Panel: Improving Healthcare Research Through Collaboration

May 9th, 2018
11:30 AM - 12:30 PM
ASC 118
Ronald Pirrallo, M.D.

Vice Chair for Academics
Department of Emergency Medicine
Greenville Health System
Objective
To establish a GHS-CU collaboration that generates health care inquiries, aimed to improve patient care processes by applying engineering methods, within the GHS Department of Emergency Medicine.

Background
The Creative Inquiry (CI) program matches motivated undergraduate and graduate students with CU Faculty to facilitate imaginative engaged learning and cross-disciplinary interactions to produce the next generation of scholars.

Hypothesis
Can the CU CI program be adapted to the GHS health care environment to advance GHS scholarship and workforce development?

Methods
Under the leadership of an embedded CU scholar, 6 teams of CI students were matched with GHS EM Clinical Faculty and EM Residents to investigate topics ranging from CPR training effectiveness to quantifying physician distractions to clinician decision making under fatigue to describing clinician physiologic biomarker variability during a shift to understanding the effect of consultant use on ED operations to TB screening modelling.

Outcomes
6 teams incorporating 12 EM GHS Faculty, 6 EM residents, 18 Undergraduates and 5 graduate students formed the Research Experience Enrichment Program (REEP) to answer 6 research questions in this academic year. The 6 teams generated 6 confirmed abstract conference presentations that secured a CU internal award of $6k for dissemination.

Conclusion
The REEP appears to have successfully built upon the CU CI framework to produce promising scholarly work and expose nearly 2 dozen CU students to the health care environment this year. Future work will evaluate if these teams generate peer reviewed manuscripts and track how many CU REEP participants pursue careers in health care.
Alain Litwin, M.D.

Vice Chair for Academics
Department of Internal Medicine
Greenville Health System
Department of Medicine
Research Efforts

May 9, 2018
Alain Litwin, MD, MPH
Vice Chair of Academics and Research
Department of Medicine
Medicine Research Areas

- Pulm Critical Care
- Rheum
- Allergy
- Cards
- Derm
- Endo
- GI
- GERI
- ID
- Hosp Med
- Heme/Onc
- Palliative Care
- Occup Med
- Neuro
- Nephro

MEDICINE RESEARCH AREAS

- Models of Healthcare Delivery
- Population Health and Screening
- Centers of Excellence
- Clinical Trials for Chronic Diseases and Cancer
- Prevention of Chronic Diseases and Cancer
- Smartphone Apps and Wearable Technology
# Cardiovascular Research

## Enrolling Trials

<table>
<thead>
<tr>
<th>Clinical Trials Open to Enrollment</th>
<th>GHS Enrolled</th>
<th>Total Enrolled / Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PIONEER-HF</strong></td>
<td>9</td>
<td>642 / 882</td>
</tr>
<tr>
<td>- Phase IIIB/IV study of Entresto vs. enalapril on changes in NT-proBNP in stabilized inpts with acute decompensated HF, EF &lt;40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Evolve Short DAPT</strong></td>
<td>22 (1 Screen Failure)</td>
<td>1,457 / 2,000</td>
</tr>
<tr>
<td>- Assess safety of 3 month DAPT in pts w/ high bleeding risk who had PCI with Synergy stent</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TAILOR-PCI</strong></td>
<td>50</td>
<td>4,450 / 5,270</td>
</tr>
<tr>
<td>- Randomized post-PCI to prospective or delayed genotyping to determine sensitivity to plavix</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GALACTIC-HF</strong></td>
<td>4 (1 Screen Failure)</td>
<td>1,865 / 8,000</td>
</tr>
<tr>
<td>- Phase III study of Omecamtiv Mecarbil in pts with chronic HF and reduced EF</td>
<td></td>
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<tr>
<td>- Eligibility: HF admission within the last year and EF ≤ 35%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MINT (Myocardial Ischemia and Infusion)</strong></td>
<td>0</td>
<td>208 / 3500</td>
</tr>
<tr>
<td>AMI with hemoglobin &lt;10 g/dL randomized to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Liberal Transfusion Strategy – transfuse when hemoglobin &lt;10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Restrictive Transfusion Strategy – transfuse when hemoglobin 7-8</td>
<td></td>
<td></td>
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</tbody>
</table>
Cardiovascular Research

