BRET: Results and Discussion

Spring 2015

CURRENT TRAINEE RESEARCH AND ACTIVITIES

IN THIS ISSUE

Letter from the Deans

Welcome to the first issue of *Results and Discussion*, a newsletter devoted to highlighting the research endeavors and accomplishments of Ph.D. graduate students and postdoctoral fellows supported by the Biomedical Research Education and Training (BRET) office.

Our intention is to keep alumni, current trainees, and families and friends informed about the impact Vanderbilt's young scientists are having on the world through their research discoveries.

The articles in this newsletter were written by current trainees who are interested in developing their writing skills for a variety of potential roles in science communication. Indeed, one mission within the BRET office is to provide resources and support for our trainees to broaden their experiences beyond advanced scientific training in order to help them transition efficiently to a wide-range of research and research-related careers.

If you are inspired by the stories you read here and would like to become more involved with our students, postdoctoral fellows, or our programs, please let us know.

We are always eager to have alumni visit to share experiences and expertise with us.

Moreover, generous philanthropic support from our alumni and community can make a tremendous impact on the training opportunities afforded our PhD students and postdoctoral fellows. We have several funds set aside specifically to assist our trainees in their research efforts, as well as in gaining the skills and experiences necessary for achieving meaningful careers.

For more information, please visit our website or feel free to reach out to either one of us directly. We would love to hear from you.

Sincerely,

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https://medschool.vanderbilt.edu/bret/

Bridging the Border

by Emily Mason, Graduate Student

The Tyska lab (left to right): David Shifrin, PhD, Scott Crawley, PhD, Meredith Weck, MSc, Suli Mao, Nathan Grega-Larson BSc, Matthew Tyska, PhD.

A recent publication in the journal *Cell,* one of the most prestigious journals of biomedical science, features research by Vanderbilt post-doctoral fellow Scott Crawley, Ph.D.

Dr. Crawley, who is originally from Canada, received his bachelor's degree in biology from St. Francis Xavier of Nova Scotia. It was there that he first became interested in biochemistry and cellular biology. After working for a few years, he decided to return to academic life and he earned his Ph.D. from Queen's University in Ontario, where he studied myosins.

By the end of graduate school, Dr. Crawley had a strong background in enzyme kinetics, biochemistry, and structural biology, "but I had never used a microscope," he explained. "I decided to treat my post doc as an opportunity to learn new techniques."

That decision led him to the lab of Dr. Matt Tyska, Associate Professor of Cell and Developmental Biology. Said Dr. Crawley, "We do everything from protein biochemistry to mouse models to a lot of cell biology, a lot of different kinds of imaging. The diverse techniques that we use in the lab are really appealing to me."

Super-resolution microscopy of a developing intestinal brush border labeled for protocadherin-24 (green) and F-actin (red).

That diversity of techniques has paid off with his recent publication titled "Intestinal Brush Border Assembly Driven by Protocadherin-Based Intermicrovillar Adhesion."

The intestine is lined with cells called enterocytes that contain many finger-like projections called microvilli that increase the surface area of the intestine to help absorb nutrients and protect the body from pathogens. These microvilli are packed tightly on the surface of the intestine and together are known as the brush border. For this study, Dr. Crawley and colleagues started out with a very basic question: How does the brush border form?

Using scanning electron microscopy, the researchers saw that microvilli are linked by physical bridges and hypothesized that these connections might be necessary for brush border development. Further analysis showed that two proteins in the cadherin superfamily, mucin-like protocadherin (MLPCDH) and protocadherin-24 (PCDH24) were expressed at the tips of microvilli and may be responsible for forming these bridges.

The researchers thought that one or the other protein would be the key component necessary for the bridges, but they were surprised to find that both components are necessary.

"What you can kind of consider is Krazy Glue where it has two components and you have to mix them together to really form a strong bond," explained Dr. Crawley.

Further analyses showed that PCDH24 and MLPCDH are brought to the surface of microvilli by two other proteins, myosin 7b and harmonin. Harmonin is particularly interesting because it is implicated in a disorder known as Usher Syndrome.

