As we enter Fall, we can look back on a very successful Spring and Summer.

We welcomed Dr. Schoborg as the new Vice Chair of Education for the department in May. He had already taken the lead on a number of teaching-related projects together with the other members of the departmental Course Directors group. Among other things, he will now play a more formal and very important role in refining and implementing a longer term plan to ensure that we can continue to excel in support of our teaching mission. Congratulations are in order to all the Faculty and support staff who helped in the success of our courses. I would like to highlight the Cell and Molecular Medicine course and team, under Dr. Robinson’s leadership, who won a Caduceus award.

We also made good progress in our research, notably with our continued publications and increased external funding. Drs. Agrawal and Singh, in particular, are to be commended for receiving new major NIH grants. Dr. Singh made the department proud by winning the prestigious ETSU Distinguished Faculty Award in Research. We said goodbye to Laura Daniel who received her PhD in May and welcomed several new graduate students in the department and look forward to their important contributions. We again had excellent seminars through our External Seminar series and our Internal Seminar series continues to be valuable as a vehicle for promoting collaborations.

Our recruitment drive ended up attracting five excellent new Faculty members to our department, with Drs. Brown, Bradshaw and Yakubenko having joined us so far, and Drs. Rodriguez-Gil and Xie joining us over the next two months. This will bolster our research in the areas of neuroscience, genetics, cardiovascular disease, inflammation and cancer, and in the longer term will ensure our continued excellence in teaching. Please join me in welcoming them as the new members of our great Biomedical Sciences team.
WELCOME NEW FACULTY...

We welcome Dr. Russell Brown, Professor, to the Department of Biomedical Sciences. Dr. Brown officially joined the faculty of the Quillen College of Medicine on July 1, 2015. He received his BS in Psychology & Chemistry from University of Oklahoma, and his PhD in Experimental Psychology from University of Kentucky in Lexington, KY. He received a Postdoctoral Fellowship at the University of Lethbridge in Lethbridge, Alberta, Canada from 1998-2000. In August of 2000, he moved here from Canada upon accepting the position of Assistant Professor with the Department of Psychology at ETSU.

Russ was born and raised in the metropolis of Weatherford, Oklahoma (population 10,000). Russ quips that they nicknamed it "Weatherberry" after "Mayberry" because of the number of similarities. This is where he met his wife, Martha (Bowden) and they were married 9/26/98. They have a daughter, Alaina Isabelle, who is 8 years old and a 3rd grader at Cherokee Elementary. She loves art, dance (ballet), and gymnastics.

In terms of special interests, Russ has been a distance runner since he was about 13 years old, and still runs 2-3 days a week. He also plays on an adult soccer team called "Real Mundo." (it’s a play on words - the "Real World" although Real means "Royal" in Spanish). They play in the "C" Division (they call it the "Champions" division; although it is the lowest division of the league). Russ is proud to say that they have won the division 3 times in the past two years (even though they have a bit older average age than the rest of the teams) Russ thinks that he may be the oldest guy on the team?

We welcome Dr. Patrick Bradshaw, Assistant Professor, to the Department of Biomedical Sciences. Dr. Bradshaw officially joined the faculty of the Quillen College of Medicine on August 1, 2015. Prior to joining QCOM he held the position of Assistant Professor in the Department of Cell Biology, Microbiology and Molecular Biology, University of South Florida. He received his BS in Bioengineering from the University of Illinois-Urbana, and his PhD in Biochemistry from the Ohio State University. He completed his Postdoctoral Fellowship from the University of Wisconsin-Madison.

Patrick grew up in Peoria, Illinois, where he met his wife, Ilknur, which was during the week he defended his PhD dissertation, while also training for a marathon. Ilknur grew up in Turkey and was a high school history teacher there before moving to the US for graduate school where they met. He has two daughters Tara, age 9 and Ela, age 6 who attend Lake Ridge Elementary school.

In his spare time Patrick enjoys many outdoor sports—running, hiking, biking, swimming, canoeing, and tennis. He also enjoys watching movies and college football and basketball games. He particularly enjoys watching his daughters at dance and sporting events.
GRANT FUNDING

Funding Agency: NIH
Grant Number: 1R01AR068787-01
Principal Investigator: Alok Agrawal, PhD
Project Title: C-reactive Protein in Rheumatoid Arthritis
Award Issue Date: July 13, 2015
Project Funding Period: 07/13/2015 – 05/31/2020
Total Amount of Award: $2,681,486 (includes $415,805 sub-award to co-investigator Dr. David Brand, University of Tennessee in Memphis)

Project Narrative: Rheumatoid arthritis (RA) is an autoimmune disease in which autoantibody-mediated inflammation leads to destruction of the joints. Also, RA patients are more susceptible to cardiovascular disease, such as atherosclerosis. C-reactive protein (CRP) is present in the blood but is also present in the joint fluid of RA patients and in atherosclerotic lesions in the artery. We propose to investigate the use of modified and engineered CRP molecules, capable of binding to immune complexes and bad cholesterol, in murine models of RA and atherosclerosis, to control the development of the disease. Successful completion of this project will reveal whether engineered CRP can help develop a treatment strategy for inflammatory diseases including RA.