Ongoing Trials

<table>
<thead>
<tr>
<th>Investigator Initiated Studies</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFib Rotor Mapping</td>
<td>26</td>
</tr>
<tr>
<td>Pilot study of compass mapping during ablation to identify AFib rotors</td>
<td></td>
</tr>
</tbody>
</table>

5 Trials in Follow-up

- ABSORB III & IV (Abbott)
- PROMUS Registry (Boston Sci)
- CABANA AFib trial (DCRI/Mayo Clinic)
- Bioflow-V DES (Biotronik)
- CardioMems PAS (St. Jude)
Memory Health: Caring for Self, Caring for Others

Investigating the effects of the stress of caring for loved ones with Alzheimer’s Disease on caregivers, and developing solutions to support caregivers

Initially:
• Duke Endowment grant
• July 2014 – July 2017
• $990,470

New Funding:
• Administration for Community Living grant
• September 2015 – September 2018
• $995,890
GHS Cancer Research

- **NCORP: Adults and Pediatrics**
  - 342 Clinical Trials (330 adult, 12 pediatric)
    - Treatment
    - Prevention
    - Cancer Care Delivery

- **Institute for Translational Oncology Research (ITOR)**
  - Phase I Clinical Research Unit (CRU)
  - Biorepository
  - Clinical Genomics Center
  - Innovation Zone

- **Center for Integrative Oncology and Survivorship (CIOS)**
  - Integrative Therapies
ITOR Biorepository
Services

• 2900 + unique patients
• > 20,000 aliquots – cancer center
  ➢ fresh snap frozen
  ➢ live cell cryopreservation
  ➢ formalin-fixed paraffin embedded
  ➢ blood (whole, plasma, serum)
• Genomic annotation with 50 gene hot spot panel
• Legal Framework in place
  • allows sharing of tissue and clinical annotation in research projects
• >20,000 aliquots – other DOM investigators
Hypothesis:
• Abnormal RNA expression (nc RNA’s) precedes protein (Biomarker) expression
• Change in protein expression triggers clinical expression of cancer

Goal:
• Establish predictive libraries of nc RNA that precede clinical diagnosis of cancer and precede threat of host death of cancer
Solution:

• Create Biorepository effort within CCPW to enroll tens of thousands of our population with yearly blood banking to create hundreds of thousands of samples for ultimate transcriptionomic interpretation of cancer evolution.

• Dedicated enhanced effort to Biobank high risk (BRCA, Hep B, MDS) to characterize the pre-clinical molecular events, the associated environmental triggers and potential portals of intervention for achieving pre-clinical “Molecular Arrest” and even “Molecular Reversal” of the process.

• “Molecular Arrest” and even “Molecular Reversal” of oncogenic progression could be Environmental/Lifestyle alteration of nc RNA expansion in targeted therapy for neutralization of alteration nc RNA portfolio.
Parkinson's Disease Subtypes

Stability of Parkinson's Disease (PD) subtypes based on a cluster analysis in a large cohort

Introduction
Parkinson's disease is recognized as a heterogeneous disorder, with variability in motor and non-motor symptoms and treatment response. Despite that, there is no precise definition about how to adequately classify patients in subtypes.

Objective
We sought to apply a systematic and data-driven approach to subtype PD patients in a large cohort to assess the stability of these subtypes over time.

