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Minority Undergraduate Research in Prostate Cancer: Bridging Opportunities  
for Post-Baccalaureate Education

PRINCIPAL INVESTIGATOR:

Robert A. Sikes, Ph.D.; David Usher, Ph.D.

CONTRACTING ORGANIZATION:

University of Delaware  
Newark, DE 19716

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# REPORT DOCUMENTATION PAGE

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<b>14. ABSTRACT</b> Five students (2 DSU) and (3 Lincoln U) qualified and were placed into our training program. All students wrote research proposal for the upcoming summer work experience. All students attended the 10 week enrichment program including specialized health disparity round table discussion designed for the HBCU students enrolled in our program. This year faculty from sociology joined our discussions and provided valuable new insight and opportunities for new prostate cancer research at UD. Two of our five students were selected to present their research at regional and national meetings where one student received a second place award. All 5 students were required to generate posters from the data acquired during their 10 weeks of research. These posters were presented at the annual Undergraduate research day at UD that now attracts over 500 participants from UD, Wesley, Lincoln, and DSU and includes the HHMI, INBRE, EPSCOR and DOD students. This is held in a format that feels like a national conference and students have 1 our presentation times followed by scheduled speakers of national reputation.					
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## Introduction:

The goals of the DOD HBCU/MI program are to increase minority representation in the sciences by fostering interactions between majority institutions (MI) and selected Historically Black Colleges and Universities (HBCU). In our case, the University of Delaware (MI) has partnered with both Lincoln University (HBCU) and Delaware State University (HBCU) for a year round education program that begins with a 10 week, intensive summer research program in laboratories at the University of Delaware that perform prostate cancer research. Exposure to prostate cancer research introduces topics invaluable for burgeoning minority cancer researchers, namely, the health disparity of prostate cancer incidence and disease outcomes.

## Body:

For summer 2010, 3 students from Lincoln University (LU) and 2 from Delaware State University (DSU) were recruited in the DOD HBCU/MI summer scholars program at the University of Delaware following identification and selection of candidates by HBCU recruiting faculty and interviews by University of Delaware researchers to confirm interest and a good match with research programs available. In keeping with our aims we have increased the GPA requirements for entry to 3.2 on a 4.0 scale.

For Aim 1 five students were selected for the summer research program. Our students this year from LU were Wachen Peters, Julia Greenfield and Janeice Hamilton who were placed in the laboratories of Drs. Sikes, Dr. van Golen and R. Duncan in Biological Sciences. Our students from DSU this year were Dominick Harrison and Alfayo Michira who were placed in the laboratories of Dr. Sikes, R. Duncan from Biological Science and Dr. Koh from the Department of Chemistry and Biochemistry. Three of five projects had faculty co-mentors and significant laboratory interaction that showed how collaborative research is conducted. This experience included joint project meetings with faculty and summer students.

For Aim 2 we have established a vibrant summer enrichment program that includes a weekly lecture series delivered through the HHMI summer scholars program as well as two, two hour roundtable discussions on selected topics in health disparities. In addition to the mentors, recruiters and program staff we were able to have faculty and students from the Department of Sociology join us this year. This led to very lively discussion and provided a new perspective for the Sociologists on communication with non-sociologists. In years past we have had Psychology faculty participate. We plan to continue this cross-fertilization with hopes for community based-prostate cancer research projects in the near future. The program for our summer enrichment program can be found at <http://www.udel.edu/chem/white/HHMI3/Summer09/S09enrichment.html> as originally posted for the students to access or see below in table format.

DATE	PROGRAM
<b>June 10</b> 1:00-3:00 318 Wolf Hall	<b>What do you need to know about Safety in the Research Laboratory?</b> <b>Krista Murray</b> (BS UD'91), Biosafety Officer and <b>Kevin Eichinger</b> , Chemical Hygiene Officer, <a href="#">Occupational Health and Safety</a> <i><u>Please note: You need to have completed safety instructions in your research laboratory. If you have not had training, you must attend the following session on June 10. If you have questions about safety, contact Occupational Health and Safety.</u></i>
<b>June 10</b> 4:00-6:00 115 Purnell Hall	<b>Undergraduate Research Ethics Conference</b> <b>Dr. Thomas Powers</b> , Department of Philosophy and co-director of the <a href="#">Science, Ethics, and Public Policy program</a> administered by the Delaware Biotechnology Institute, and graduate students
<b>June 17</b>	<b>What are you doing here this summer? Introduction to Research</b>

