Summary of Scholarly Activities
Department of Biomedical Sciences
July 1, 2015 – June 30, 2016

I. PUBLICATIONS
Note: *graduate student; **undergraduate student; ***medical student

I-A. Journal Publications


(2015) ATR Plays a direct antiapoptotic role at mitochondria which is regulated by prolyl isomerase Pin1. *Mol Cell* Oct 1;60(1):35-46. PMID: 26387736


Leonard C, Schoborg RV, Borel N (2015) Damage/danger associated molecular patterns (DAMPs) inhibit chlamydia pecorum and C. trachomatis serovar E inclusion development in


I-B. Books or Chapters:

**Books:**

Kostrzewa RM and T Archer (co-Editors) *Neurotoxin Modeling of Brain Disorders – Life-long Outcomes in Behavioral Teratology*, for *Current Topics in Behavioral Neuroscience* (CTBN) book series (Geyer M, C Marsden, B Ellenbroek, Editors) (Springer New York) (2016). Each chapter is peer-reviewed and is treated as an individual refereed contribution. Each chapter is listed in Medline and PubMed as an article in the journal section.

**Book Chapters:**


II. PAPERS, ABSTRACTS, AND/OR PRESENTATIONS

II-A. Regional

Alkhateeb T*, Ozment, T, Youngberg G, Williams D, Hoover DB. Effects of sepsis on renal structure and sympathetic innervation in mice. ETSU Appalachian Student Research Forum, April 2016. Tuga Alkhateeb won First Place: Master’s Candidate/Biomedical & Health Sciences Division.


Fleenor JW***, King KA, Harrison TA, Defoe DM. Development of multipolar cell shape in mouse corneal endothelium. ETSU Appalachian Student Research Forum, April 2016.


Gilmer D**, Cuihong J. Focal adhesion kinase inhibition promotes adult olfactory stem cell proliferation via ciliary neurotrophic factor. ETSU Boland Undergraduate Research Symposium, March 2016.

Gilmer D**, Cuihong J. Focal adhesion kinase inhibition promotes adult olfactory stem cell proliferation via ciliary neurotrophic factor. Undergraduate Research Symposium at University of Tennessee, Knoxville TN.


Ingram V**, Ordway G. 3D printed food and dysphagia: Food of the future has a purpose. ETSU Boland Undergraduate Research Symposium, March 2016.

Jones R**, Zou Y. Pin1 in the DNA damage response in relation to RPA modification. ETSU Appalachian Student Research Forum, April 2016.


Kirby J***, Kruppa M. Polymicrobial interactions: Rediscovery and characterization of an inhibitor of neisseria gonorrhoeae. ETSU Appalachian Student Research Forum ETSU, April 2016. **John Kirby won First Place: Medical Residents category.**


Monroe LL***, Armstrong MG*, Williams DL, Hoover DB. Zymosan-induced SIRS results in severe hypothermia and mild depression of cardiac dromotropic function in mice. ETSU Appalachian Student Research Forum, April 2016. Lizzie Monroe won First Place, Group B: Medical Student category.


Ngwa DN*, Gang TB, Singh SK, Agrawal A. Engineered C-reactive protein with improved protective action against pneumococcal infection. ETSU Appalachian Student Research Forum, April 2016.


Whitted C*, Cartwright M*, Walls S, Zou Y, Torrenegra R, Palau V. Two isomeric flavonoids have a synergistic effect in colon cancer when used in combination with 5-fluorouracil cells due to increased DNA damage. ETSU Appalachian Student Research Forum, April 2016.
II-B. National


Campbell RP, **Duffourc M**, Schoborg RV, Beaumont E. Vagal nerve stimulation mitigates aberrant gut flora observed in guinea pigs with pressure overload. American Heart Association Scientific Sessions, November 2015, Orlando, FL.

Cline-Parhamovich K, **Ferslew KE**. The grape soda death: Acute fluid intoxication complicated by potential furosemide ingestion (part of Pediatric Postmortem Toxicology). Presented at the 68th Annual Meeting of the American Academy of Forensic Sciences, Feb 26, 2016, Las Vegas, NV.


Downs AM, Ozment TR, Bond CE, Elgazzar M, Williams DL, **Hoover DB**. Leukocytes may alter their mode of acetylcholine release during sepsis. Poster presentation at the 38th Annual Conference on Shock, Shock 43 (Suppl. 1):56, June 6-9, 2015, Denver, CO.