Usher Syndrome occurs in about 4 in 100,000 births, and results in both deafness and blindness in patients. Currently there are no treatments for Usher syndrome, but Dr. Crawley hopes that studying the microvillar system might lead to new knowledge. "The limiting factor in this research is that there is no good cell culture model for stereocillia or photoreceptors [the tissues affected by Usher Syndrome]. Since we have a really good cell culture model system, we think that what we learn in the intestinal model can be applied to the other systems."

Dr. Crawley is quick to share credit with his colleagues, "I have to stress that it was really a group effort. Every author on the paper really contributed to the study."

In the future, Dr. Crawley hopes to run a lab of his own. Luckily, he can look to his mentor for tips. "I've learned a lot about how to run a lab from Matt. He really does an amazing job in terms of keeping the lab going, and keeping morale really high."

FOR MORE INFORMATION

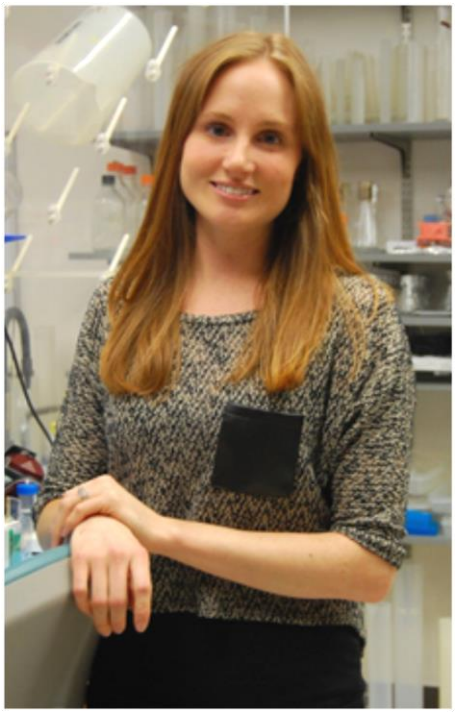
Intestinal brush border assembly driven by protocadherin-based intermicrovillar adhesion

CELL 2014 APR 10
Crawley, SW, et. al.

Passage'ing Through Science: from Cancer to Communication

by Dikshya Bastakoty, Graduate Student

Katherine 'Kate' Venmar grew up in Vermont. As the daughter of a dentist, she was exposed to science and biology at a very young age and developed an intense fascination for human anatomy and physiology. Having grown up with Grey's Anatomy coloring books and a microscope as a toy, Venmar was set on going to medical school after completing college at Denison University in Ohio. However, a research job at Northwestern University in Chicago that she practically stumbled into after college led her to pursue the Ph.D. path.



Kate Venmar entered the interdisciplinary graduate program at Vanderbilt in the fall of 2010. She is pursuing her Ph.D. in the Department of Cancer Biology

Venmar entered the Vanderbilt Interdisciplinary Graduate Program (IGP) in the fall of 2010 and joined Dr. Barbara Fingleton's laboratory in the Department of Cancer Biology the following year. Her study of the role of Interleukin signaling in cancers was recently published in the journal *Cancer Research.*

In this paper she reported that an immune signaling molecule called Interleukin4 (IL4), and its receptor IL4R, cause breast cancer cells to grow in number, survive as single cells, and form colonies—all phenomena that occur as part of the process of metastasis, in which the breast cancer cells move to a different organ where they grow secondary tumors. She tested the role of IL4 and its receptor in two different organs where breast cancer often metastasizes—lung and liver.

Prior to her paper, there were conflicting views on the role of IL4 in cancer,-- one camp saying that IL4 is pro-tumorigenic and another stating that it is anti-tumorigenic.

Venmar says that "In fact, the anti-tumorigenic studies looked so strong that they actually put people under IL4 treatment in clinical trials", which ultimately failed.

When asked if her findings could now lead to an anti-IL4R therapy for breast cancer, she cautions against possible resistance that has been observed previously in many targeted cancer therapies. "So many projects pick their favorite receptor; we develop an inhibitor against it, [and] tumor cells mutate, and the patients will relapse".