June 17	<p><b>What are you doing here this summer? Introduction to Research</b>  <a href="#">Dr. David Usher</a> (Dept. of Biological Sciences, Assoc. Dir. UD's HHMI Undergraduate Science Education Program), <a href="#">Dr. Harold White</a> (Dept. Chemistry &amp; Biochemistry, Director UD's HHMI Undergraduate Science Education Program) and Veteran Undergraduate Research Students: <a href="#">Tyler Larsen</a> and <a href="#">Laura Sloofman</a>.</p>
June 19 10 - noon	<p><b>Rescheduled Event for those who missed the June 10 session.</b>  <b>What do you need to know about Safety in the Research Laboratory?</b>  <a href="#">Krista Murray</a> (BS UD'91), Biosafety Officer and <a href="#">Kevin Eichinger</a>, Chemical Hygiene Officer, <a href="#">Occupational Health and Safety</a></p>
June 23 (optional)	<p><b>Dealing with America's Health Disparities Problem - Part I Socioeconomic and Cultural Factors</b>  <a href="#">Drs. David Usher</a>, <a href="#">Robert Sikes</a> (Dept. of Biological Sciences), <a href="#">Jacqueline Aldridge</a> (NUCLEUS Program), and <a href="#">Cynthia van Golen</a> (Delaware State University), and <a href="#">Susan Safford</a> (Lincoln University)  <b>Special optional session in 243 Wolf Hall from 12-1:30 PM</b>  <b>Readings: <a href="#">Disparities and Discrimination in Health Care-an Introduction</a></b>  <a href="#">Health Care Disparities Reading List Abstracts</a>.</p>
June 24	<p><b>Don't stop now-Other University opportunities?</b>  <a href="#">Susan Serra</a>, Service Learning Coordinator and <a href="#">Katharine Kerrane</a>, Senior Associate Director, Honors Program, and undergraduate panelists discussing National and International Scholarship Opportunities, Semester Abroad, Service Learning, and related opportunities. (<a href="#">Goldwater</a>, <a href="#">Marshall</a>, <a href="#">Mitchell</a>, <a href="#">Rhodes</a>, and <a href="#">Truman</a> Scholarships, <a href="#">Fulbright Fellowships</a>)</p>
July 1	<p><b>What is it like to be a scientist in academia?</b>  <b>Career biographies from UD scientists. - Managing a career in science.</b>  <a href="#">Sharon Rozovsky</a> and <a href="#">Hal White</a> (Chemistry and Biochemistry), <a href="#">Patricia DeLeon</a> and <a href="#">David Usher</a> (Biological Sciences), <a href="#">Gilberto Schleining</a> (Mathematical Sciences), <a href="#">Anne Robinson</a> (Chemical Engineering)</p>
July 7 Tuesday lunch (optional)	<p><b>What's it like to be a woman in science? Lessons and advice from women who know.</b>  <b>Special optional session in 243 Wolf Hall from 12-1:30 PM</b>  <a href="#">Drs. Roberta Colman</a> and <a href="#">Mary Watson</a> (Chemistry and Biochemistry), <a href="#">Dr. Tessa Serex</a> (Senior Research Toxicologist, DuPont Haskell Laboratory) and <a href="#">Dr. Rosanne Foley</a> (DuPont Haskell Laboratory)</p>
July 8	<p><b>What is a scientist's life like in Industry?</b>  <a href="#">Frank Vella</a> (<a href="#">SDI Diagnostics</a>), <a href="#">Yli Vellejo</a> (<a href="#">ANP Technologies Inc</a>), <a href="#">John David</a> (<a href="#">ANP Technologies, Inc.</a>), <a href="#">Joy Muholland</a> (Associate at <a href="#">RatnerPrestia</a>), <a href="#">Anastasia Christianson</a> (<a href="#">AstraZeneca</a>), <a href="#">Robert Akins</a> (<a href="#">Nemours</a>), <a href="#">Andrew Cottone</a> (<a href="#">Adesis</a>)</p>
July 15	<p><b>How do I get into graduate and/or professional School?</b>  <a href="#">Dr. David Usher</a>, (Dept. of Biological Sciences),  <a href="#">Dr. Melinda Duncan</a>, (Dept. of Biological Sciences),  <a href="#">Dr. Brian Bahnson</a>, (Dept. of Chemistry and Biochemistry)  <a href="#">Dr. John Pelesko</a>, (Dept. of Mathematical Sciences)  Students</p>
July 22	<p><b>How does biomedical research benefit patients?</b>  <b>Clinical Translational Research: A Team Approach involving physicians, health professionals, engineers, and mathematicians.</b>  <a href="#">Dr. Bruce Bowman</a> MD/PhD (Christiana Care), <a href="#">Dr. Christina Arenson</a> MD (Thomas Jefferson University), <a href="#">Dr. Lynn Synder-Mackler</a> (Dept. of Physical Therapy), <a href="#">Dr. Thomas Buchanan</a> (Dept. of Mechanical Engineering), <a href="#">Dr. Lee Ann Reisenberg</a> PhD, RN (Christiana Care), <a href="#">Dr. Robert Mason</a> PhD (Nemours).</p>
July 28 Tuesday lunch (Optional)	<p><b>Dealing with America's Health Disparities Problem- Part II Race-based Medicine</b>  <a href="#">Drs. David Usher</a> and <a href="#">Robert Sikes</a> (Dept. of Biological Sciences), <a href="#">Jacqueline Aldridge</a> (NUCLEUS Program), <a href="#">Dr. Cynthia van Golen</a> (Delaware State University), <a href="#">Dr. Susan Safford</a> (Lincoln University)  <b>Special optional session in 243 Wolf Hall from 12-1:30 PM</b>  Reading: <a href="#">Should Racial Profiling have a Role in Cancer Prognosis?</a></p>
July 29	<p><b>How to communicate your Results - Conferences (Talks and Posters)</b>  <b>Judging Rubrics</b> for the ASBMB Undergraduate Poster Competition 2007  <a href="#">Dr. David Usher</a> (Dept. of Biological Sciences), <a href="#">Tyler Larsen</a> and <a href="#">Laura Sloofman</a>.  A good site for <a href="#">instructions on poster preparation</a>.</p>
August 5	<p><b>Why isn't my research supervisor in the lab more?</b>  <b>Publishing in Scientific Journals, Paying for Science</b></p>

For Aim 3 scheduling conflicts prevented the recruitment of University of Delaware speakers into the HBCUs for seminars. These deficiencies have been rectified for the upcoming fall and spring semesters. Drs. Sikes, Usher, Cooper and van Golen have already agreed to give seminars at our HBCU collaborators. No HBCU faculty were recruited into UD workshops on improving teaching.