Fulmer M*, Englehaupt E, Garst C, **Brown S**, **Theeweke D**. Type-2 cannabinoid receptor deficiency is associated with atherosclerotic lesion calcification in Ldlr-null Mice. (Oral presentation - M. Fulmer received a travel award from AHA-ATVB to present the abstract) Arteriosclerosis, Thrombosis and Vascular Biology / Peripheral Vascular Disease Scientific Sessions, Omni Hotel, May 5-7, 2016, Nashville, TN.


Hilton B*, Gopal S, Xu L, Mazumder S, **Musich PR**, Cho BP, **Zou Y**. ATR plays a direct antiapoptotic role at mitochondria which is regulated by prolyl isomerase Pin1. Cell Symposia on Multifaceted Mitochondria, July 19-21, 2015, Chicago, IL.

University, May 28-29, 2016, Columbus, OH.

Joplin KH, **Duffourc M.** Initial analysis of the transcriptome of pupal diapause in the flesh fly (*Sarcophaga crassipalpis*) Entomological Society of America Annual Meeting, November 15-18, 2015, Minneapolis, MN.

Kirby SL*, Cummins ED, Peterson DJ*, Denton AR, Dose JM, **Brown RW.** A test of the aversive versus the rewarding effects of nicotine in rats neonatally treated with quinpirole. Society for Neuroscience, October 2015, Chicago, IL.


Levine E, **Defoe DM.** Vazquez-Chona F. Tumor suppressor p27KIP1 modulates cell-cycle entry and limited neurogenic potential in radial Müller glia. IOVS 2016;57:ARVO E-Abstract 4186, ARVO Annual Meeting, May 1-5, 2016, Seattle, WA.

Li D, Williams D, Lowman D, **Kruppa M.** Calderone R. Cell wall synthesis, mitochondrial complex 1 subunits and signal transduction. 13th ASM conference on *Candida* and candidiasis. Apr 2016, Seattle, WA.

Monroe LL***, Armstrong MG, Zhang X, **Hall JV.** Ozment TR, Li C, Williams DL, **Hoover DB.** Zymosan-induced peritonitis results in hypothermia, impaired cardiac function and bacterial translocation. Poster presentation at the 39th Annual Conference on Shock, June 11-14, 2016, Austin, TX.

Monroe LL***, Armstrong MG*, Williams DL, **Hoover DB.** Zymosan-induced SIRS results in severe hypothermia and mild depression of cardiac dromotropic function in mice. Lizzie Monroe presented poster at the 2016 Meeting of the American Medical Student Association, Washington, DC.

Ngwa DN*, Gang TB, Singh SK, **Agrawal A.** Engineered C-reactive protein with improved protective action against pneumococcal infection. Immunology 2016 Meeting, . *J. Immunol.* 196: 63.4 (Selected for Oral Presentation and Travel Award), Seattle, WA.

Ordway GA, **Szebeni K.** DiPeri TP, Johnson LA, Stockmeier CA, Crawford JD*, Chandley MJ, **Szebeni A.** Elevated DNA oxidation and DNA repair enzyme gene expression in brain white matter in major depressive disorder. *Biological Psychiatry* 79(9S): 233S, May 11-14, Atlanta, GA.

Pathak A*, Singh SK, Thirumalai A, Armstrong PB, **Agrawal A.** Evolution of a host-defense function of C-reactive protein from horseshoe crab to humans. Immunology 2016 Meeting, *J. Immunol* 96: 132.5 (Poster Presentation), April 13-17, 2016, Seattle, WA.

Peterson DJ*, Bardo CM, Cummins ED, **Brown RW.** The role of the α7 and α4β2 nicotinic
receptors in nicotine sensitization and neural plasticity of adolescent rats neonatally treated with quinpirole. Society for Neuroscience, Chicago, IL (October, 2015).

Phillips Campbell R, Duffourc M, Schoborg RV, Beaumont E. Vagal nerve stimulation mitigates aberrant gut flora observed in guinea pigs with pressure overload. American Heart Association Scientific Sessions, Poster presentation. *Note: only 2700/8000 (34%) of submitted abstracts were accepted. Nov. 7-11, 2015, Orlando, FL.


II-C. International

Acosta L, Rodriguez-Gil DJ, Rela L, Greer CA. Olfactory pathway plasticity, early response of the olfactory ensheathing cells and microglial cells to a massive damage of the olfactory epithelium, 23rd Meeting of the French glial cell club, June 1st - 3rd, 2016, Carry-le-Rouet, France.