Instead she is interested in investigating what processes IL4/IL4R signaling controls so that "[we] can understand possible compensatory mechanisms as well, that could be targeted" when the cancer cells eventually develop resistance.

As part of that effort, she has been studying the effect of IL4/IL4R signaling in cancer cell metabolism; that work is poised to be published soon.

In addition to working on her projects in the lab, Venmar has taken on a leadership role in the Cancer Biology Student Association, serving as methodology chair, then president and vice-president over the past several years. With an interest in teaching and science advocacy, she also has been active in the Cancer Advocacy group at Vanderbilt Ingram Cancer Center (VICC), and has worked to keep cancer advocates engaged and on the agenda at the annual joint Cancer Biology and Host-Tumor Interactions Retreat.

Talking about her graduate school experience at Vanderbilt, she says with a laugh, "it has been a lot harder than I thought it would be", but she also admits that she took on a lot of other things along the way.

Pushing herself to the limits is something Venmar has done all her life. While she was in high school, she was in love with horseback riding, and competed nationally in dressage. She used to train in Florida for several months every year, and worked seven days a week to help pay for her horse. Venmar taught herself a variety of high school courses, and thinks the experience helped shape her into the independent and hard working person that she is.

Just as she took charge of her education then, she has taken charge of her training now. Building on her success in research, Venmar plans to pursue a career in science communication so that she can combine her love of science with her interest in science advocacy, teaching and communication. To that end, she has already started contributing as a writer to the Reporter, VUMC's weekly newspaper. She is a member of the American Medical Writer's Association, which she is using to expand her contacts in the field. Venmar also continues to grow her writing portfolio through various avenues such as helping to write a program grant for the VICC Advocacy group and contributing to Alumni Spotlight articles for the VUMC BRET Office of Career Development newsletter.

She is excited about the new interdisciplinary approaches science is moving into, and is looking forward to contributing as a communicator who can translate science to the general public and to the various decision-making bodies that shape science today.

FOR MORE INFORMATION

IL4 receptor ILR4α regulates metastatic colonization by mammary tumors through multiple signaling pathways.

CANCER RESEARCH 2014 AUG 15
Venmar KT, et. al.

ASPIRE Modules Expand Training Opportunities

by Elizabeth Conrad, Graduate Student

"I honestly had no idea what to expect, but was impressed by what was offered," said a trainee who participated in this fall's *Technology Commercialization* Module, one of five short courses launched this fall as part of the Vanderbilt ASPIRE (Augmenting Scholar Preparation and Integration with Research-Related Endeavors) Program which is administered through the BRET Office of Career Development.

The ASPIRE Program was established in 2013 to prepare biomedical sciences graduate and postdoctoral trainees to make well-informed career decisions and to provide them with the resources and support needed to help them transition to research and research-related careers. ASPIRE offers educational programs in career planning and management to trainees at all stages of their development.

The ASPIRE Modules are intended for post-qualifying Ph.D. students and postdoctoral fellows and are designed to expose interested trainees to topics in business and entrepreneurship, scientific communication, and clinical research.

Of the modules offered this fall, class size ranged from 6 to 75, depending on the structure and objectives of the course. In general, the modules were designed to provide trainees with broad exposure to a field they have identified as a career interest, as well as opportunities to network with local experts and leaders in the field.

> "I think the real value of these modules is to expose graduate students and postdocs to potential career paths outside of the lab."
>
> -ASPIRE Module Participant, Fall 2014

"I think the real value of these modules is to expose graduate students and postdocs to potential career paths outside of the lab. Even now, the gulf between the lab and jobs outside the lab seems quite large and efforts like this help give young scientists insight into how to make the transition," said one module participant.

The ASPIRE program is supported by a five-year, $1.2 million "BEST" (Broadening Experiences in Scientific Training) grant (1DP7OD018423) from the National Institutes of Health (NIH). The program is co-directed by Roger Chalkley, Ph.D., senior associate dean in the Office of Biomedical Research Education & Training (BRET), Kathleen Gould, Ph.D., associate dean for Biomedical Sciences and director of Graduate Student Support, and Kim Petrie, Ph.D., director, Office of Career Development.