Methods
A sample of 1,180 PD patients from the PD Cognitive Genetics Consortium (PODGOC), a longitudinal multicenter cohort, was used in this study. Cluster tendency, the best cluster algorithm, and the optimal number of clusters were determined based on statistical methods. Hierarchical agglomerative cluster with Euclidean distances was performed with motor subscapules derived from MDS-UPDRS part III, adjusted by age at onset and disease duration. A clinical prediction rule was constructed using principal component analysis, followed by multinomial logistic regression. This tool was applied to a follow-up visit after 2 years. Clinical, demographic and cognitive information were compared between subtypes in the baseline.

RESULTS
Three subtypes were observed. Patients in the "benign tremor-dominant" group (N=425; 36%) had more tremor compared to other motor symptoms, had the lowest functional and motor impairment and the best scores in a comprehensive cognitive evaluation, particularly executive function. A "malignant" subtype was seen (N=110; 9%) in which patients exhibited the worst functional, motor and cognitive impairment. Patients in the third subtype (N=646; 55%) exhibited intermediate functional and motor scores. After two years, 54% (95/174) of the benign, 67% (103/153) of the intermediate and 19% (6/32) of the malignant subtypes were stable. The overlap between our solution and the traditional subtype classification proposed by Stobbs et al. (2013) was 19.8%.

Conclusions
We demonstrated that PD subtypes derived from a cluster analysis of motor symptoms are stable in two years of follow-up. A tremor-dominant phenotype had less severe motor and cognitive impairment, especially in the executive domain. The malignant subtype was the smallest and least stable, mainly due to the loss of follow-up in this group and the progression of the patients from the intermediate subtype. Further research will be necessary to confirm these findings and to establish the biological mechanisms underlying PD subtypes. Clear subtype definition is essential to better delineate clinical trials and assist in the development of personalized treatment in PD.
Wearable Sensors Quantify Parkinson’s Disease Symptoms

Introduction

Accidental events are often cited as incorrect pronouncements in a study of 12 people with Parkinson’s disease outside the clinic. Dixie, however, can be hard-coded, suffer from poor sleep, and daily mobility. It’s crucial to monitor daily mobility and sleep quality, as these are critical for predicting Parkinson’s disease (PD) progression.

Methods

Twelve patients with Parkinson’s disease and at least two years of clinical disease were enrolled in a 12-month study. Patients were monitored using wearable sensors for daily mobility and sleep quality. The study was conducted at Greenville Health System in Greenville, South Carolina. Participants were provided with wearable sensors for daily mobility and sleep quality monitoring.

Single Day Recordings and Analysis of Two Subjects

Intra-Day

- Graph A: Graph A shows the intra-day activity of a participant with Parkinson’s disease monitored via wearable sensors. The graph compares the activity levels throughout the day, highlighting the periods of increased and decreased activity.

5-Month Response

- Graph B: Graph B illustrates the 5-month response of a participant with Parkinson’s disease. The graph shows the changes in activity levels over a five-month period, indicating the effectiveness of the treatment.

Medication Response

- Graph C: Graph C presents the medication response of a participant with Parkinson’s disease, demonstrating the changes in activity levels following medication administration.

Diary Results

Table 1: Patient Summary

<table>
<thead>
<tr>
<th>Patient ID</th>
<th>Age</th>
<th>Gender</th>
<th>Disease Duration</th>
<th>Medication Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>55</td>
<td>Male</td>
<td>3 years</td>
<td>On</td>
</tr>
<tr>
<td>P2</td>
<td>60</td>
<td>Female</td>
<td>5 years</td>
<td>Off</td>
</tr>
</tbody>
</table>

Table 2: Internal Consistency

<table>
<thead>
<tr>
<th>Measure</th>
<th>Alpha Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT</td>
<td>0.75</td>
</tr>
<tr>
<td>TUG</td>
<td>0.69</td>
</tr>
</tbody>
</table>

Table 3: Correlations between Electrocardiogram and Force Data

- Graph D: Graph D shows the correlations between electrocardiogram (ECG) data and force data obtained from wearable sensors. The graph illustrates the strength of the correlation between the two types of data.