## Key Research Accomplishments:

Our summer scholars are outstanding. They have only 10 weeks to get their bearings in the laboratory, write a summary of their research projects, perform the research and complete a poster for presentation. Clearly there is a very steep learning curve and very high expectations from faculty. That a few are polished enough, even in their first year, to present at national meetings is already impressive since they usually have no research experience before coming to UD and almost always no public presentation skills or experience. Those students selected for a second summer, e.g. Wachen Peters, are extremely motivated and accomplish a great deal. Wachen's success at regional meetings and solid showing at national meetings bodes well for her future placement and our continued recruitment efforts. Cross-fertilization of our health disparities discussion with Psychology and Sociology has established a foundation for additional collaborations and outreach work that may allow us to place non-biology students in a summer research program next year.

## Reportable Outcomes:

### 1. Summer Poster Session Presentations:

<http://www.udel.edu/udaily/2010/aug/summer081409.html>



P2 Receptors and ATP enhances the migration of prostate cancer cells

Wachen Peters, Christine Maguire, [Randall L. Duncan](#), and [Robert A. Sikes](#)  
Lincoln University

**Background:** Purinergic signaling stimulates many biological processes such as cell proliferation, differentiation, and apoptosis. Two classes of purinergic receptors, GPCR (P2Y) and gated channels (P2X), have been identified that bind ATP as a ligand. Similarly, activation of these receptors by ATP can promote cell migration, a critical component of wound healing. ATP also has been shown to have an anticancer effect on in vivo. Herein, we describe the effect of ATP on the migration of an isogenic progression series of prostate cancer (PCa) cell lines on three different extracellular matrices, Collagen I (bone), Matrigel (basement membrane), and Schwann cell-derived (Nerve support cells) in order to mimic growth on these common sites or routes of metastasis. We hypothesize that ATP treatment activates purinergic receptors that increases cell migration on all three extracellular matrices. **Methods:** RT-PCR was used to determine the mRNA expression profile of P2 receptors and ecto-nucleotidases. 0.1nM ATP or 2U/ml apyrase was added to PCa cell lines cultured on three different matrices in vitro. Migration was examined using wound healing assays by photomicroscopy for four days, as well as RT-PCR to determine effect of interaction with each ECM on the

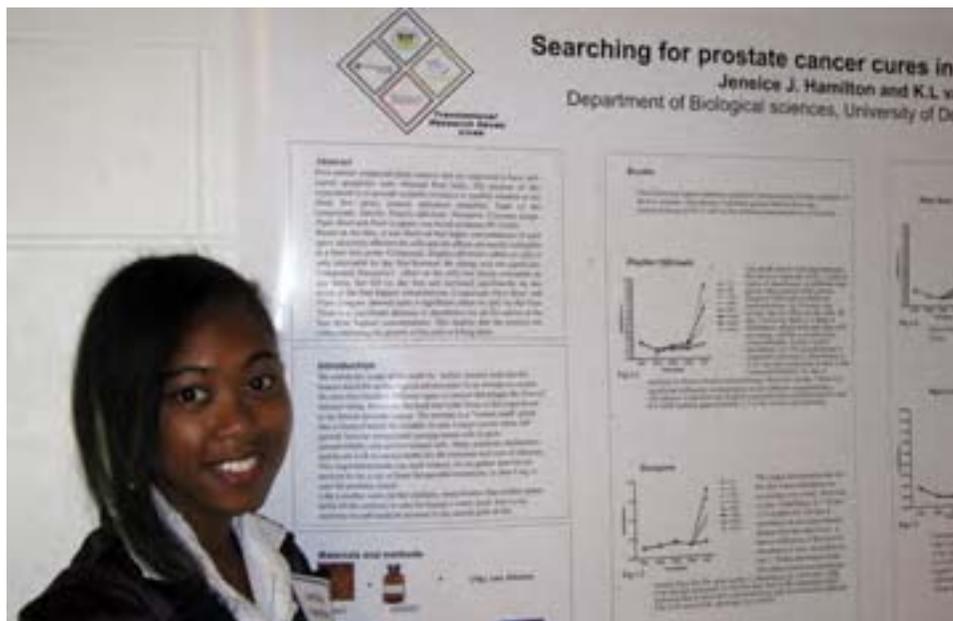
mRNA profile. **Results:** ATP increased the migration of LNCaP cells on Collagen I to a higher degree than on either Schwann and matrigel over vehicle alone. Peak wound closure occurred after 48 hours, while treatment of cells with apyrase alone inhibited cell migration. Differential expression of P2 receptors and ectonucleotidases was seen when comparing growth of cells on the matrices. **Conclusions:** ATP is necessary for PCa migration on collagen I, matrigel and Schwann cell matrix. The differential expression of P2 receptors is speculated to be responsible for variable wound healing on extracellular matrices. **Fund:** Department of Defense HBCU/MI Undergraduate Research Training Grant, PC080950