"These Ph.D. trainees and postdoctorate fellows have amazing critical thinking skills and are being trained by the best in the country. The ASPIRE program is making them excellent job candidates by readying an already-elite group," says Kate Stuart, Program Manager for the Office of Career Development.

"Our goal is not to try to divert everyone in their training here at Vanderbilt outside of an academic career. This is supposed to augment their options," says Ashley Brady, Ph.D., ASPIRE Program Manager and Director of Career Engagement and Strategic Partnerships, regarding the mission of the modules.

The final component to be added to the ASPIRE Program will be an internship and externship program, to be launched in the fall of 2015. This initiative will offer trainees the opportunity to broaden their skills outside of the lab and classroom setting. "We're targeting these modules to give trainees some background so that if they participate in our internship program they will have a better knowledge going into their internship, said Brady.

The novelty of these modules and the careful design of the entire ASPIRE program provides trainees with resources, exposure and experience. The hope is that this will prevent trainees from either struggling to find an appropriate niche in the research realm or unnecessarily wasting valuable time outside the lab searching for these resources.

"These highly-trained scientists have so much to offer and it is important for us to give them the experiences and the tools to get out there and utilize their background and training to make a difference in the world, and that's not only through experiments in the lab. It's our responsibility as other scientists, as taxpayers, and as members of society to support and nurture our scientists to utilize their talents in the best way possible," Brady said.

ASPIRE Modules: Fall 2014 Schedule

Course Title	Director	Trainees Participating	Frequency	Dates
Technology Commercialization	M. Villolobos, Ph.D. Manager, Vanderbilt Center for Technology Transfer and Commercialization	28	6 sessions	Sept 3-Oct 8
Effective Oral Communication Methods	B. Damon, Ph.D., Assoc. Prof, Radiology, and Radiological Sciences and Biomedical Engineering	20	7 sessions	Sept 10-Oct 22
Biomedical Research and The Media	W. Wood, MLAS, Exec. Dir. of New Media Productions, VUMC News and Public Affairs	6	8 sessions	Sept 17-Nov 5
Fostering Relationships at Work	M. Germek, Ph.D., BRET Psychologist	6	4 sessions	Sept 23- Oct 14
Introduction to the Principles and Practice of Clinical Research (IPPCR)	NIH Clinical Center, (VU serving as a registered remote site)	75	Twice weekly for 5 months	Oct 14-Mar 9, 2015

FOR MORE INFORMATION

To learn more about the Vanderbilt ASPIRE Program, upcoming events and activities, and how you can become involved, please visit the ASPIRE website at:

https://medschool.vanderbilt.edu/aspire

Super Resolution Microscopy Takes Vanderbilt by STORM

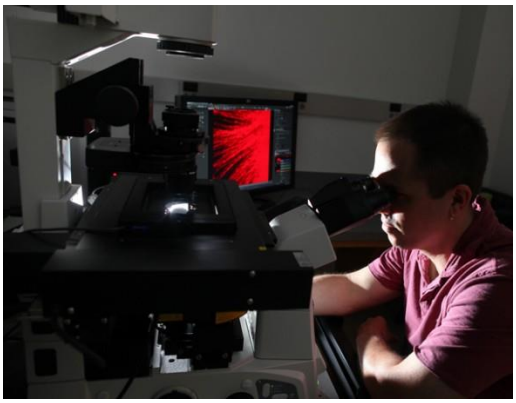
by Suneethi Sivakumaran, Ph.D., Postdoctoral Fellow

A team of investigators from the Vanderbilt Epithelial Biology Center recently joined forces to submit a successful application to the National Institutes of Health for a shared instrumentation grant (S10-OD012324) aimed at funding the acquisition of two new super-resolution optical microscopes.

"These new systems are the first of their kind in the southeastern United States and their acquisition will undoubtedly make Vanderbilt researchers more competitive on a national and international scale," said Matthew Tyska, Ph.D., Associate Professor of Cell and Developmental Biology, who serves as principal investigator on the grant.