Busch FA, Agrawal A, Wysocki V. Native mass spectrometry as a structural biology tool. (Poster presentation) Mosbacher Kolloquium: Protein structure, from first principles to biomedical applications, March 31-April 2, 2016, Mosbach, Germany.

Fulmer M*, Englehaupt E, Garst C, Brown S, Thewke D. Modulation of late stage atherosclerosis by the Type-2 cannabinoid receptor. Cannabinoid Research and IACM 8th Meeting of Cannabinoids in Medicine, Sept. 12, 2015, Sestri Levante, Italy.


III. INVITED PRESENTATIONS

III-A Regional

Dr. Patrick Bradshaw. Title: “Natural therapies for improving mitochondrial function in neurodegenerative diseases.” ETSU Department of Biomedical Sciences Seminar Series, January 15, 2016.

Dr. Michelle Duffourc. Title: “Introduction to RNA-seq;Key considerations for project design.” ETSU Department of Biomedical Sciences Seminar Series, December 11, 2015.

Dr. Regina Phillips Campbell. Title: “Effect of vagal nerve stimulation on gut flora in guinea pigs with heart failure.” ETSU Department of Biomedical Sciences Seminar Series, October 23, 2015.

Dr. Theo Hagg. Title: “Microvascular damage regulates outcomes after nervous system injury.” ETSU Department of Biomedical Sciences Seminar Series, September 4, 2015.
Dr. Jennifer Hall. Title: “Hormones and chlamydia trachomatis: friend or foe?” ETSU Department of Biological Sciences Seminar Series, March 2016.

Dr. Jennifer Hall. Title: Presented a talk to high school students interested in careers in the fields of science and medicine and about college programs necessary to achieve their goals, Grundy High School (Grundy, VA) Career Chat Presenter.

Dr. Cuihong Jia. Title: “Integrin signaling regulates CNTF, LIF and neurogenesis in vivo.” TSU Department of Biomedical Sciences Seminar Series, December 4, 2015.

Dr. Diego Rodriguez-Gil. Title: “A cilia-associated protein alters axon extension in Meckel Gruber Syndrome.” ETSU Department of Biomedical Sciences Seminar Series, April 8, 2016.

Dr. Antonio Rusinol. Title: “Prelamin A in cell cycle control.” ETSU Department of Biomedical Sciences Seminar Series, September 25, 2015.

Dr. Rob Schoborg. Title: “Ascertaining the role of acetylcholine producing cells in chlamydial genital tract infection.” ETSU Department of Biomedical Sciences Seminar Series, September 11, 2015.

Dr. Valentin Yakubenko. Title: “New potential mechanism for neutrophil-mediated macrophage recruitment during inflammation.” ETSU Department of Biomedical Sciences Seminar Series, November 13, 2015.

III-B. National


Dr. Don Hoover. Title: "Exploration of cholinergic mechanisms: From brain to heart to spleen." Robert E. Stitzel Lecture, Department of Physiology and Pharmacology, West Virginia University School of Medicine, Morgantown, WV, October 14, 2015.

Dr. Don Hoover. Title: “Exploration of cholinergic mechanisms: From brain to heart to spleen.” University of New England, Department of Pharmaceutical Sciences, College of Pharmacy, November 9, 2015.

Dr. Gregory Ordway. Title: “White matter oligodendrocyte pathology in depression and suicide.” Mini-Symposium Speaker, Suicide Research Summit, IASR/AFSP, NYC, October 11, 2015.
Dr. Gregory Ordway. Title: “Suicide, Depression, and Brain Biology.” Guest presentation, Virginia Polytechnic Institute Out of Darkness Event, sponsored by the American Foundation for Suicide Prevention, March 17, 2016.

Dr. Rob Schoborg. Title: “Using co-infections to explore the biology of sexually transmitted pathogens.” Guest speaker, Department of Biomedical Sciences, University of South Alabama, Mobile, AL, December 7, 2015.

Dr. Krishna Singh. Title: “Molecular Signals Involved in Myocyte Apoptosis and Myocardial Remodeling.” Department of Physiology and Biophysics, University of Louisville, KY, December 8, 2015.

III-C. International


Dr. Richard Kostrzewa. Title: “L-DOPA effects on striatal microdialysate levels of hydroxyl radical in parkinsonian rats.” Invited oral presentation, 2nd Central European Biomedical Congress (CEBC). Chairman, symposium on Processes and Mechanisms Associated with Parkinson’s Disease, Krakow, Poland, 15-18 June 2016.