Investigation of the Presence of Purinergic Receptors in Cancer Cell Lines

**Julia Greenfield**, Christine Maguire, [Robert A. Sikes](#) and [Kenneth L. van Golen](#)  
Lincoln University

Once thought to be only involved in the metabolic process, knowledge of the complete function of the ATP molecule has expand and with it the concept of purine nucleotides and nucleosides as extra cellular messengers. These messenger molecules constitute what is known as the purinergic signaling system, which plays a role in the signaling of many cellular functions from neurotransmission to cell differentiation[1]. Previous literature has shown that ATP signaling mediated by P2 receptors has anticancer effects. However, other studies have demonstrated a role of purinergic signaling in cancer progression leading to metastasis. We hypothesize that certain purinergic molecules are present on prostate cancer cells and dictate their ability to metastasize. Previous work in our laboratory has shown a distinct pattern of purinergic receptor expression on the mRNA level in the LNCaP series of isogenic cell lines. In addition, these cells produce and release ATP into the extracellular environment. To illuminate which of the eight P2 receptor are expressed on the protein level, immunoblots were preformed, selecting for a number of the P2Y receptors. Currently we have demonstrated expression of the P2Y1, P2Y6, and P2Y14 receptors, which have the strongest signal. Expression of the remaining receptors need to be determined.

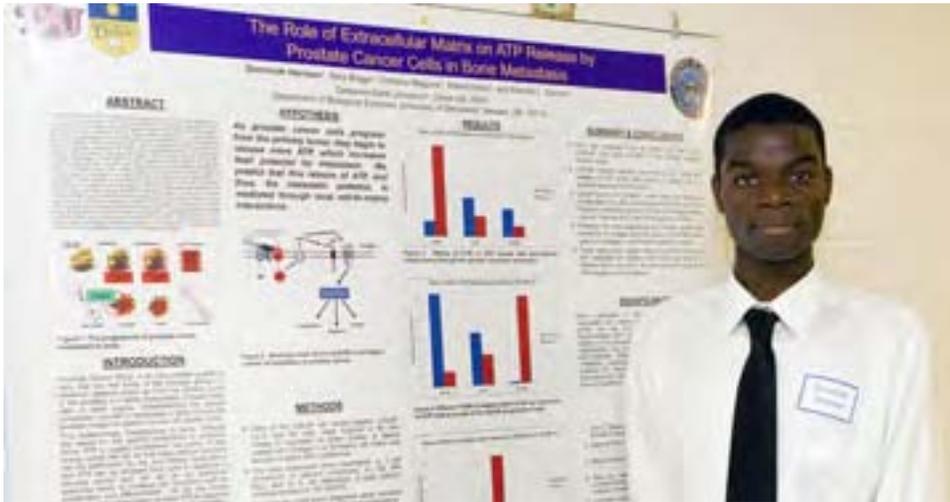


### Testing natural compound extracts for anti-cancer properties

Jeneice Hamilton and [Kenneth VanGolen](#)

Lincoln University

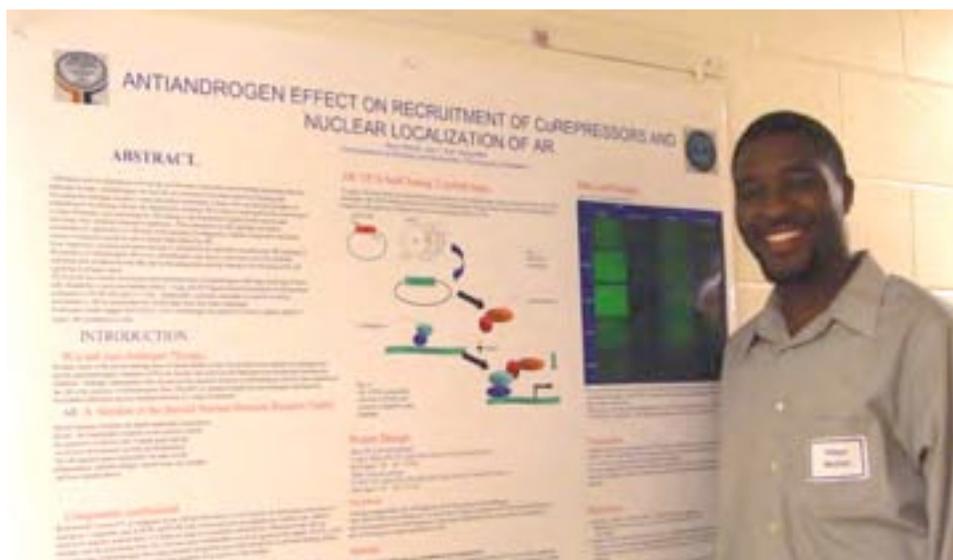
Five natural compound plant extracts (spices) that are suspected to have anti-cancer properties were obtained from India. The purpose of this experiment is to provide scientific evidence to confirm whether or not the spices possess such properties. Each of the compounds, namely: *Zingiba officinale*, Tinospora, Cucuma Longa, Piper Betel and Piner Longum, was tested on human PC-3 cells. A thousand cells were placed in each well of a 96 well plate. The following concentrations (in microliters) of spices dissolved in DMSO was added to the cells: 1:10, 1:50, 1:100, 1:250, 1:500, 1:1000 and 1:2500. Controls were 1:500 and 1:1000. Readings were taken at different time points, that is, every day for four consecutive days and the final reading was taken on the seventh day. At the end of each time point, cells were treated with MTT and incubated for two hours. A MTT assay was then ran and the data was collected and graphically presented showing absorbance against time. Based on these data, it was observed that higher concentrations of each spice adversely affected the cells and the effects are mostly noticeable at a later time point. Compound *Zingiba officinale* effect on cells is only noticeable by day four however, the change was not significant. Compound Tinospora effect on the cells was barely noticeable on day three, but fell on day four and increased significantly on day seven at the four highest concentrations. Compounds Piper Betel and Piner Longum showed quite a significant effect on cells by day four. Compound Cucuma Longa is still undergoing evaluation and the final readings for the last four compounds are set for the next 24 hours. It is however predicted that absorbance of cells at the higher concentrations will be much less than at the lower concentrations. This implies that the extracts are either inhibiting the growth of the cells or killing them.