The OMX V4 Structured Illumination Microscopy (SIM) system, by GE/Applied Precision, allows researchers to view living cells at twice the resolution (100nm) of other conventional imaging technologies available on campus. This means viruses, proteins, vesicles and other small organelles can now be observed within the cell with clarity which was not possible previously.

The second instrument to be added to Vanderbilt's arsenal is the Nikon Stochastic Optical Reconstruction Microscopy (STORM) system. STORM takes advantage of advances in technology that opened the door to nanolevel imaging and earned its discoverers the Nobel Prize in Chemistry in 2014. This instrument permits visualization of non-living and fixed samples to resolutions of 20nm, enabling investigators to view the precise position of single molecules in cells.



Senior Research Specialist Sean Schaffer (CISR) demonstrates Vanderbilt's new super-resolution microscopy system known as "STORM." Photo credit: Vanderbilt University/Susan Urmy

These new scopes allow researchers to work around the limitations in optical physics that have constrained biologists for over a century. Vanderbilt investigators are now able to design nano-scale experiments that were not possible only a few short years ago. Imaging data from the super-resolution regime is forcing us to rethink long-standing paradigms in biology," Tyska said.

> "These new scopes allow researchers to work around the limitations in optical physics that have constrained biologists for over a century."
>
> -- Matthew Tyska, Ph.D.

The Vanderbilt Cell Imaging Shared Resource (CISR) maintains and provides training on both of these instruments, making this state-of-the-art technology available to all researchers at Vanderbilt University.

FOR MORE INFORMATION

Vanderbilt's Nikon STORM and the GE/Applied Precision OMX V4 are managed by the Vanderbilt Cell Imaging Shared Resource (CISR)

FOR MORE INFORMATION CONTACT CISR STAFF
615-343-3750

❖ Important Dates| 2015 ❖

- 3MT Competition.....Friday, March 27
- 1st Yr PhD students Select Laboratories.....Tuesday, April 21
- 2015 Postdoctoral Association & Shared Resources Symposium.....Tuesday, April 28
- Vanderbilt Commencement.....Friday, May 8
- Annual RCR Training .....Monday, May 11
- Last Day of Classes for IGP/QCB .....Friday, May 27
- 2015 Annual Career Symposium .....Friday, May 29
- 2015 Simple Beginnings Ceremony .....Friday, Sept 24

For more information visit:
https://medschool.vanderbilt.edu/bret/
or contact us at: 615-343-4611

Reversing the Effects of Stress on Anxiety

by Emily Poulin, Graduate Student

Anxiety disorders affect many people worldwide. While there is much that is not understood about the development of these disorders, high stress levels are known to play a role.

Rebecca Bluett and Joyonna Gamble-George, two Ph.D. students in the lab of Sachin Patel, M.D., Ph.D., are the lead authors on a recent study demonstrating that the level of a certain factor within the brain affects the severity of stress-induced anxiety in mice.

In the study, published recently in *Translational Psychiatry*, they showed that increasing the amount of that factor could reverse the effect of stress on anxiety.

That particular factor is called anandamide.

"We showed that the amount of anandamide in a mouse's brain corresponds with the amount of anxiety that they express. So the less anandamide they had, the more anxious they were," Bluett said.

In this study, Bluett and Gamble-George manipulated anandamide levels in mice and evaluated how anxious the mice became after experiencing stress.

They used two behavioral tests to evaluate anxiety levels in the mice.

The first test involves putting mice in one side of a two-sided box after receiving a stress stimulus.

The divisions of the box were different: "one is open and well-lit and the other is enclosed and dark. Mice have a tendency to gravitate toward a very dark, enclosed area. So once you put them in the dark, enclosed compartment, you measure how much time it takes for them to go into the open, light compartment," Gamble-George said.

The longer it takes for mice to exit the dark side of the box, the more anxious they are.

The second test the researchers used is called novelty-induced hypophagia. Mice were first trained to drink a vanilla shake in a non-anxious environment. After undergoing stress, mice were placed in an anxious environment with the shake.

"Mice that are more anxious will take a longer amount of time to approach the shake," Gamble-George said.

The researchers found that giving the mice a drug to increase anandamide levels reversed anxiety in mice after stress.