Dr. Ming-Yang Zhu. Title: “Effects of chronic social defeat and glucocorticoids on norepinephrine transporter expression and underlying molecular mechanisms Invited Seminar Speaker, GuangJi Mental Hospital, Soochow University, May 11, 2016.

Dr. Yue Zou. Title: “A novel role of ataxia telangiectasia RAD3-related (ATR) in cell death”. Invited Seminar Speaker, “Department of Biochemistry and Molecular Biology, Sichuan University, Chengdu, China. July 16-17, 2015.

V. VISITING PROFESSORS:

Name: John C. Quindry, Ph.D., FACSM
Title: Associate Professor, School of Kinesiology
Institution: Auburn University, Auburn AL
Date: September 14, 2015
Event: External Seminar Series
Topic: “Exercise and cardioprotection against ischemia/reperfusion injury”
<table>
<thead>
<tr>
<th>Name:</th>
<th>Bruce D. Carter, Ph.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title:</td>
<td>Professor, Department of Biochemistry</td>
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<tr>
<td></td>
<td>Associate Director, Vanderbilt Brain Institute</td>
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<tr>
<td></td>
<td>Director of Graduate Studies for Neuroscience</td>
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<tr>
<td>Institution:</td>
<td>Vanderbilt University School of Medicine, Nashville, TN</td>
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<tr>
<td>Date:</td>
<td>October 12, 2015</td>
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<tr>
<td>Event:</td>
<td>External Seminar Series</td>
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<tr>
<td>Topic:</td>
<td>“Killing and eating neurons: Mechanisms of retrograde apoptotic signaling and phagocytic clearance of the cell corpses”</td>
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<table>
<thead>
<tr>
<th>Name:</th>
<th>Arturo, Casadevall, M.D., Ph.D.</th>
</tr>
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<tbody>
<tr>
<td>Title:</td>
<td>Chair, W. Harry Feinstone Department of Molecular Microbiology &amp; Immunology</td>
</tr>
<tr>
<td>Institution:</td>
<td>John Hopkins Bloomberg School of Public Health, Baltimore MD</td>
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<tr>
<td>Date:</td>
<td>April 18, 2016</td>
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<td>Event:</td>
<td>External Seminar Series</td>
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<tr>
<td>Topic:</td>
<td>“Thoughts on the origin of microbial virulence”</td>
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<thead>
<tr>
<th>Name:</th>
<th>Peisong Ma, Ph.D.</th>
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<tbody>
<tr>
<td>Title:</td>
<td>Research Assistant Professor, Department of Medicine and Pharmacology</td>
</tr>
<tr>
<td>Institution:</td>
<td>University of Pennsylvania, Philadelphia, PA</td>
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<tr>
<td>Date:</td>
<td>April 25, 2016</td>
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<td>Event:</td>
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<td>Topic:</td>
<td>“Fine tuning the hemostatic response through regulated control of G Protein signaling in platelets”</td>
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<thead>
<tr>
<th>Name:</th>
<th>Lance A. Johnson, Ph.D.</th>
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<tr>
<td>Title:</td>
<td>Postdoctoral Fellow, Department of Behavioral Neuroscience</td>
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<tr>
<td>Institution:</td>
<td>Oregon Health &amp; Science University, Portland, OR</td>
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<tr>
<td>Date:</td>
<td>May 5, 2016</td>
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<td>Event:</td>
<td>External Seminar Series</td>
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<tr>
<td>Topic:</td>
<td>“Cognitive impairment, diabetes and apoe: Mechanisms of cerebrovascular dysfunction and recovery”</td>
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<tr>
<th>Name:</th>
<th>Aaron Polichnowski, Ph.D.</th>
</tr>
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<tbody>
<tr>
<td>Title:</td>
<td>Research Scientist</td>
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<tr>
<td>Institution:</td>
<td>Edward Hines, Jr., VA Hospital, Hines IL</td>
</tr>
<tr>
<td>Date:</td>
<td>May 13, 2026</td>
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<td>Event:</td>
<td>External Seminar Series</td>
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<tr>
<td>Topic:</td>
<td>“The acute kidney injury-chronic kidney disease nexus”</td>
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<tr>
<th>Name:</th>
<th>Wei Qiu, Ph.D.</th>
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<tbody>
<tr>
<td>Title:</td>
<td>Assistant Professor, Department of Surgery/Oncology Institute</td>
</tr>
<tr>
<td>Institution:</td>
<td>Loyola University Chicago, Maywood, IL</td>
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<tr>
<td>Date:</td>
<td>May 16, 2016</td>
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<td>Event:</td>
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<td>Topic:</td>
<td>The role of FAK in hepatocarcinogenesis”</td>
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<thead>
<tr>
<th>Name:</th>
<th>Carlos Bolanos-Guzman, Ph.D.</th>
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<tbody>
<tr>
<td>Title:</td>
<td>Professor, Department of Psychology</td>
</tr>
<tr>
<td>Institution:</td>
<td>Florida State University, Tallahassee, FL</td>
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VI. EXTRAMURAL FUNDING