Conclusions

The wearable system captures daily activity data throughout the day with increased temporal resolution. Differences in symptom magnitude and daily recordings may be explained in terms of patient perception, which is associated with the effects of different activities and tasks. Further, the use of wearable sensors for monitoring daily activities and mobility may aid in the evaluation of novel therapeutic interventions.
Accelerating the Revolution in Population Health (care)

Step 1: Capture clinical & population data

Data (360° View & Learning)
- Clinical processes & outcomes
- Patient-reported outcomes
- Behavior, Socioeconomic, Environment, Geospatial
- Cost (cost effectiveness)

Step 2: Obtain 360° view of data

Step 3: Analyze & models data

Analysis
- Prioritize community and healthcare delivery system objectives and outcomes
- Identify key modifiable social and medical determinants impacting priority outcomes

Step 4: Identify areas to apply discoveries

Model & Translate
Translate key determinants into effective action programs for:
- Integrated health system
- Patients
- Communities

Step 5: Implementation impact

Implementation (interface with Clinics & Healthcare Systems / Communities to):
- Conduct Pilot Interventions
- Support Broad Implementation

Step 6: Analytics, research & services impact

* ≥75% of research is rapid learning health system (RLHS)
### CCI Pharmacological Treatment Algorithm

<table>
<thead>
<tr>
<th>Regimen-1</th>
<th>Regimen- 2</th>
<th>Regimen- 3</th>
<th>Regimen – 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 pills; 3 meds</td>
<td>2 pills; 3 meds</td>
<td>3 pills; 3 meds</td>
<td>2 pills; 4 meds</td>
</tr>
<tr>
<td>Lisinopril 40 (Free)</td>
<td>Benazepril / Amlodipine 40 / 10 ($4/Mo)</td>
<td>Losartan 100 ($4/mo)</td>
<td>Benazepril / Amlodipine 40 / 10 ($4/mo)</td>
</tr>
<tr>
<td>Amlodipine 10 ($4/mo)</td>
<td>Indapamide 2.5 ($4/mo)</td>
<td>Amlodipine 10 ($4/mo)</td>
<td>HCTZ / Spironolactone (25 / 25, generic co-pay)</td>
</tr>
<tr>
<td>Indapamide 2.5 ($4/mo)</td>
<td></td>
<td>Indapamide 2.5 ($4/mo)</td>
<td></td>
</tr>
<tr>
<td>Total Cost: $8 / mo</td>
<td>Total Cost: $8 / mo</td>
<td>Total Cost: $12 / mo</td>
<td>Total Cost: Est. $8 - $20 / mo</td>
</tr>
</tbody>
</table>

**Notes:**
1. Treatment algorithm should control 80%–90% of hypertensives to <140/<90
2. *If patients have compelling indications for specific BP med classes, include them*
Impact of MAP / Target: BP on BP Control in Family Medicine: Phase 1/2 Results.

Phase 1 – Single Site

- Baseline: 61.2%
- First Visit: 78%
- Last Visit: 89.8%

Phase 2 – 16 Sites

- Baseline Visit: 64.6%
- Last MAP Visit: 75.3%

Figure 1: Interval differences of Pre-HgbA1c and Post HgbA1c for the JUMP study group versus the control group.
Patients graduating from JUMP session with our residents and dietician
Community-based HCV treatment colocated with OAT programs

PREVAIL: Intensive models of HCV care for people who inject drugs

Daily adherence to DAAs

<table>
<thead>
<tr>
<th>Study Arm</th>
<th>ETR</th>
<th>SVR12</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT</td>
<td>98.0% (50/51)</td>
<td>98.0% (50/51)</td>
</tr>
<tr>
<td>Group</td>
<td>93.8% (48/51)</td>
<td>93.8% (48/51)</td>
</tr>
<tr>
<td>Individual</td>
<td>96.1% (49/51)</td>
<td>90.2% (46/51)</td>
</tr>
<tr>
<td>Total</td>
<td>96.0% (144/150)</td>
<td>94.0% (141/150)</td>
</tr>
</tbody>
</table>