## The Role of Extracellular Matrix on ATP release by Prostate Cancer Cells in Bone Metastasis

**Dominick Harrison<sup>1</sup>**, [Randall Duncan](#), [Robert Sikes](#), [Mary Boggs](#), and Christine Maguire  
<sup>1</sup>Delaware State University

The Effect of Extracellular Matrix on ATP release by Prostate Cancer Cells in Bone Metastasis / / Prostate Cancer is one of the most common types of cancer found in men affecting one in six in the United States, but it is the metastasis of this cancer to bone and pain associated with this metastasis that dramatically impacts the quality of life of the patient. Unfortunately, the mechanism of how cancer cells metastasize is unclear. Recent studies have suggested that tumor cells produce abundant ATP and our lab postulates that the release of ATP from these cells, and the subsequent binding to purinergic receptors regulates metastasis. As the cancer cells metastasizes, it encounters and binds to different types of extracellular matrix (ECM) proteins that we believe will increase the release of ATP and enhance metastasis of the cancer. To test this hypothesis, we used the LNCaP (Lymph Node Carcinoma of the Prostate) progression model of Prostate Cancer. This model consists of four cell lines at various stages of prostate cancer progression from relatively benign (LNCaP) to highly aggressive and metastatic to bone (C4-2B). In this project, I grew C4, C4-2, C4-2B cells on different ECM proteins and determined if the release of ATP from these cells was dependent on the attachment of these cells to the ECM. Cells were grown on either tissue culture plastic, collagen I or neural ECM proteins produced by primary culture of Schwann cells. Basal release of ATP was measured by removing an aliquot of medium from the cells grown on these ECM proteins and indirectly measuring ATP using the luciferin-luciferase assay. My lab has shown that ATP release is regulated by extracellular calcium entry, so we added either ionomycin (calcium ionophore) or high KCL (depolarization to active voltage sensitive calcium channels) to the medium to determine if cells grown on this different ECM's had different amounts of ATP available for release.  
Department of Biological Sciences, Funded by Department of Defense



## Antiandrogen Effect on Recruitment of CoRepressors and Nuclear Localization of Androgen Receptor

**Alfayo Michira, [John T. Koh](#), and Kathy Miller**  
Department of Chemistry and Biochemistry

Androgens such as testosterone activate the proliferation of prostate cancer through interaction with the androgen receptor. Antiandrogens are used for the treatment of prostate cancer by blocking and disrupting the androgen receptor's trans-activation mechanism. Cancer cells can develop resistance to antiandrogens by altering cellular AR signaling by mutating AR so that it is activated by the antiandrogen or other hormones, over expressing the AR leading to the expression of genes in the nucleus and activating other cytokines responsive pathways. These alterations in AR signaling can lead to recruitment of coactivators to AR even in the presence of antagonists, whereas compounds that block nuclear localization should be able to block transcription by AR. Over expression/ cytokine activation can lead to recruitment of coactivators and abnormal AR signaling in the presence of antiandrogens. However, antiandrogens may cause co-activators not to be recruited indicating that corepressors may take part in the antagonistic activity leading to the blocking of the AR signaling in prostate cancer. The Koh lab has recently developed a new structural class of antiandrogens with long extensions to more fully disrupt the co-activator binding surface. Using AR-GFP ligand induced localization of AR has been evaluated in LNCaP cells and CV1 cells. Additionally, constructs necessary to examine co-factor recruitment to AR by mammalian two hybrid assay have also been constructed. Preliminary results suggest that Pan52, a new antiandrogen developed at UD has a superior ability to reduce AR localization in cells. Acknowledgement: This work is supported by HHMI and funded by the Department of Defense.

2. National and regional meeting presentations/awards. Janeice Hamilton and Wachen Peters took their research efforts on the road to exhibit posters at the American Society Biochemistry and Molecular Biology meeting in Anaheim, California, the Annual Biomedical Research Conference for Minority Students (ABRCMS) in Phoenix, Arizona and the 12th annual Undergraduate Research Symposium in the Chemical and Biological Sciences at the University of Maryland, Baltimore County (UMBC), MD. Wachen received a second place prize for her poster on purinergic signaling in prostate cancer at the UMBC research conference. These results signal that our program is gaining in strength.

**Conclusions:**

We have enrolled 5 students from 2 HBCUs for the purpose of an enriched summer research program that has a prostate cancer focus and addresses several aspects of health disparities. All students successfully completed all requirements of the program: research description, hands on bench science, poster production and public presentation(s). Two of 5 students were selected for participation in national or regional meetings and one received a second place for her poster in a regional meeting. The program is functioning well and mechanisms to address deficiencies in academic year lectures has been addressed. 5 students were selected for the summer program for 2010, which is currently in progress.

**References:**

Not applicable

**Attachments:**

UDaily articles (N=4) describing student activities and achievement.

## Students present their findings at summer symposium

3:15 p.m., Aug. 14, 2009---Wall-to-wall guests filed into the hallways of McKinly Laboratory on Wednesday, Aug. 12, to hear and see oral and poster presentations by the 181 students participating in this year's Summer Undergraduate Research Symposium.