Funding Agency: NIH
Grant Number: 1R56AI117730-01
Principal Investigator: Alok Agrawal, Ph.D.
Collaborator: Michael Kruppa, Ph.D.
Project Title: Complement-mediated anti-pneumococcal functions of C-reactive protein
Award Issue Date: August 24, 2015
Project Funding Period: 9/01/2015 – 8/31/2016
Total Amount of Award: $370,000

Project Narrative: C-reactive protein (CRP) is a component of the innate immune system and inflammatory response. CRP has been shown to possess anti-microbial activity against *Streptococcus pneumoniae* infection in mice. Our goal is to understand the mechanisms by which the complement-activating and complement factor H-binding capabilities of CRP relate to its functions in protecting mice against pneumococcal infection, and to define how CRP, directly or indirectly, acts on the surface of *S. pneumoniae* to kill them. Successful completion of this project will reveal how the properties of CRP can be utilized to develop a treatment strategy for pneumococcal infection. In addition, the investigation of CRP-complement factor H interactions may also have implications in other areas of clinical medicine, such as age-related macular degeneration.
GRANT FUNDING

Funding Agency: NIH (NHLBI)
Grant Number: R15HL129140
Principal Investigator: Krishna Singh, PI; Mahipal Singh, Co-PD/PI; Gary Wright, Co-I
Project Title: Role of ATM in Myocardial Remodeling Following Myocardial Infarction
Award Issue date: 8/01/2015
Project Funding Period: 8/01/2015 – 7/31/2018
Total Award: $423,485

Project Narrative: Loss or inactivation of ATM protein in the human genetic disorder ataxia-telangiectasia (A-T) leads to pleiotropic phenotype, including neuronal degeneration, immunodeficiency, genomic instability, premature aging and cancer predisposition. Individuals with an ATM mutation in one allele are spared from most of the symptoms of the disease, but are more susceptible to ischemic heart disease. The proposed studies, investigating the cellular and molecular changes occurring in the heart during ischemic heart disease, e.g., following myocardial infarction, may identify molecular targets to treat ischemic heart disease in A-T patients.

Investigator: Gary Wright, PhD
Project Title: Isotopomer Analysis of Anaplerotic Pathways Induced by Hypoxia in Heart
Award Issue Date: June 15, 2015
Project Funding Period: 09/01/2015 – 08/30/2016
Total Amount of Award: $42,000

Award covers RC-SIRM services to perform stable-isotope metabolic studies. “The NIH Common Fund’s Metabolomics program aims to increase national capacity in metabolomics by supporting the development of next generation technologies to enhance the sensitivity and speed with which specific elements of the cellular metabolome can be identified and quantified, providing training and mentoring opportunities, increasing the inventory of chemically identifiable metabolites through the synthesis and availability of high quality reference standards, and by promoting data sharing and collaboration.”
15 YEARS of HARD WORK IN SPINAL RESEARCH AT THE UNIVERSITY OF KENTUCKY REAPS MANY REWARDS

“It’s very rewarding to see all our very hard work in the center over 15 years pay off... Dr. Theo Hagg

Dr. Theo Hagg, Professor and Chair, who worked closely for many years with the research team at the Spinal Cord Injury Research Center at the University of Louisville, is proud and pleased that the research efforts of the team have its rewards. The spinal cord is so very important and virtually is the superhighway for the body—enabling communications between the brain and the rest of the body.

Many years have gone into the study of spinal injury at the University of Kentucky. During a recent CNN report, in July 2015, breakthrough research has contributed to an innovative procedure that is being tested with positive results. As noted by the CNN report, it is “being hailed a [major] breakthrough in spinal cord injury research.” The team of researchers came up with the idea of implanting electrical stimulators directly in the spines. Sensors are wired to paralyzed legs that are connected to electrodes implanted into the spine of the individual. Also according to the report this form of epidural stimulation research has enabled at least four individuals to recover voluntary movements in limbs and the ability to stand. The Christopher and Dave Reeve Foundation helped fund the study and is raising $15 million to continue the study on more test subjects.

This electrical impulse procedure has also shown many other positive results. Some of the other benefits are viewed as just as important as being able to stand or move limbs.

Increased mobility has resulted in improved overall health. Some subjects have experienced improved bladder control, bowel control, as well as blood pressure control. And, in some cases, the subject is happy to have regained sexual function.

Research will continue to be a main focus in the area of spinal cord injury. Future hopes are that one day that those who suffer from this type of injury, will be able to walk again. Link to http://www.cnn.com/2015/07/24/health/paralyzed-patients-stand-again/index.html to access detailed articles.