Overall adherence: DOT (82.8%), Group (77.5%), Individual (74.4%)

No SVR in 9 patients: 3 in group, 5 in individual and 1 in DOT
- 3 patients did not achieve undetectable HCV RNA
- 2 patients died during treatment
- 4 patients with HCV RNA not detected at EOT

Litwin AH, et al. EASL 2017, Amsterdam. #PS-130
Real world DAA outcomes among PWID

**Hepatitis C Real Options**

- National study - 8 states, 16 sites
- Enrolling 750 Current PWID (injected within 3 months)
  - 600 initiating HCV treatment with once daily sofosbuvir/velpatasvir x 12 weeks
- On-site HCV treatment at either:
  - community health centers or
  - methadone treatment programs
- Outcomes: Initiation, Adherence, Completion, SVR, Resistance, Reinfection (over 2 years)
- Stakeholders: National advocacy & medical organizations (HRC, NVHR, AATOD, NATAP), government (CDC), clinicians, patients, industry
Study Design

**Randomization**

**mDOT**

**Arm A:**
1) OTP, N=150; 2) CHC, N=150

**Arm B:**
1) OTP, N=150; 2) CHC, N=150

**Patient**

**Tx Initiation**

12 weeks sof/vel

**EOT**

**SVR 12**

**Consent**

Baseline

**Week 0**

Up to 12 weeks to initiate treatment

**Weekly follow up**

**Week 12**

**Week 24**

**Monthly follow up**

**Week 120**

**Quarterly follow up**
Virtual DOT (vDOT) may be as effective as in-person modified DOT (mDOT) for people who use drugs

- 17 patients treated with SOF/LDV
- 12/17 (71%) used illicit drugs within 6 months; 14/17 (82%) have injected drugs
- 16/17 (94%) achieved ETR
- vDOT adherence 91% vs mDOT 83%
Some ways to bridge the cultural divide

• Meet and Greet with Divisions of Medicine (e.g. neurology, geriatrics, and primary care).
• Develop virtual networking spaces – for initial one-on-one and group meetings and ongoing collaborations – new Clemson Building and/or Zoom
• Identify resources at CUSHR that are of interest to GHS Clinical Researchers
• Monthly Department of Medicine Research Seminar to be launched – will invite CUSHR investigators
• Web-based directory of researchers, mentors, and resources within HSC
Angela Sharkey, M.D.

Senior Associate Dean of Academic Affairs
USC School of Medicine – Greenville
Introduction to the Biomedical Researchers at USCSOM-Greenville

May 9, 2018
Areas of Expertise

- **Microbiology**: ESKAPE pathogens, mutagenesis, drug discovery, growth analysis, virulence assays, QC of instrumentation for private sector, antimicrobial properties of proteins
- **Cell biology**: cell culture, microscopy, flow cytometry
- **Biochemistry**: protein detection, protein purification, structure-function analysis, enzyme assays, proteins as biomarkers of disease, glycan-protein interactions
- **Molecular biology**: PCR, RT-PCR, molecular cloning, assess epigenetic modifications, gene mutations in disease
- **Developmental Biology**: IVF, embryo culture
- **Reproductive Physiology**: endocrinology (e.g. hormone assays), semen analysis
- **Immunology**: Flow cytometry, cell sorting, magnetic cell separation, immunoassays, lymphocyte function assays
## BMS Faculty Research Focus Areas