GRANT FUNDING

Extramural Funding Awards:

<table>
<thead>
<tr>
<th>Grant Description</th>
<th>PI</th>
<th>Agency</th>
<th>Funding Period</th>
<th>Total Direct</th>
<th>Total Indirect</th>
<th>Total Award</th>
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<tbody>
<tr>
<td>“C-reactive protein in rheumatoid arthritis”</td>
<td>Alok Agrawal, PI</td>
<td>NIH</td>
<td>7/13/15 to 5/31/20</td>
<td>$1,970,855</td>
<td>$710,631</td>
<td>$2,681,486</td>
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<td>$425,323</td>
<td>$152,703</td>
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<td>“Complement-mediated anti-pneumococcal functions of C-reactive protein”</td>
<td>Alok Agrawal, PI</td>
<td>NIH</td>
<td>9/1/15 to 8/31/16</td>
<td>$250,000</td>
<td>$120,000</td>
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<td>$83,108</td>
<td>$39,892</td>
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<td>“Metabolic mechanisms of amino acid-mediated lifespan extension in c. elegans”</td>
<td>Patrick Bradshaw, PI</td>
<td>NIH</td>
<td>9/15/15 to 4/30/16</td>
<td>$49,022</td>
<td>$22,550</td>
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<td>$20,797</td>
<td>$8,991</td>
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<td>“Nicotine and the roles of nicotine receptors in rodent model of schizophrenia”</td>
<td>Russell Brown, PI</td>
<td>NIH</td>
<td>7/1/13 to 6/30/16 (transfer from ETSU Psychology)</td>
<td>$300,000</td>
<td>$108,221</td>
<td>$408,221</td>
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<td>$100,000</td>
<td>$35,114</td>
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<td>“Effect of compound A on recovery from cerebral ischemia”</td>
<td>Russell Brown, PI</td>
<td>Neurodetective Int'l Inc.</td>
<td>5/1/13 to 4/30/18 (transfer from ETSU Psychology)</td>
<td>$11,644</td>
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<td>$1,474</td>
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<td>“Role of ATM in myocardial remodeling following myocardial infarction”</td>
<td>Krishna Singh, PI</td>
<td>NIH</td>
<td>8/1/15 to 7/31/18</td>
<td>$300,000</td>
<td>$123,485</td>
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<td>$100,000</td>
<td>$41,162</td>
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“Role of B2 integrins in macrophage retention and egress during inflammation” NIH; Valentin Yakubenko, PI; project funding period 1/15/16 to 4/30/18 (transfer from Cleveland Clinic);
Total Direct: $585,000; Total Indirect: $237,943; Total Award $822,943
Year Direct: $150,000; Year Indirect: $72,000; Year Total $222,000

“The contribution of integrin alphaDbeta2 to the macrophage migration and lipid deposition during atherogenesis” AHA; Valentin Yakubenko, PI; project funding period 9/1/15 to 6/30/16 (transfer from Cleveland Clinic);
Total Direct: $63,110; Total Indirect: $6,311; Total Award $69,421
Year Direct: $63,110; Year Indirect: $6,311; Year Total $69,421

“Identifying molecular determinants and biomarkers for MET targeted therapy in glioblastoma” Stephen M. Coffman Foundation; Qian Xie, PI; project funding period 2/1/16 to 1/31/17 (transfer from Van Andel Research Institute);
Total Direct: $100,000; Total Indirect: $0; Total Award $100,000
Year Direct: $100,000; Year Indirect: $0; Year Total $100,000