Dr. Hagg and his research team continue ongoing research in search of cures for spinal injuries here at Quillen College of Medicine, Department of Biomedical Sciences.

DR. HAGG AUTHOR OF BOOK CHAPTER

Dr. Krishna Singh, Professor, attended the Experimental Biology Conference held in Boston, MA, March 27 - April 1, 2015. Dr. Singh sponsored Suman Dalal, Postdoctoral Fellow, and Stephanie Cunningham, DBMS Graduate Student, who presented posters at the meeting.

Dr. Tom Ecay, Professor, attended the Experimental Biology Conference held in Boston, MA, March 27 - April 1, 2015.

Dr. Phil Musich and Ben Hilton attended the Cell Symposia on Multifaceted Mitochondria, July 19 - 21, 2015, Chicago, IL, and presented a poster on “ATR Plays a Direct Antiapoptotic Role at Mitochondria Which Is Regulated by Prolyl Isomerase Pin1”.

Poster presentation: Hilton B, Gopal S, Xu L, Mazumder S, Musich PR, Cho BP, and Zou Y “Dissociation dynamics of XPC-HR23B from damaged DNA is a determining factor of NER efficiency”. The 17th Annual Midwest DNA Repair Symposium, June 6-7, 2015, Indiana University, Bloomington Indiana.

Ben Hilton received the First Place Award for his platform presentation on “ATR Plays a Direct Antiapoptotic Role at Mitochondria Which Is Regulated by Prolyl Isomerase Pin1.” The 17th Annual Midwest DNA Repair Symposium, June 6-7, 2015, Indiana University, Bloomington Indiana.

Dr. Yue Zou attended and gave a platform presentation on “Pin1 regulation of DNA damage response functions of ataxia telangiectasia RAD3-related (ATR)” at Society of Chinese Bioscientists in America 15th International Symposium, Taipei, June 26-29, 2015.

Dr. Yue Zou visited West China Center of Medical Sciences, Sichuan University, China in July of 2015, and gave a seminar on “A novel role of ataxia telangiectasia RAD3-related (ATR) in cell death”.

Dr. Richard M. Kostrzewa, Professor, attended the VII Neurotoxicity Meeting in Cuenca, Spain, 12-16 April 2015. In this meeting he presented the paper "L-DOPA and p-Chloroamphetamine (PCA) Effects on Hydroxyl Radical Levels in Striatal Tissue and in vivo Microdialysates of Parkinsonian Rats" in the symposium on 'Neurodegeneration and Neuroinflammation in Parkinson's Disease'. He also Chaired the Symposium on 'Stress and Neurodegeneration'; and as Councilor in the Neurotoxicity Society, attended the Society Council meeting as well as the business meeting.

Dr. Kostrzewa in the "Pulpit" above the banquet room in the former monastery, which is now a Hotel, in which the Neurotoxicity Society meeting took place in Cuenca, Spain.

NIH REVIEW STUDY SECTIONS

Dr. Alok Agrawal, Professor, served on the following Study Sections:

The “Innate Immunity and Inflammation” study section review committee, NIH, June 4-5, 2015, New Orleans, LA.

The “Innate Immunity and Inflammation ZRG1 III-F (08)” special emphasis panel review committee, NIH, June 5, 2015, New Orleans, LA.

The “Arthritis, Connective Tissue, and Skin” study section review committee, NIH, June 8-9, 2015, Dallas, TX.


DR. MIKE KRUPPA RECEIVES TENURE AND PROMOTION TO ASSOCIATE PROFESSOR

Congratulations! to Dr. Mike Kruppa for receiving Tenure and promotion to Associate Professor effective July 1, 2015. Per Dr. Hagg, “these are major milestones and important achievements in his professional career. We are looking forward to his continued important contributions to the mission of our department, our College of Medicine and ETSU.”

Dr. Hagg comments, “she very clearly has a strong commitment to training students and has an exemplary record of service to our Institution. Her enthusiastic leadership and outgoing personality contributed greatly to the success of the new departmental Journal Club which she initiated.” Hampton High School will benefit greatly to have a teacher of Dr. Campbell’s caliber. We wish her well in her new career endeavors. A drop by reception was held for Dr. Campbell on August which was attended by many colleagues throughout the College and University.

We bid farewell to Robin Montgomery who accepted a position as Business Manager for the Department of Pediatrics effective August 1, 2015. Robin served as Manager of Finance for the Department of Biomedical Sciences. Her financial expertise was instrumental in the successful merger of the Basic Sciences Departments. A drop by reception was held for Robin on July 24. Not only will Robin’s financial expertise be missed; but, also her enthusiasm and perpetual positive outlook on life will be missed by all. We wish her much happiness and success in her new position.