Harold White, professor of chemistry and biochemistry and director of the University of Delaware's Howard Hughes Medical Institute Undergraduate Science Education Program, said, "This is the largest number we have had in nine years, by a significant amount. A large part of that increase is attributed to the greater participation of students from the College of Engineering."

The symposium gives undergraduates who've spent the summer pursuing independent research projects in the sciences, mathematics and engineering a chance to hone their presentation skills and showcase their work.

To open the symposium, Scott Strobel, a Howard Hughes Medical Institute professor and a professor of biophysics and biochemistry at Yale University, gave a lecture on "The Search for Microbiological and Chemical Diversity in the Rainforest."

In the lecture, which took place in Wolf Hall auditorium, Strobel spoke of his experiences studying in Ecuador and Peru, where he takes students to help them gain ownership of their science projects, studying biological diversity.

"I wanted to create a situation where a group of students could have complete ownership over a project," Strobel said.

He stressed to the symposium participants that ownership over a scientific project is important because, "you guys all live in a world where there are a lot of expectations about what science is going to deliver to you, to deliver to us, the problems that science is going to solve. So you have to decide what problem it is that you care so passionately about and are so interested in and is so important that it's going to consume your life and your attention and your energy for some number of years."

Students presenting at the Undergraduate Research Symposium displayed ownership of their projects, and months of hard work paid off with each student presenting on their research findings.

"By preparing a poster about their research, students have an opportunity to reflect on what they have done, put it in perspective, and gain valuable experience in communicating their work to others," White said.

Among the undergraduate students involved in the symposium, Kevin Crum, a UD junior in the Honors Program studying in the area of marine science, spent most of the summer studying the effects of shoreline hardening on nearby fish populations.

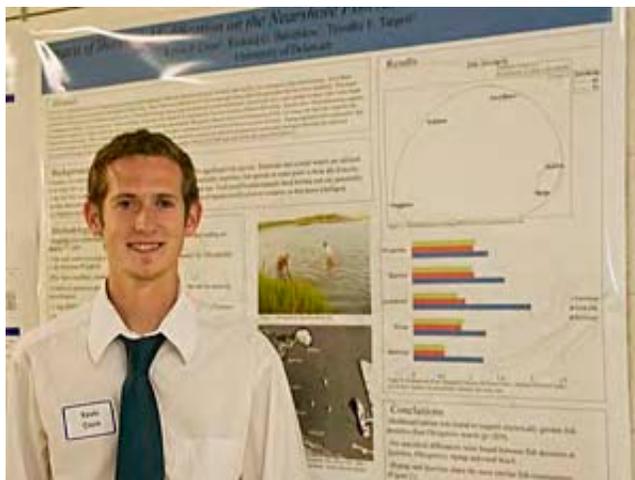
"We picked a site in the University of Delaware boat basin down in Lewes," Crum said, "and we seined, which is just a big net, for about 10 meters and then we counted and measured the fish that we caught and



*Scott Strobel of Yale University discusses "The Search for Microbiological and Chemical Diversity in the Rainforest."*



*In Wolf Hall auditorium, Scott Strobel talks about his research experiences in Ecuador and Peru and the involvement of his students.*



did some diversity indexes.”

Crum studied five different areas in the one site and found that while some areas had a high fish population, they had a low level of diversity, and other areas had a low level of fish population but a high level of diversity.

Steven Foltz, a UD senior in the Honors Program majoring in biochemistry, did his research on a genetic disease called Spinal Muscular Atrophy, also known as SMA.

“I did research up at the Children’s Hospital because this is a disease that kills people in childhood, a lot of the time, depending on the severity,” Foltz said. “My particular project was to probe for abnormal protein expression in cells because our disease is characterized by degeneration of motor neurons in the spine, so I took samples of differentiated motor neurons and then basically probed them for protein expression.”

In addition to UD students, the symposium also included students from Delaware State University, Lincoln University, Delaware Technical and Community College and Wesley College among others.

One student from Lincoln University, Jeneice Hamilton, did her research on the anti-cancer properties of five different kinds of spices. Hamilton, who is from Jamaica, said that she chose to do research on the herbs because, “in Jamaica, they do use herbs a lot.”

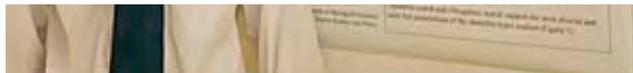
Eight students presented their research as talks in a competition, which was sponsored by the UD Chapter of Sigma Xi. The winners received \$100, \$50 and \$25 gift certificates presented to them by Carl Schmidt, chapter president and associate professor of animal and food sciences at UD. First place went to Michael Napolitano, a senior biochemistry major; second place went to Rebecca Brown, a senior biological sciences major; and third place went to Sharon Weaver, a junior chemical engineering major.

The Summer Undergraduate Research Symposium is cosponsored by the Howard Hughes Medical Institute’s Undergraduate Science Education Program, the University of Delaware Chapter of Sigma Xi, the College of Arts and Sciences, the National Institutes of Health IDeA Network of Biomedical Research Excellence (INBRE) Program, the Delaware Biotechnology Institute and Sigma Xi.