“Unrestricted funds transfer for research” Van Andel Research Institute; Qian Xie, PI; project funding period 2/1/16 to 6/30/18 (transfer from Van Andel Research Institute);
Total Direct: $10,539; Total Indirect: $0; Total Award $10,539
Year Direct: $10,539; Year Indirect: $0; Year Total $10,539

“AARN 2016 Travel Award” American Brain Tumor Association; Qian Xie, PI; project funding period 3/1/16 to 6/30/16;
Total Direct: $1,212; Total Indirect: $0; Total Award $1,212
Year Direct: $1,212; Year Indirect: $0; Year Total $1,212

“Alector LLC Sponsored Research Agreement” Alector LLC; Theo Hagg, PI; project funding period 11/1/15 to 10/31/16;
Total Direct: $15,000; Total Indirect: $7,200; Total Award $22,200
Year Direct: $7,500; Total Indirect: $3,600; Total Award $11,100

Continued Extramural Funded Grant Awards:

Total Amount of Continued Funding FY2016 Distribution: $1,192,791

“Anti-apoptotic Role of Ataxia Telangiectasia and Rad3-Related” NIH; Yue Zou, PI; project funding period 9/1/14 to 8/31/17;
Year Direct: $108,024; Year Indirect: $49,138; Year Total $157,162

“Cholinergic anti-inflammatory mechanisms in sepsis and septic shock” NIH; Donald Hoover, PI; project funding period 9/1/14 to 8/31/17;
Year Direct: $59,474; Year Indirect: $31,712; Year Total $91,186

“Targeting CNTF to increase adult forebrain neurogenesis.” NIH R01; Theo Hagg, PI; project funding period 04-15-2014 to 03-31-2019;
Year Direct: $198,850; Year Indirect: $91,471; Year Total: $290,321.
“Oxidative DNA damage in brainstem oligodendrocytes in depressed suicide victims.” American Federation for Suicide Prevention; **Gregory Ordway, PI**; project funding period 06-30-2014 to 07-01-2016; Year Direct: $44,988; Year Indirect: $0; **Year Total: $44,988.**

“Genetics of trans-kingdom interactions between candida and bacteria.” NIH R15; **Mike Kruppa, PI**; project funding period 06-14-2014 to 05-31-2017; Year Direct: $78,056; Year Indirect: $35,906; **Year Total: $113,962.**

“Osteopontin: role in myocyte apoptosis and myocardial function” Dept. of Veterans Affairs; **Krishna Singh, Ph.D., PI**; project funding period 07-01-2014 to 6-30-2018; Year Direct: $241,364; Year Indirect: $0; **Year Total: $241,364.**

“Vascular responses as therapeutic targets after SCI.” NIH (University of Louisville Sub-award); **Theo Hagg, PI**; project funding period 01-01-2014 to 07-31-2016; Year Direct: $171,492; Year Indirect: $82,316; **Year Total: $253,808.**

**Continued Extramural Funded Grant Extensions:**

“Characterization of a novel host pathway that regulates chlamydial development.” NIH-National Institute of Allergy and Infectious Disease; R01 AI095637-01; **Robert V. Schoborg, PI, Michelle M. Duffourc, Consultant; Jennifer Hall, Co-I**; project funding period 07-01-2011 to 07-31-2016.


“Modulation of atherosclerosis by type 2 cannabinoid receptor.” NIH 1R15HL113878-01A1. **Douglas P Thewke, PI; Antonio Rusinol, Co-I**; project funding period 01-10-2013 to 12-31-2016.

**Continued Extramural Funding for Grants Awarded to non-DBMS PI:**

None

**Intramural Grant Awards:**

*Total Internal Grants Awarded to Biomedical Sciences PI: $40,000*

“Molecular analysis of nutrient transport pathways in amniote embryos” ETSU RDC **Thomas Ecay, PI**, project funding period 7/1/15 to 6/30/16; Total Award $10,000
“Does estrogen and/or progesterone alter chlamydia trachomatis development through the Wnt/B-catenin signaling pathway” ETSU RDC Jennifer Hall, PI, project funding period 7/1/15 to 6/30/16; Total Award $10,000

“The induction of integrin signaling by microsporidia adherence to host cells” ETSU RDC Russell Hayman, PI, project funding period 7/1/15 to 6/30/16; Total Award $10,000

“How does chlamydia genital tract infection protect from subsequent herpes virus challenge?” ETSU RDC Robert Schoborg, PI, project funding period 7/1/15 to 6/30/16; Total Award $10,000