

## Progress Report Quarters 1 – 4, Montana Research Initiative: One Medicine

### 1. Hires Quarter 1:

Research Technicians: 4.0 FTE  
Postdoctoral Scholars: 2.5 FTE  
Research Scientists: 1.0 FTE  
Undergraduate Students: 3  
Graduate Students: 2

### Hires Quarter 2:

Graduate Students: 2 (partial support from MT funding)  
Postdoctoral scholar from quarter 1 left due to personal reasons, replaced with a newly hired research technician: 1.0 FTE (partial support from MT funding)  
Postdoctoral scholar: 1.0 FTE (partial support from MT funding)  
Summer Research Assistant  
Undergraduate hired to replace one from Quarter 1 (student is moving)  
Research Associate: 1.0 FTE (partial support from MT funding)  
Research Assistant III – Hourly

### Hires Quarter 3:

Research Technicians: 2 employees at 0.5 FTE  
Research Assistant II: Hourly  
Graduate Students: 1  
Undergraduate Students: 1

### Hires Quarter 4:

Research Assistant II: Hourly  
Graduate Students: 1  
Undergraduate Students: 1

### Hires Quarter 5:

Nothing to report

### Hires Quarter 6:

### 2. Equipment Purchased:

None

### 3. Progress Towards Milestones:

#### Grants Awarded:

- NIH R21AI119772. Title: Development of a novel, safe and efficacious Coxiella burnetii vaccine. Total costs: \$396,000. PI: Agnieszka Rynda-Apple, Co-PI: Mark Jutila
- NIH R21 AI117441. Title: Role of type I IFN and human TLR4 in Coxiella burnetii pathogenesis. Total costs: \$396,000. PI: Mark Jutila.
- \$50,000 was awarded in September by the NIAID/NIH Center of Biomedical Research Excellence for Zoonotic Infection. This pilot project funding provides supplemental support for Dr. Jodi Hedges collaboration with Mark Jutila's Project of the

## One Medicine Grant.

- \$30,000 was awarded in September by the NIAID/NIH Center of Biomedical Research Excellence for Zoonotic Infection. This pilot project funding provides supplemental support for Agnieszka Rynda-Apple's collaboration with Mark Jutila's Project of the One Medicine Grant.
- Plowright PI: Wildlife disease risk analyses. US Geological Survey (USGS) \$59,991 Total Award Period Cover
- \$30,000 was awarded in September by the NIAID/NIH Center of Biomedical Research Excellence for Zoonotic Infection. Supplemental support for Benfang Lei's Project of the One Medicine Grant.
- \$50,000 was awarded in September by the NIAID/NIH Center of Biomedical Research Excellence for Zoonotic Infection. This pilot project funding provides supplemental support for Raina Plowright's Project of the One Medicine Grant.
- \$50,000 was awarded in September by the NIAID/NIH Center of Biomedical Research Excellence for Zoonotic Infection. This pilot project funding provides supplemental support for Matt Taylor's Project of the One Medicine Grant.
- \$50,000 was awarded in September by the NIAID/NIH Center of Biomedical Research Excellence for Zoonotic Infection. This pilot project funding provides supplemental support for Diane Bimczok's Project of the One Medicine Grant.

## Quarter 2 Grants Awarded:

- **NIH-NIAID- 1R21AI123293-01**; "*Caenorhabditis elegans* infection model for *Coxiella burnetii*" (Minnick, PI), 2/15/16-1/31/18. **\$398,750**

## Quarter 3 Grants Awarded:

- **NIH- 7R01DK099452-03** "Inflammation-dependent methylation in the mucosa" (Kominsky, PI) **\$250,000** 07/1/2016 – 6/30/2017

## Quarter 4 Grants Awarded:

- Quinn PI: \$150,000 Investigator Initiated Research Grant Pfizer, Development of Novel JNK Inhibitors for Treatment of Rheumatoid Arthritis
- Plowright PI: \$499,999 Defense Advanced Research Projects Agency Young Faculty Award. "Modeling Pathways to Zoonotic Spillover" [In contracting phase]
- Taylor PI: \$40,000 NIAID/NIH Center of Biomedical Research Excellence for Zoonotic Infection. Inflammatory responses during alphaherpes infection
- Voyich PI: \$40,000 NIAID/NIH Center of Biomedical Research Excellence for Zoonotic Infection. The SaeR/S Regulatory System of *Staphylococcus aureus* Prevents Complement-mediated Interactions with Human B cells

- Walk PI: \$45,000 NIAID/NIH Center of Biomedical Research Excellence for Zoonotic Infection. Novel, narrow-spectrum inhibitors of *Clostridium difficile*
- Weidenheft PI: \$45,000 NIAID/NIH Center of Biomedical Research Excellence for Zoonotic Infection. CRISPR generated human genome knockout libraries for studying infectious diseases

### **Quarter 5 Grants Awarded:**

- Miles PI: USDA, Determining the Gut Microbiota-dependent Impacts of Anthocyanin-rich Aronia Berries on Obese Individuals of Distinct Inflammatory Phenotypes (\$150,000)
- Minnick PI : \$406,517.00 NIH-NIAID- 1R21AI128575-01; “Small regulatory RNAs of *Bartonella bacilliformis*, the agent of Carrion’s disease”, 9/01/16 - 8/31/2018. (pending; priority score = 25)

### **Quarter 6 Grants Awarded**

- Voyich PI: NIH R21 1R21A128295-01. The SaeR/S Regulatory System of *Staphylococcus aureus* Prevents Complement-mediated Interactions with Human B cells \$396,000. Pending priority score 23
- Gerlach, Robin. Linking engineering and urology towards a better understanding and improved treatment of urinary stones. (Role: Mentor). Burroughs Wellcome Fund Collaborative Research Travel Grant Program. Total: \$10,667. 06/17-12/17.