Dr. Sharon Campbell, after 15 years at ETSU, has decided to leave us to become a High School Chemistry teacher at Hampton High School located in Carter County. Dr. Campbell made many valuable and notable contributions to the mission of the Quillen College of Medicine and ETSU as a whole. As
DR. CHRISTOPHER R. DANIELS RECEIVES OUTSTANDING DISSERTATION AWARD FOR 2015

Dr. Christopher R. Daniels’s Dissertation in Biomedical Science, entitled “Extracellular Ubiquitin: Role in Cardiac Myocyte Apoptosis and Myocardial Remodeling” was chosen to receive the ETSU School of Graduate Studies and ETSU Graduate Council Outstanding Dissertation Award for 2015. The Dissertation was nominated by Dr. Krishna Singh, Committee Chair, and chosen by an award committee that was composed of members of the ETSU graduate faculty. Dissertation Committee Members were: Dr. William Joyner, Dr. Robert Wondergem, Dr. Chuanfu Li, Dr. David S. Chi, Dr. Mahipal Singh.

Dr. Daniels received a plaque and monetary award of $250. In addition, his name will also be inscribed on a plaque to be permanently displayed in the Graduate School Lobby. The objective of this award is “to recognize outstanding graduate students for their achievements, to increase the profile of graduate education at ETSU, to help promote excellence in graduate research.”

Upon graduation Chris accepted a position as Associate Director-Clinical Labs at MEDPACE, A Global CRO, Cincinnati, Ohio.

ALUMNI NEWS….

DR. LAURA DANIEL receives doctoral degree at Convocation on May 9, 2015. Dr. Daniel has accepted a Postdoctoral position with the laboratory of Dr. Dan Roden, Division of Clinical Pharmacology, Vanderbilt University School of Medicine, Nashville, TN, effective May 18, 2015. She completed the requirements for her doctoral degree under the supervision of Dr. Krishna Singh.

Congratulations to Cindy Canter, Coordinator, who graduated Cum Laude from Northeast State Community College on May 12, 2015, with an Associate of Applied Science Degree in Office Administration. Cindy also holds a Bachelor of General Studies degree from ETSU. Cindy has been employed with the Quillen College of Medicine for 30+ years.

FAP FAR FAE… 2014-15

The FAP FAR FAE process has been completed for the year. The Faculty are commended for their diligence and help in submitting these reports in a timely manner.

Also, thanks to Ms. Cynthia Taylor and Ms. TJ Neal for their help in assisting with the coordination of this process.

Note from the Editor…

Many thanks to everyone who contributed photos and information for this newsletter.
INTERNAL SPEAKERS

April 3, 2015
Doug Thewke, PhD
Professor
Title: Role of cannabinoid receptor Type 2 in the pathophysiology of atherosclerosis

April 10, 2015
Gregory Ordway, PhD
Professor
Title: Stress is something you should avoid: Insights from the study of oligodendrocytes in the human brain

April 17, 2015
Yue Zou, PhD,
Professor
Title: A novel role of ataxia telangiectasia Rad3-related (ATR) in cell death

May 8, 2015
Jessica Slade
Graduate Student
Title: Nectin-1 is required for chlamydial development in vivo and prior chlamydial infection in BALB/c mice protects from subsequent HSV challenge

May 15, 2015
David Johnson, PhD
Professor
Title: Emphysema, death by oxygen and SERPINS

May 22, 2015
Michael Kruppa PhD
Assistant Professor
Title: Everything you wanted to know about Candida albicans …but were afraid to ask

SCHEDULE FOR UPCOMING INTERNAL SEMINARS FOR FALL 2015 (Rom B06)
Our fall seminar schedule is on the website: http://www.etsu.edu/com/dbms/news/internalsem.aspx
Contact person: Dr. Brian Rowe.

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<th>Date</th>
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<td>Dr. Theo Hagg</td>
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<td>September 25</td>
<td>Dr. Antonio Rusinol</td>
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<td>October 9</td>
<td>Ben Hilton, Graduate Student</td>
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<td>October 23</td>
<td>Dr. Phillips Campbell (Small auditorium)</td>
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<td>October 30</td>
<td>Dr. Michelle Duffourc</td>
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<td>November 6</td>
<td>Dr. Victoria Palau</td>
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<td>November 20</td>
<td>Dr. Michelle Chandley</td>
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<td>December 4</td>
<td>Dr. Cuihong Jia</td>
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EXTERNAL SPEAKERS

April 14, 2015

Thomas Huckaba, PhD, Assistant Professor, Department of Biology, Xavier University of Louisiana, New Orleans,

Title: Altered properties in human kinesins with mutations that cause hereditary spastic paraplegia

April 24, 2015

Dr. Carey N. Pope, Regents Professor, Sitlington Chair of Toxicology, Department of Physiological Sciences, College of Veterinary Medicine, Oklahoma State University

Title: Endocannabinoids, nano-scavengers, and organophosphate toxicity

May 1, 2015

Dr. M. Stephen Trent, Professor, Department of Infectious Diseases, University of Georgia

Title: It’s What on the outside that counts: Remodeling the bacterial cell surface

May 11, 2015

Rick C.S. Lin, PhD, Professor of Neurobiology & Anatomical Sciences, Psychiatry and Human Behavior, Pediatrics Executive Director, Center for Developmental Disorders Research, University of Mississippi Medical Center, Jackson, MS

Title: Don’t mess with serotonin during early brain development or else: Autism?