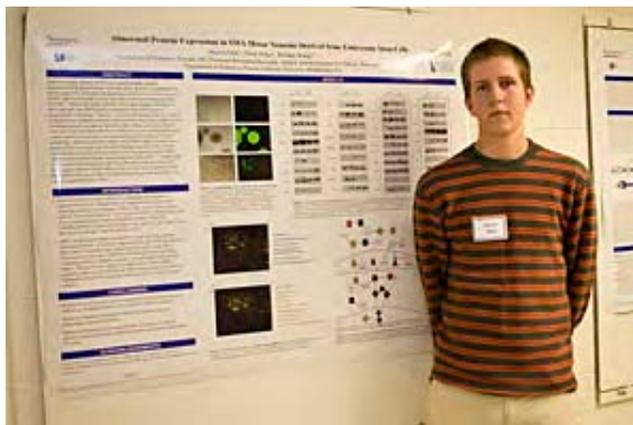
Participating students were supported by the Howard Hughes Medical Institute Undergraduate Science Education Program, the University of Delaware Undergraduate Research Program, the National Institutes of Health IDeA Network of Biomedical Research Excellence (INBRE) Program, Delaware Biotechnology Institute, the National Institutes of Health Bridges Program, NIH Bridges Program, The National Science Foundation (NSF) Experimental Program to Stimulate Competitive Research, (EPSCoR) Beckman Scholars Program, Ronald McNair Scholars Program, Charles Peter White Fellowships, DoD Program and Chemistry Alumni Fellowships.

Story by Adam Thomas  
Photos by Ambre Alexander

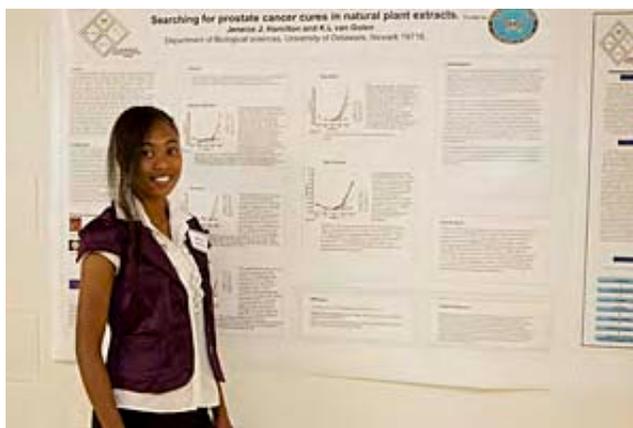
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*UD junior Kevin Crum*



*UD senior Steven Foltz*



*Jeneice Hamilton of Lincoln University*

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## Three UD undergraduate researchers win awards at national meeting

12:04 p.m., May 4, 2010----Three University of Delaware undergraduate researchers - Tejal Naik, Laura Sloofman and Amy Styer -- won awards at the Experimental Biology 2010 meeting held April 24-28 in Anaheim, Calif.

As part of the meeting, the American Society for Biochemistry and Molecular Biology sponsored its 14th undergraduate poster competition.

Naik, a junior Honors Program student majoring in biological sciences, received an award for the best poster in the thematic area of chemical biology and drug discovery.

Sloofman, a senior Honors Program student majoring in quantitative biology, won honorable mention for her poster in the systems biology category, and Styer, a senior Honors Program student majoring in biochemistry, won honorable mention for her poster in the protein structure and function category.

For the last decade, the UD Howard Hughes Medical Institute's Undergraduate Science Education Program has been sending students to the Experimental Biology meetings to present research.

Since 2001, students from the University have received more awards in this competition than students from any other college or university.

This year, the contingent included four UD faculty members, 13 UD students and one Lincoln University undergraduate researcher.

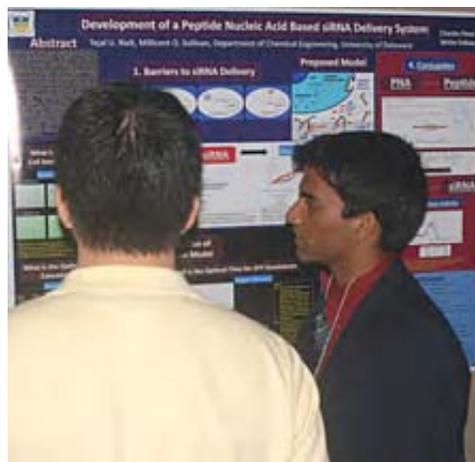
In addition to Sloofman and Styer, UD students who attended were Rebecca Brown, Aleksey Dvorzhinskiy, Jean Huynh, Megan Kissig, Tyler Larsen, Tejal Naik, Michael Napolitano, Rachel Randell, Robert Sheehan, Katharine Shelly and Jamie Stull. Lincoln student **Wachen Peters** also attended.

Faculty who attended were Harold White, professor in the Department of Chemistry and Biochemistry; David Usher, professor in the Department of Biological Sciences; Seung Hong, laboratory coordinator in the Department of Biological Sciences; and Gary Laverty, associate professor in the Department of Biological Sciences.

White, director of the UD HHMI Undergraduate Program, said this was a great group of students. "They really got into the meetings and interacted well together. I think they learned a lot about the importance of large meetings in disseminating new scientific discoveries and stimulating new research," he said.

The trip to Experimental Biology 2010 was organized by the University of Delaware HHMI Undergraduate Science Education Program with additional support from travel grants from the American Society for Biochemistry and Molecular Biology, the Arnold and Mabel Beckman Scholars Program, and the Office of Equity and Inclusion.

