and breath holding (BH) tasks. We measured pain intensity with the Defense and Veterans Pain Rating Scale (DVPRS) before and after each task. Mixed ANOVA demonstrated no overall main effect of stimulation polarity for either task (all p > 0.27). However, DVPRS rise associated with CP was significantly smaller with anodal than cathodal tDCS (p = 0.024). These results do not suggest that tDCS polarity differentially modulated tolerability of CP- and BH-related pain distress in healthy volunteers. However, polarity of tDCS targeting left DLPFC significantly modulated DVPRS scores. This unexpected result may suggest tDCS-related effects on nociception or DLPFC-mediated attention, or preferential modulation of an affective valence of pain captured by DVPRS.

Lay Summary (MUST be limited to 200 words, anything beyond 200 words will be truncated for print). Please keep in mind - Discover Brigham is open to the public, this lay summary needs to be appropriate for lay audiences with NO scientific background. *

Chronic pain is a serious medical challenge with significant psychiatric symptoms. The “suffering” aspect of chronic pain is debilitating, reduces quality of life, and leads to anxiety, depression, and even suicide. Current therapies inadequately treat these symptoms, instead focusing on relieving the sensory component of pain with analgesic medications. These medications, including opioids and antiinflammatories, often provide only short-term relief and can have serious side effects including addiction and gastrointestinal damage. An emerging technique of non-invasive brain stimulation called transcranial direct current stimulation (tDCS) may help reduce this suffering aspect of chronic pain. In this method, two electrodes placed on the scalp provide a weak electrical current that can make targeted areas of the brain more or less active. The method is generally considered safe and can be given while someone is awake with minimal discomfort. This preliminary study used tDCS to target a region of the brain involved in sensory pain processing known as the dorsolateral prefrontal cortex. Although the study was carried out in healthy volunteers, the results did suggest that the stimulation may affect how these volunteers rated the pain associated with a laboratory assessment of pain tolerance. A follow-up study is ongoing in chronic pain patients.

Clinical Implications (MUST be limited to 40 words and accessible to a lay audience) - please describe the clinical implications of your research.*

If future studies show a clear reduction in chronic-pain-related disability after transcranial direct current stimulation, this method may become a new noninvasive and inexpensive treatment for chronic pain and potentially other psychiatric disorders. Necessary clinical research is ongoing.