HEALTH & SAFETY

IMPORTANT SAFETY REMINDERS....

Lab Coats. Wear closed lab coats in the lab only. Lab coats must be removed before leaving the lab.

Wear Gloves. Appropriate lab gloves should be worn in the lab only. Lab gloves should not be worn outside of the lab.

Wear Closed Toed Shoes. Closed toed shoes with non-slip soles are not appropriate lab wear.
CONGRATULATIONS—2015 COM DEAN’S AWARDS RECIPIENTS

Dr. KRISHNA SINGH
PROFESSOR
RECEIVES THE 2015
DEAN’S DISTINGUISHED
FACULTY AWARD FOR
RESEARCH

DR. RUSS HAYMAN
PROFESSOR
RECEIVES THE 2015
DEAN’S DISTINGUISHED
FACULTY AWARD FOR
TEACHING

DR. TOM KWASIGROCH
PROFESSOR
RECEIVES THE 2015
QCOM PROFESSOR OF
THE YEAR AWARD

DR. KRISHNA SINGH RECEIVES “ETSU DISTINGUISHED FACULTY AWARD IN RESEARCH” FOR 2015

Congratulations to Dr. Krishna Singh, Professor, who received the highest honors “ETSU Distinguished Faculty Award in Research” for 2015. Dr. Singh’s research focuses on the molecular and cellular basis of heart failure. Her current research efforts are funded under a 4-Year VA Merit Research Grant received through the Department of Veterans Affairs. Dr. Singh was also recently awarded a new NIH (NHLBI) grant to study the role of ATM in myocardial remodeling following myocardial infarction. Dr. Singh has been employed with the COM since January 1, 2002, and has always been an outstanding addition to COM faculty.

Again, congratulations are extended to Dr. Singh and her research team. As Dr. Hagg stated, “It is well-deserved and a recognition for her lengthy, consistent, highly impactful and outstanding research productivity. We are proud to have her as our colleague in our department.”
The following faculty of Pre-Clinical Sciences were selected by the graduating class of 2015 for initiation into the **Scarlet Sash Society** during the Quillen College of Medicine Commencement on May 8, 2015. This is a distinct honor for their continued excellence in medical education and commitment to the students. The scarlet sash is worn with academic regalia.

Dr. Michelle Duffourc  
Dr. Paul Monaco  
Dr. Tom Kwasigroch  
Dr. Rob Schoborg

**Biomedical Sciences Graduate Student Award**

**Dr. Alok Agrawal, Professor**, received the 2014-2015 Biomedical Sciences Graduate Students' *“Course Director of the Year”* Award.

**Dr. Alok Agrawal, Professor**, received the 2014-2015 Biomedical Sciences Graduate Students' *“Professor of the Year”* Award.

Dr. Rob Schoborg, Professor, was one of two faculty members selected to participate in the hooding of the graduating medical student class during the **Quillen College of Medicine Commencement** held on May 8, 2015. The “Hooders receive a bronze hand-cast bronze sculpture to display in their office for one year.

**Dr. Krishna Singh, Professor**, was bestowed the honor of carrying the banner for the School of Graduate Studies during one of the ETSU Convocation Ceremonies. The Convocation was held in the Memorial Center on ETSU Main Campus, on May 9, 2015.
2015 Caduceus Ceremony Results

M1 – Outstanding Course of the Year
Biochemistry and Molecular Biology
Dr. Antonio Rusinol, Course Director
Awarded to the basic science course which 1st year students regard as the best educational experience including curriculum, content, and professor interaction with students.

M1 – Professor of the Year
Dr. Paul Monaco
Awarded by the 1st year students to basic science faculty demonstrating exemplary professionalism, mentorship, and scholarship.

M2 – Outstanding Course of the Year
Microbiology
Dr. Russ Hayman, Course Director
Awarded to the basic science course which 2nd year students regard as the best educational experience including curriculum, content, and professor interaction with students.

M2 – Professor of the Year
Dr. Rob Schoborg
Awarded by the 1st year students to basic science faculty demonstrating exemplary professionalism, mentorship, and scholarship.

ROB BECKER RECEIVES THE OUTSTANDING COLLEGE OF MEDICINE STAFF AWARD FOR 2015

Congratulations to Rob Becker for receiving the Outstanding College of Medicine Staff Award for 2015. The individual selected to receive the Outstanding College of Medicine Staff Award is someone who goes beyond their usual duties to assist students in the pursuit of their medical education. Rob is the Coordinator for the Gross Anatomy Lab.