The HHMI Undergraduate Science Education Program, the Arnold and Mabel Beckman Scholars Program, the Charles Peter White Fund, the



*Tejal Naik won an award in the undergraduate poster competition sponsored by the American Society for Biochemistry and Molecular Biology.*



*Laura Sloofman won an honorable mention award in the undergraduate poster competition sponsored by the American Society for Biochemistry and Molecular Biology.*



UD Undergraduate Research Program, the National Institutes of Health, the National Science Foundation, the National Eye Institute, and the Department of Defense supported research by the students.

For details on UD participation, see the website.

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*Amy Styer won an honorable mention award in the undergraduate poster competition sponsored by the American Society for Biochemistry and Molecular Biology.*

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## UD student takes top honors at national conference

3:05 p.m., Dec. 3, 2009----One of six University of Delaware students who participated in the **Annual Biomedical Research Conference for Minority Students (ABRCMS)** held last month in Phoenix, Ariz., received top honors for his poster presentation.

Michael Holder, a senior exercise sciences major in the Department of Health, Nutrition and Exercise Sciences and a Howard Hughes Medical Institute NUCLEUS scholar at UD, was honored in the physiological sciences category for his presentation "Normotensive Salt Resistant Individuals and the Nighttime Dip in Blood Pressure." His research mentor is William Farquhar, associate professor in the department.

This was the fourth year in a row that a student from University of Delaware has won an award at the conference. There were approximately 3,000 conference attendees with 1,215 student biomedical research presenters.

Other HHMI NUCLEUS scholars that attended and presented at this year's conference included Danielle Toupo, junior quantitative biology major; Devan Turner, junior chemistry major; David Marsan, junior biochemistry major; Wuroh Timbo, junior biological sciences major and Honors Program student; and **Wachen Peters, junior Department of Defense scholar from Lincoln University.**

The students were accompanied by Jacqueline Aldridge, HHMI Bridges and HHMI NUCLEUS program director; Carlton Cooper, assistant professor in the Department of Biological Sciences and HHMI NUCLEUS advisory board member; and Christina Bussie, HHMI NUCLEUS graduate intern and second-year graduate student in the counseling in higher education master's degree program.

ABRCMS is a scientific forum that provides an opportunity for minority students and their advocates to convene and present their research to an audience of their peers. It is also encouraged that students, faculty and program directors network with each other to take advantage of opportunities to advance in the various scientific disciplines.

Hundreds of schools displayed exhibits to present their graduate programs, post-doctoral programs and summer undergraduate research opportunities. The emphasis on networking was evident at this year's conference as some of the new changes were a session in which individuals could meet and network with their individual disciplinary professional societies.

Exhibitors said they were pleased that UD students took advantage of this opportunity, so much so that it was mentioned that UD students were the only students that offered business cards to their colleagues.

The conference keynote address was by Mae Jemison, the first woman of color to go into space and the founder of the Jemison Group and BioSentient Corp. Tyrone Haynes, a professor at the University of California Berkeley, presented a talk titled "From Silent Spring to Silent Night: What Have We Learned" about the harmful effect of pesticides in the water supply.



*Michael Holder with the ABRCMS award.*



*The University of Delaware group at November's ABRCMS conference.*

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Aldridge said the experience “was uplifting and fun, as many of this year’s attendees from UD had never previously been to Phoenix. The students and staff alike left the conference inspired and energized about their individual endeavors and future possibilities.”

She added, “With the academic, professional and personal development workshops and the constant encouragement from conference organizers and attendees, the ABRCMS conference was truly a highlight in the group’s pursuits. The information and inspiration gained from this conference will not be soon forgotten.”

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## Delaware undergraduate researchers present at regional science symposium

10:14 a.m., Oct. 12, 2009---Fifteen University of Delaware students and two Lincoln University students who worked at the University of Delaware last summer presented posters at the 12th annual Undergraduate Research Symposium in the Chemical and Biological Sciences, held Oct.10 at the University of Maryland, Baltimore County. Eight of these students received first or second place awards in various judging categories.

First place awards went to **Tejal Naik** in Biochemistry and Molecular Biology and to **Katharine Shelly** and **Megan Kissig** in the Biological Sciences.

Second place awards went to **Rachel Randell** and **Rachael Latshaw** in the Biological Sciences; **James White** and **Wachen Peters** (Lincoln University) in the Chemical Sciences; and **Steve Foltz** in Biochemistry and Molecular Biology.

Other students presenting or attending included: **Jeneice Hamilton** (Lincoln University), **Michael Napolitano**, **Matthew King**, **Jean Huynh**, **Robert Sheehan**, **Rebecca Brown**, **Alissa Kregling**, **Wuroh Timbo** and **Scott Wroten**.

Brown, Foltz, King, Kissig, Latshaw, Naik, Napolitano, Randell, Sheehand, Shelly, Timbo and White are all in the University Honors Program.

A symposium highlight was a plenary talk by Peter Agre, a Nobel Prize-winning chemist. He discussed the influences and unexpected events in his career that led from his undergraduate research experiences through medical school to his discovery of aquaporins, for which he received the 2003 Nobel Prize in Chemistry. Currently, he directs the Johns Hopkins Malaria Research Institute and serves as president of the American Association for the Advancement of Science.

The Howard Hughes Medical Institute Undergraduate Science Education Program organized and sponsored the trip. Hal White, professor of chemistry and biochemistry and director of the HHMI Program, accompanied the students.

Contributed by H.B. White

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*University of Delaware and Lincoln University students at the 12th annual Undergraduate Research Symposium in the Chemical and Biological Sciences*

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