<table>
<thead>
<tr>
<th>USCSOMG – Biomedical Sciences Faculty</th>
<th>Focus Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sergio Arce, M.D., Ph.D.</td>
<td>Immunology and pathogenesis of multiple myeloma and sarcoidosis</td>
</tr>
<tr>
<td>Asa C. Black, Jr., M.D.</td>
<td>Pluripotent adult stem cells and multiple sclerosis</td>
</tr>
<tr>
<td>Anna V. Blenda, Ph.D.</td>
<td>Antimicrobial properties of human galactin proteins; genetics of Split Hand Foot Malformation (SFHM)</td>
</tr>
<tr>
<td>Renee J. Chosed, Ph.D.</td>
<td>Genetics/epigenetics posttranslational modifications and disease progression; molecular mechanisms of human embryo development</td>
</tr>
<tr>
<td>Steven E. Fiester, Ph.D.</td>
<td>Microbiology/infectious disease; virulence of multidrug-resistant bacterial pathogens</td>
</tr>
<tr>
<td>Lauren A. Gonzales, Ph.D.</td>
<td>Vertebrate paleontology; evolution of primate brain</td>
</tr>
<tr>
<td>Richard L. Goodwin, Ph.D.</td>
<td>Mechanisms of cardiovascular development and malformation; cell-based therapies</td>
</tr>
<tr>
<td>Richard L. Hodinka, Ph.D., F (AAM)</td>
<td>Clinical microbiology, infectious diseases; molecular diagnostics, identification and monitoring of microbial pathogens</td>
</tr>
<tr>
<td>Ann Blair Kennedy, LMT, BCTMB, DrPH</td>
<td>Patient and stakeholder engagement; behavioral change interventions and integrative medicine</td>
</tr>
<tr>
<td>Mohammed K. Khalil, DVM, M.S.Ed., Ph.D.</td>
<td>Medical education and innovative learning strategies; learning and instructional technology</td>
</tr>
<tr>
<td>Thomas I. Nathaniel, Ph.D.</td>
<td>Neurology; stroke/telestroke program; medical education</td>
</tr>
<tr>
<td>William E. Roudebusch, Ph.D.</td>
<td>Embryology; preimplantation embryo morphometrics</td>
</tr>
<tr>
<td>Rebecca Russ-Sellers, Ph.D.</td>
<td>Health services research; medical education</td>
</tr>
<tr>
<td>Jennifer Trilk, Ph.D.</td>
<td>Exercise science; Exercise is Medicine Greenville; improving patient health through exercise</td>
</tr>
<tr>
<td>Matthew Tucker, Ph.D.</td>
<td>Sleep and memory processing; medical education</td>
</tr>
<tr>
<td>Shanna Williams, Ph.D.</td>
<td>Craniofacial study; medical education</td>
</tr>
<tr>
<td>William Wright, Ph.D.</td>
<td>Diabetic retinopathy; medical education assessment practices; curriculum design</td>
</tr>
</tbody>
</table>
Sergio Arce, MD PhD
Clinical Associate Professor, Immunology
arce@greenvillemmed.sc.edu
Sergio Arce, MD PhD - Immunology

SARCOIDOSIS

Unknown antigen
APC
CD4+ T cell
CD4+ T cell
CD8+ T cell
Giant cell
Epithelioid cell

SARCOIDOSIS

MULTIPLE MYELOMA

Targeting soluble survival factors
Targeting migration
Targeting HNC
Targeting adhesion

3D-COLLAGEN MATRICES
Anna Blenda, PhD
Clinical Associate Professor, Genetics and Biochemistry
ablenda@greenvillemed.sc.edu
Anna Blenda, PhD Genetics
Current/Active Research Projects

1. **Antimicrobial properties** of human galectin proteins, specifically **galectin-9**:
   - collaboration with Dr. Stowell, MD PhD, Emory U SOM,
   - USC SOMG students: Anita Venkatesh (M2) and Mary K Montes de Oca (M3)

2. **Use of galectin-9** protein as a **biomarker** in non-invasive diagnosis of endometriosis:
   - collaboration with Dr. Lessey, MD PhD, GHS,
   - Aspire-I grant proposal submitted, patient samples available, pilot study initiated

3. Faculty sponsor supervising current M3 student Ronnie Funk at Emory SOM in the **split hand-foot malformation** genetic study:
   - collaboration with Dr. Schwartz, PhD, Greenwood Genetic Center
Anna Blenda, PhD Genetics