As one Nominee stated, “The dedication and humility that he demonstrates on a daily basis inspires those around him to strive for excellence… it is my hope that the Staff Senate, before selecting a recipient for the Distinguished Staff Award, will try to imagine Quillen College of Medicine without Rob Becker because he is an integral part of the framework that makes Quillen such an exceptional training institution.”
Dr. Suman Dalal
completed the requirements for
Doctor of Philosophy
at
DR. B.R. Ambedkar Center for Biomedical
Research
Department of Biomedical Sciences,
University of Delhi, Delhi, India,
February 26, 2015.

Dr. Dalal’s supervision was conducted in conjunction
with Professor B.C. Das, and Dr. Krishna Singh, Co-
Chair and Supervisor. As a Postdoctoral Fellow, Dr.
Dalal will continue to work in the laboratory of Dr.
Krishna Singh and continue her research studies
involving “Molecular Signals Involved in Cardiac
Myocyte Apoptosis and Myocardial Remodeling.”

Dissertation Abstract

Cardiovascular diseases are the world’s leading cause of death. Accumulation of misfolded proteins and alterations in calcium homeostasis induce endoplasmic reticulum (ER) stress which leads to apoptosis and results in a number of pathologies including cardiovascular diseases. Thus, the ER stress pathway can be an important target for the treatment of these diseases. However, the molecular mechanisms underlying the activation, regulation, and execution of the ER stress response in the heart have not yet been fully clarified. Here we have tested the hypothesis that β-AR-stimulation induces ER stress, and that initiation of ER stress plays an important role in cardiac myocyte apoptosis and myocardial remodeling on both the in vitro and in vivo levels. For in vitro studies, adult rat ventricular myocytes (ARVMs) were used, while the in vivo studies were carried out following chronic β-AR-stimulation and myocardial infarction (MI) in mice. Using the ER stressors, thapsigargin and brefeldin A, we demonstrated that ER stress induces apoptosis in ARVMs. β-AR-stimulation using isoproterenol (ISO) significantly increased the expression of ER stress proteins such as GRP-78, Gadd-153 and Gadd-34, while activating caspase-12 in ARVMs. These effects were mimicked by thapsigargin. β-AR-stimulation for 15 min caused an elevation in PERK and eIF-2α phosphorylation, while 3h of β-AR-stimulation showed a decline of ~50% in eIF-2α phosphorylation below basal levels with no change in the elevated PERK phosphorylation. This decline in eIF-2α phosphorylation was prevented by using β1-AR antagonist, CGP20712A methanesulfonate salt, but not by the β2-AR antagonist, ICI 118551 hydrochloride. Forskolin, an adenyl cyclase activator, simulated the effects of ISO on eIF-2α phosphorylation. Alleviation of ER stress using Salubrinal (SAL) maintained eIF-2α phosphorylation and inhibited β-AR-stimulated apoptosis. Furthermore, inhibition of caspase-12 using z-ATAD prevented β-AR-stimulated apoptosis as well as the thapsigargin-induced apoptosis.

In the in vivo mouse heart, β-AR-stimulation induced ER stress as evidenced by increased expression of GRP-78 and Gadd-153, activation caspase-12, and dephosphorylating eIF-2α. Alleviation of ER stress using SAL maintained phosphorylation of eIF-2α, inhibited activation of caspase-12 and decreased β-AR-stimulated apoptosis in the heart.

β-AR-stimulation is considered as an important part of the remodeling process in the post-myocardial infarction (MI) heart. MI increased expression of GRP-78 and GADD-153, while activating caspase-12. MI induced cardiac myocyte apoptosis, and left ventricular (LV) dysfunction as evidenced by increased LV dilation and decreased LV function. Alleviation of ER stress using SAL decreased cardiac myocyte apoptosis, and decreased LV dilation while improving LV function 7 days post-MI.

Thus, using both in vitro and in vivo studies, we have provided evidence that β-AR-stimulation induces ER stress in isolated cardiac myocytes and in the heart. Alleviation of ER stress decreases β-AR stimulated apoptosis in vitro and in vivo. Using MI as a second model of myocardial remodeling, we provided evidence for the role of ER stress in cardiac myocyte apoptosis and myocardial dysfunction. These findings suggest that ER stress pathways may be used as potential therapeutic targets in cardiovascular diseases.
WE EXPRESS OUR APPRECIATION TO THE FOLLOWING FACULTY WHO SERVED AS JUDGES FOR THE POSTER AND ORAL COMPETITIONS AT THE 2015 APPALACHIAN STUDENT RESEARCH FORM AND THE 2015 BOLAND UNDERGRADUATE RESEARCH SYMPOSIUM:

Dr. Alok Agrawal  
Dr. Eric Beaumont  
Dr. Sharon Campbell  
Dr. Michael Kruppa  
Dr. Antonio Rusinol  
Dr. Robert Schoborg  
Dr. Krishna Singh  
Dr. Douglas Thewke

WE EXPRESS OUR APPRECIATION TO THE FOLLOWING STUDENTS (AND FACULTY SPONSORS) WHO PRESENTED POSTER(S) AND/OR ORAL PRESENTATION AT THE 2015 APPALACHIAN STUDENT RESEARCH FORUM. WE ESPECIALLY RECOGNIZE THOSE AWARD WINNERS AND CONGRATULATE THEM ON THIS ACHIEVEMENT.