In addition, they showed that after receiving a stress stimulus, total anandamide levels decreased and correlated with more anxiety.

Their results have implications for patients suffering from anxiety disorders. For the first time, this study showed that anandamide can mediate a reversal of anxiety.

"It had been shown before this paper that if you increase anandamide during stress exposure, you can prevent the expression of anxiety and depression…it hadn't been shown that you can reverse it once it had manifested," Bluett said.

Additionally, Bluett and Gamble-George have used an animal model of stress-induced anxiety to determine if changing the levels of anandamide can alter anxiety-like behavior caused by a form of traumatic stress.

"It's similar to someone who has anxiety as a result of a stressor. You can correlate this animal model to people who have PTSD because they've experienced something that was traumatic in their life," Gamble-George said.

There is widespread interest in targeting this system as a therapy for stress-induced anxiety. In fact, this system is already being used to reduce anxiety, albeit in an unorthodox manner. Anandamide activates the cannabinoid system in the brain, a system that can also be stimulated by the active component of marijuana.

"There have been several studies showing that one of the primary reasons people use marijuana is to reduce anxiety. So this system is very well established in terms of anxiety regulation," Bluett said.

However, there is still much to understand about the system and its role across the spectrum of anxiety disorders.

Rebecca Bluett and Joyonna Gamble-George , at the bench in the lab of Sachin Patel, M.D., Ph.D., Department of Medicine.

"There are a lot of nuances to figure out before we know that for this person with PTSD, maybe this kind of manipulation is going to be better than for another person with a generalized anxiety disorder," Bluett said.

Bluett and Gamble-George came to Patel's lab through Vanderbilt's Interdisciplinary Graduate Program and are both pursuing their Ph.D. in the Neuroscience Graduate Program.

Gamble-George, in her fourth year of graduate school, was attracted to Patel's lab because of her interest in mental health issues.

"Down the line, I want to focus on doing research with mental health disparities, particularly the social aspects of these mental health differences, such as poverty, and how that impacts people with anxiety and depression…I think that by being in his lab, I can obtain the skills that will help me do that," she said.

Bluett, in her third year, is also interested in pursuing research on psychiatric disease.

"We understand so little about it still. There are so many theories about what is going on and probably more than one is correct…what we call depression is probably more than one thing," she said.

FOR MORE INFORMATION

Central anandamide deficiency predicts stress-induced anxiety: Behavioral Reversal through endocabinoid augmentation.

TRANS PSYCHIATRY 2014 JUL 8
Bluett RJ and Gamble-George JC et al.

UPCOMING EVENTS

Aspire To Connect

The second annual ASPIRE to Connect event took place on March 3rd, 2015. This half day workshop focuses on building professional relationships. Trainees have the opportunity to gain practical tips and learn techniques to meet new people and cultivate authentic professional connections.

Annual Career Symposium

The Office of Career Development's 2015 Annual Career Symposium will focus on "Science Careers that Put Your Communication Skills to Work" and will be held on Friday, May 29th, 2015.

Annual Postdoctoral and Shared Resources Symposium

The 2015 Annual Postdoctoral and Shared Resources Symposium will take place on Tuesday, April 28th. In addition to featuring research talks from several current postdoctoral fellows, there will be presentations from two of Vanderbilt's core facilities as well as a keynote address from Craig N. Giroux, Ph.D., Scientific Review Officer for the Bioengineering Science and Technologies Integrated Review Group at the NIH.

Inspiring Women in Science and Beyond

by Patricia Jumbo-Lucioni, Ph.D., Postdoctoral Fellow

Clare Adams is a fifth year graduate student in the Cellular and Molecular Pathology Program in the Department of Pathology, Microbiology and Immunology who is pursuing her Ph.D. in the laboratory of Christine Eischen, Ph.D. She is the first author of a recent article published in the journal *Cancer Research*. In her manuscript, Adams focuses on the role of very small RNA molecules, known as microRNAs, in tumorigenesis.

"The paper focuses on an enzyme known as Dicer which is important in the processing of microRNA in B-cell development and lymphomagenesis", said Adams.