### **Total Funding Received:**

**\$3,554,924**

### **Grants Submitted Quarter 1 – Quarter 6 (Quarter 6 highlighted in yellow, grants listed are still pending)**

- Voyich PI: NIH R01 Role of the *Staphylococcus aureus* SaeR/S Regulatory System in Neutrophil Evasion \$1,821,360.
- Voyich Co-PI: NIH E01 Regulation of *Streptococcus pyogenes* virulence by ADP-ribosyltransferase SpyA \$180,000.
- Weidenheft PI:
  - National Institutes of Health – NRSA postdoctoral fellowship (2)
  - Cancer Research Institute – postdoctoral fellowship
  - National Science Foundation- postdoctoral fellowship
- Plowright: NSF (coupled Human Natural Systems; \$1,750,000)
- Plowright: Transmission or within-host dynamics driving pulses of zoonotic viruses in reservoir-host populations Searle Scholars Program (\$300,000)

- Quinn PI: NIH R21, Novel JNK Inhibitors for Treatment of Rheumatoid Arthritis, \$396,000
- June PI: NIH R21, NEOPS: Nanostructure-Enhanced Optical Pressure Sensors for Mouse Knees, \$395,903
- June PI: NIH R21, Advanced NMR Evaluation of Fluid Motion in Human Articular Cartilage for Improved Diagnosis of Osteoarthritis, \$395,927
- Voyich PI NIH/NIAID R011R01AI135039-01 \$1,821,360. Sensing and Adapting to the Neutrophil: Determining SaeR/S Dependent Evasion Strategies Used by *Staphylococcus aureus*
- Voyich PI NIH/NIAID/ R2 1R21AI135277-01 Influence of Antecedent Influenza A Infection on *Staphylococcus aureus* Virulence Gene Expression during Pneumonia \$396,000
- Lei PI NIH/NIAID 2R01AI095704-06 Innate Immune Evasion by Group A *Streptococcus* \$1,821,360
- Bimczok. A sub-project application for a COBRE grant entitled “Center for the Study of the Mucosal Interface in Human Health and Disease”, \$150,000
- Bimczok. R01 grant application entitled “Mechanisms of Dendritic Cell – Epithelial Cell Interactions in Human Gastric Mucosa”, \$1, 821,360
- Copié (PI) R21 Title: Modulation of *S.aureus*-neutrophil interactions and evasion of neutrophil killing through metabolic reprogramming \$396,000.

### Working with Industry:

- Importantly, the three main PIs of the One Medicine proposal (Voyich, Jutila, and Quinn) are working with Totem Biosciences to generate data and projects appropriate for SBIR and STTR grants. We anticipating submitting these types of grant proposals within the next two quarters of funding.
- PI Quinn established a collaboration with a small Montana pharmaceutical company, SAJE Pharma, LLC from Kalispell, MT.

### Quarter 2 Update:

- PIs Voyich, Jutila, Quinn, and Minnick, are working with Totem Biosciences

### Quarter 3 Update:

- PI Quinn began experiments in collaboration with SAJE Pharmaceuticals
- Experiments being outlined with Totem Biosciences

### Quarter 4 Update:

- An SBIR is in preparation with Totem for investigating scours
- PI Quinn established a collaboration with a small Montana pharmaceutical company, SAJE Pharma, LLC from Kalispell, MT. SAJE has been developing novel inhibitors of S-nitrosoglutathione reductase (GSNOR) as anti-inflammatory treatments. Tested a

combination of JNK and GSNOR inhibitors in a model of rheumatoid arthritis and found that both compounds were individually effective, but that the combined treatment with both compounds was even better at inhibiting the development of rheumatoid arthritis. Further studies are being planned.

- Experiments are designed with Totem for augmenting innate immunity against *S. aureus*

#### **Quarter 5 Update:**

- An SBIR was submitted with Totem for investigating scours
- A second SBIR is in progress with Totem investigating immunomodulation to combat *Staphylococcus aureus*
- Experiments are underway with Totem

#### **Quarter 6 Update:**

Experiments ongoing with Totem.  
SBIRs in progress with Totem

#### **Expanding Research Capabilities**

- Provided funding for establishing a new research program on the role of the intestinal epithelium in infectious disease in Fall, 2015.

**Update for quarter 2:** New PI is in the process of hiring.

**Update for quarter 3:** New PI hired 1.0 FTE and 1 Graduate Student

**Update for quarter 4:** Nothing additional for this quarter.

**Update for quarter 5:** Nothing additional for this quarter.

**Update for quarter 6:** Nothing additional for this quarter.

#### **Disseminating Knowledge Gained from the State Funded Initiative:**

##### **Update Quarter 1:**

- Several papers are in progress that will credit the Montana State Research Initiative for funding.

##### **Update Quarter 2:**

- **Four papers in revision crediting State Funding**

##### **Update Quarter 3:**

- **Four papers published or in press citing State Funding Initiative**
- **Two papers published with work directly related to state proposal**

#### **Update Quarter 4**

**Seven additional papers published or in press citing State Funding Initiative**

**Total papers with citation: 11**

#### **Update Quarter 5**

- One Medicine was highlighted at the Agricultural Symposium Nov 10  
Breakout groups with Montana Stockgrowers to hear priorities for research

#### **Update Quarter 6**

- Total papers with citation 15
- 3 Seminars Highlighting One Medicine

**4. Total expenditures in first – sixth quarters of funding: \$1,191,350.83**