2015 ASRF AWARD WINNERS—POSTER PRESENTATIONS

First Place—Group A: Doctoral Candidate, Sponsor: Dr. Douglas Thewke  
Biomedical & Health Sciences  
Makenzie Fulmer  
Title: The Effects of Type-2 Cannabinoid Receptor Deficiency on Late State Atherosclerosis

First Place—Group B: Doctoral Candidate, Sponsor: Dr. Rob Schoborg  
Biomedical & Health Sciences  
Jessica Slade  
Title: Co-Infection of Balb/Mice with Clamydia Muriduram and Herpes Simplex Virus-2 (HSV-2) Significantly Reduces HSV-2-Indueced Mortality and Viral Shedding

Second Place—Group A: Medical Students Sponsor: Dr. Don Hoover  
Biomedical & Health Sciences  
Pooja Jagadish  
Title: Effects of GTS-21, A Selective Alpha-7 Nicotinic Acetylcholine Receptor Agonist, on Heart Rate and Contractility in Isolated mouse Atria
WE EXPRESS OUR APPRECIATION TO THE FOLLOWING STUDENTS (AND FACULTY SPONSORS) WHO PRESENTED POSTER(S) AND/OR ORAL PRESENTATIONS AT THE 2015 APPALACHIAN STUDENT RESEARCH FORUM.

J. Gagel, J. Fleenor and Gary Wright. Remodeling of mitochondrial function by the 02-sensor: Role of transporters.


Francis Kwofie, Rachel Green, Douglas Lowman, David Williams and Michael Kruppa. Candida albicans hyphal mannan is structurally distinct from yeast mannan.


Makenzie L. Fulmer, Emilee Engelhaupt, Christopher Garst, Stacy Brown and Douglas Thewke. The effects of Type-2 cannabinoid receptor deficiency on late state atherosclerosis.

Pooja Jagadish, Ashwin Jagadish and Donald Hoover. Effects of GTS-21, a selective ALPHA-7 nicotinic acetylcholine receptor agonist, on heart rate and contractility in isolated mouse atria.

Hannah V. McNeill, Dr. Regenia Phillips Campbell, Stephanie Scofield, and Dr. Eric Beaumont. The effect of vagal nerve stimulation therapy Ion nucleus of the solitary tract function in a pressure overload rat model.


Stephanie L.C. Scofield, Dr. Christopher R. Daniels, Dr. Suman Dalal, Dr. Mahipal Singh, Dr. Krishna Singh. Extracellular ubiquitin modulates cardiac fibrosis by manipulating cardiac fibroblast function.

WE EXPRESS OUR APPRECIATION TO THE FOLLOWING STUDENTS (AND FACULTY SPONSORS) WHO PRESENTED POSTER(S) AND/OR ORAL PRESENTATIONS AT THE 2015 BOLAND UNDERGRADUATE RESEARCH SYMPOSIUM.

Elaina Campbell  
Title: A Study of the Kinetics of a Reaction Between VO(Hedta)-1 and H2O2  
Sponsor: Dr. Sharon Campbell

Emilee Engelhaupt  
Title: Impact of Type-2 Cannabinoid Receptor (CB2) on Atherosclerotic Lesion Calcification  
Sponsor: Dr. Douglas Thewke

Rebecca Howard, Senior  
Title: Isolation of Extracytosolic Vesicles from Candida Albicans: A Quorum Sensing Mechanism  
Sponsor: Dr. Michael Kruppa

Benjamin Jewett, Senior  
Title: Inverse Changes in Ghrelin and A2A Receptor Gene Expression Levels in the Hippocampus of Heart Failure Canines Following Spinal Cord Stimulation  
Sponsor: Dr. Gregory Ordway

Elizabeth Kwenda, Freshman  
Title: Intracellular Enzyme Activity of Na+/K+ Atpase and Ca2+/Mg2+ATPase in the Cerebellum of Autistic Patients  
Sponsor: Dr. Gregory Ordway

John Magnuson  
Title: The Role of Transport Genes RTA3 and GNP3 on the Morphogenesis of Candida Albicans  
Sponsor: Dr. Michael Kruppa

Joni Watson, Senior  
Title: Identification of Three Transcription Factors (GZF3, RFX1, ORF19.3928) Involved in Candida-Bacterial Interactions  
Sponsor: Dr. Michael Kruppa