Her paper confirms an important role for Dicer in the viability of B cells and B cell lymphomas.

Adams completed her bachelor's degree in Biology at Appalachian State University in North Carolina. In the fall of 2009, Adams was admitted to the Interdisciplinary Graduate Program at Vanderbilt, where she ultimately joined the Eischen laboratory. In addition to her academic responsibilities, Adams has been the president of the Pathology Student Association (PSA) for the last 2 years. The PSA supports various student activities and ensures open communication between students and faculty.

Adams' passion for science started during her high school years and was strongly nurtured and encouraged by her parents. As an undergraduate, she was profoundly influenced by her chemistry professor who also served as her research advisor. Adams started doing research in her lab and soon became her supplemental instructor, assisting with lectures and mentoring students from class and in the lab.

"But probably the wisest person when it comes to doing science is my current mentor, Chris. She encourages all her students and trainees, and includes us in various opportunities to grow both scientifically and professionally", said Adams.

Adams plans to apply for an academic postdoctoral position after completing her Ph.D. degree at Vanderbilt.

"In the future I see myself running a lab. I am not 100% sure at what type of university, maybe a top ten like Vanderbilt, but maybe somewhere where the research resources aren't as great", said Adams.

> "...Probably the wisest person, when it comes to doing science is my current mentor..."
>
> – Clare Adams.

Clare Adams in the laboratory with her mentor, Christine Eischen, Ph.D.

She enjoys the idea of introducing more people, especially young women, to research and getting them enthusiastic about it, similar to what happened to her during her earlier career path. Adams also entertains the idea of gaining further experience in curriculum development, teaching, and science outreach. To this end, Clare co-founded the Vanderbilt University Women in Science and Engineering (VU-WISE) organization and has taken on several leadership roles within the group, including serving as treasurer and currently as mentorship chair. She acknowledges by first-hand experience that support for women in science is lacking and that advocacy is required to overcome these struggles.

FOR MORE INFORMATION

Inactivation of p53 is insufficient to allow B cells and B-cell lymphomas to survive without Dicer.

CANCER RESEARCH, 2014 JUL 10
Adams, C. et al.

BRET Trainees Get a Look "Inside the Beltway"

by Suneethi Sivakumaran, Ph.D., Postdoctoral Fellow

This past fall, the BRET Office of Career Development and the Vanderbilt ASPIRE Program partnered with the Vanderbilt Office of Federal Relations and other campus offices to provide to trainees an externship opportunity in federal stem policy and advocacy. Nine participants were sponsored by the ASPIRE program to attend this two-day immersion experience held October 16-17, 2014 in Washington, D.C.

This program gave trainees the opportunity to learn how federal STEM policy is made and the role that advocacy can play in influencing federal research funding. During their visit to Washington, trainees met with a variety of officials, including a number of Vanderbilt University alumni, who work in the executive and legislative branches of the government, as well as multiple scientific societies and associations.

Participants sponsored by the ASPIRE Program included biomedical sciences students and postdoctoral fellows from a variety of disciplines and expertise, all of whom were interested in exploring career opportunities in science policy and its related fields.

"The federal STEM policy and advocacy event was very effective at introducing me to science policy and the different avenues of work associated with it. I enjoyed the sessions from professionals in the field describing the roads they took to get into science policy," said Gloria Laryea, Ph.D., a student in the Neuroscience Graduate Program at Vanderbilt.

Participants were exposed to a full agenda that included an introduction to the history of U.S. science and technology research policy, introduction to the federal budget process, and background on the role of coalitions in policy making. In addition, trainees heard first-hand from staffers describing what it is like to work on Capitol Hill. Participants took on the role of senior legislators in a mock congressional conference committee. These activities gave participants hands-on experience as science policy advocates and provided valuable opportunities to network and learn from the experts.

Nine trainees from the BRET Office of Career Development were sponsored by the ASPIRE Program to attend a Federal STEM Policy and Advocacy externship October 16-17, 2014 in Washington, D.C.

Other partnering programs included the Vanderbilt School of Engineering, the Vanderbilt Graduate School, and the Center for Student Professional Development.

BRET:
Results and
Discussion

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