Research Projects in Discussion Phase

1. Role of **galectin-9** in regulation of **multiple myeloma biology**:  
   - collaboration with Dr. Arce, MD PhD, USC SOMG

2. Role of **galectin-9** in **granuloma formation** in sarcoidosis:  
   - collaboration with Dr. Arce and Dr. Kornev, PhD, Clemson U

3. **Stroke research** (role of galectins, metabolomics profiling, microbiome study):  
   - collaboration with Dr. Thomas Nathaniel, PhD, USC SOMG
Renee J. Chosed, PhD
Clinical Assistant Professor, Biochemistry and Molecular Biology
chosed@greenvillemmed.sc.edu
Renee J. Chosed, PhD Biochemistry

Current Project 1: Model the human Mixed-lineage leukemia (MLL) multi-protein complex in yeast (*Saccharomyces cerevisiae*)
- **Molecular biology** techniques to alter the yeast genome
- Analyze **histone modification** status in the genetically altered yeast strains
- Assess **protein-protein interactions** within the MLL protein complex

Current Project 2: Investigate the molecular mechanisms responsible for “self-correction” of aneuploid human embryos prior to implantation
- Measure gene expression (**RT-PCR**) in pre-implantation embryo blastocoel fluid
- **Enzyme assays** to detect apoptosis in blastocoel fluid
Steven E. Fiester, PhD
Clinical Assistant Professor, Microbiology
fiester@greenvillemmed.sc.edu
Steven E. Fiester, Ph.D. Microbiology

• **Research interests:**
  – Elucidation of virulence mechanisms in ESKAPE (*Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa* and *Enterobacter* species) pathogens allowing for the development of therapeutics
  – Collaborative investigation of atypical ESKAPE infections and ESKAPE pathogens with multidrug- and pandrug-resistances

• **Key research accomplishments:**
  – Recharacterized *A. baumannii* as hemolytic
  – Demonstrated ability of *A. baumannii* to utilize heme-*b* as an iron source
  – Demonstrated efficacy of gallium protoporphyrin IX as an effective therapeutic against multidrug-resistant *A. baumannii*

  ![RBCs alone vs. RBCs with A. baumannii](adapted-from-fiester-et-al-2016-plos-one)
• **Current Research:**
  – Targeting phospholipase C of *A. baumannii* for therapeutic purposes
  – Investigating localization of Ga-PPIX in *A. baumannii* at Argonne National Labs
  – Characterizing *A. baumannii* isolates causing necrotizing fasciitis

• **Private collaborations:**
  – Development of a Trojan horse antibiotic to treat multidrug-resistant *K. pneumoniae*

Contact info:
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William E. Roudebusch, PhD
Clinical Associate Professor,
Developmental Biology,
Reproductive Physiology
roudebus@greenvillemed.sc.edu
William E. Roudebush, PhD

• Developmental biology
  – Fertilization
    • Enhancing sperm-egg interactions
      – Role of growth factors (Platelet-activating factor; PAF)
  – Preimplantation embryo development
    • Role of growth factors (PAF)
    • Molecular mechanisms
      – Self-correction of aneuploidy

• Reproductive physiology
  – Endocrinology
    • Assay development & utilization
      – AMH; Inhibin B; PAPP-A
  – Therapeutics
    • Enhancing IUI outcomes
      – PAF
To Find Out More About our BMS Faculty and Their Research Interests

• [http://sc.edu/study/colleges_schools/medicine_greenville/faculty/faculty/index.php](http://sc.edu/study/colleges_schools/medicine_greenville/faculty/faculty/index.php)
  
  – Filter by Department
    • Biomedical Sciences
Guest Panelists

- Ronald Pirrallo, M.D., Vice Chair for Academics, Department of Emergency Medicine, Greenville Health System

- Alain Litwin, M.D., Vice Chair for Academics, Department of Internal Medicine, Greenville Health System

- Angela Sharkey, M.D., Senior Associate Dean of Academic Affairs, USC School of Medicine - Greenville