Hena Yakoob, Senior  
Title: Influence of Anti-HIV drug Elvitegravir on Chlamydial Development  
Sponsor: Dr. Robert Schoborg
**Title:** Co-infection of BALB/c mice with *Chlamydia muridarum* and Herpes Simplex Virus-2 (HSV-2) significantly reduces HSV-2-induced mortality and viral shedding  
**Authors:** Jessica Slade, Jennifer Hall, Jennifer Kintner and Robert Schoborg  
**Presenter:** Jessica Slade  
**Institution:** Quillen College of Medicine, East Tennessee State University, Johnson City, TN.  
**Background and Significance:** Co-infection with *Chlamydia trachomatis* and Herpes Simplex Virus-2 (HSV-2) has been reported in humans and studied *in vitro* but the clinical consequences are unknown. **Objectives:** To determine whether disease progression and/or pathogen shedding differs between singly-infected and co-infected animals. **Methods:** Female BALB/c mice were vaginally co-infected with $10^6$ IFU *C. muridarum* (Cm) followed 3, 9 or 27 days later by $5 \times 10^3$ PFU HSV-2. Cm and HSV-2 singly-infected mice served as controls. Additionally, viable chlamydiae were either replaced with $10^6$ IFU UV-irradiated Cm or azithromycin-cured from the genital tract (GT) prior to HSV-2 co-infection. Vaginal swabs were performed to determine pathogen shedding by chlamydial titer assay and plaque assay for HSV-2. HSV-2-induced morbidity and mortality was monitored daily. **Results:** Compared to HSV-2 singly-infected controls, mice infected with Cm 3 or 9 days prior to HSV-2 co-infection exhibited significant protection from HSV-2-induced neurologic disease and significantly reduced viral shedding. Protection from mortality was not observed when mice were i) co-infected with HSV-2 on day 27 post chlamydial infection; ii) co-infected with UV-irradiated Cm and HSV-2 or; iii) azithromycin-treated prior to HSV-2 co-infection.  
**Conclusions:** Protection from HSV-2-induced disease is observed when viable Cm is detectable in the GT prior to HSV-2 infection, but is not observed when Cm-infected mice are no longer shedding detectable chlamydiae either naturally or due to antibiotic treatment. Thus, *Chlamydia*-induced protection is transient and likely requires the presence of chlamydiae or their components to alter the progression of HSV-2-induced neuroinvasive disease.  
Congratulations to Jessica Slade who won the Biomedical and Health Sciences, Doctoral Candidates Group B Division.

**Title:** Influence of the Anti-HIV drug Elvitegravir on Chlamydial Development.  
**Authors:** Hena Yakoob, Jennifer Kintner, and Robert Schoborg  
**Presenter:** Hena Yakoob  
**Summary:** Exposure to low-dose quinolones induces chlamydia into a state of persistence, in which the bacteria are noninfectious but viable. This study hypothesized that the anti-HIV drug Elvitegravir, a quinolone derivative, would inhibit chlamydial development. The data indicate that Elvitegravir is not a persistence-inducer, but does inhibit chlamydial development *in vitro*.

**Scholar:** Dr. Jenny Hall, Matthew Grimm, Summer Niswonger Scholar (Currently in UT College of Nursing, Knoxville, TN), Dr. Rob Schoborg, and Jessica Slade, Biomedical Sciences PhD Student
Dr. Suman Dalal (pictured left) attended the Experimental Biology Conference held in Boston, MA (March 27-April 1, 2015). She presented her poster entitled, "Osteopontin-stimulated apoptosis in cardiac myocyte involves reactive oxygen species and mitochondrial pathway." Suman is a Postdoctoral Fellow in the laboratory of Dr. Krishna Singh.

Undergraduate honors student, Hena Yakoob (pictured right) has successfully completed her project in the laboratory of Dr. Rob Schoborg and graduated this May from the ETSU Honors Program. She was also recently awarded a Summer Research Internship at the Sansum Diabetes Center in Santa Barbara, CA.

Jessica Slade (pictured left) won the Biomedical and Health Sciences, Doctoral Candidates Group B division in the 2015 Appalachian Student Research Forum. Jessica is a doctoral graduate student in the laboratory of Dr. Rob Schoborg.

Dr. Suman Dalal (pictured left) attended the Experimental Biology Conference held in Boston, MA (March 27-April 1, 2015). She presented her poster entitled, "Osteopontin-stimulated apoptosis in cardiac myocyte involves reactive oxygen species and mitochondrial pathway." Suman is a Postdoctoral Fellow in the laboratory of Dr. Krishna Singh.

Stephanie L.C. Scofield (pictured right), Graduate Student in the laboratory of Dr. Krishna Singh, attended the Experimental Biology Conference in Boston, MA (March 27-April 1, 2015). She presented her poster entitled, "Extracellular ubiquitin modulates cardiac fibroblast phenotype and function."
Cindy Canter and Tonya Ward did a great job organizing the baby shower for Chiharu Lovins.

Madelyn Renee Lovins,  
Born May 20, 2015  
6 lb. 5 oz., 19.42 inches

CRYSTAL MAUPIN GETS INTO THE SPIRIT  
ETSU PRIDE WEEK