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TITLE:
Prostate Cancer Research Training Program

PRINCIPAL INVESTIGATOR:
David M. Lubaroff, PhD

CONTRACTING ORGANIZATION:
University of Iowa
Iowa City, IA 52242

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14. ABSTRACT
The HBCU Summer Research Training Program accepted a total of 8 students from Lincoln University for each of the eight week sessions during the summers of 2016, 2017 & 2018. Each student was assigned to a laboratory of a participating mentor and also paired with a member of the mentor's laboratory. This laboratory member assisted with day to day aspects of the research project. During the summer the students work diligently on their research project, participate in meetings of the mentor's laboratory, attend workshops and seminars associated with our and other summer programs, and attend a special course in prostate cancer. We integrate the Lincoln students into social programs held throughout the campus for summer interns. At the end of the summer sessions the students present a poster of the research results from the summer experience. They also present the results of their research in the fall at Lincoln University. Of the students that have graduated from Lincoln, 58.3% are attending, or have attended, postgraduate programs.

15. SUBJECT TERMS
Summer research; prostate cancer; HBCU institutions

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Introduction:

In our initial award (W81XWH-06-1-0266), begun in 2006, we were funded for five students from Lincoln University of Pennsylvania. Because of a large number of qualified student applicants we were funded for additional three students in 2007 (W81XWH-07-1-0241), allowing our program to support a total of eight Lincoln students each summer. We applied for, and were awarded; additional grants (W81XWH-09-1-0270), W81XWH-10-1-0459, W81XWH-12-1-0117), W81XWH-13-1-0178, and this award W81XWH-16-1-0549 after the original grants had been completed. For the year reported here we had the following faculty participants: David M. Lubaroff, PhD, Principal Investigator, Paul Heidger, PhD, University of Iowa Faculty Advisor, Karen Baskerville, PhD, and Whelton Miller, PhD, Lincoln University Faculty Advisors, and the following University of Iowa mentors: James Brown, MD; Frederick Domann, PhD; Paloma Giangrande, PhD; Prabhat Goswami, PhD; Yi Luo, PhD; Susan Lutgendorf, PhD; Lyse Norian, PhD; Aliasger Salem, PhD; Michel Schultz, PhD; Andrean Simons-Burnett, PhD; Douglas Spitz, PhD; Chad Tracy, MD; George Weiner, MD; Michael Wright, PhD; and Nicholas Zavazava, MD.

Body:

Recruitment and Admission:
Brochures, application forms, and posters were designed and printed and sent to Drs. Baskerville and Miller at Lincoln. Thirteen applications were received for 2014, twenty for 2015, twenty-three for 2016, fourteen for 2017, and seventeen for 2018. The applications were reviewed by the Admissions Committee whose membership consisted of Dr. Lubaroff, Dr. Heidger, Dr. Simons-Burnett, Dr. Baskerville, and Dr. Miller. Admission was offered to a total of 8 students for 2016 4 students for 2017, and four students for 2018 since only one grant was active in the last two years. The CDMRP chose to discontinue the Undergraduate HBCU Summer Research Training Program so we are only working on one grant to support 4 students..

Students accepted for the 2016 Program

Kimoni Driver
Nonye Ibik
Ayana McLaren
Chinonso Obidike
Prisca Obidike
Siani Snaith
Destiney Taylor

Students accepted for the 2017 Program

Jane-Frances Aruma
Ceryce Collie
Nile Garner
Ime Nkanta

Students accepted for the 2018 Program

Emmanuella Ikechukwu
Sarina Murray
Oreoluwa Oladimeji
Cieara Rouse

Advance Preparation and Information Distribution:
Following acceptance of the students into the program we assigned each student a mentor based upon his/her choices listed in their applications. Each mentor then assigned a member of the lab as a "big brother/big sister," a person that partners with the student during the 8 week summer session. The mentor also prepared a portfolio of articles covering the area of research the student would be working on, including published papers by the mentor. These materials were sent to the students in advance of their arrival at the University of Iowa.

A six week course on Prostate Cancer was organized with six faculty assigned to deliver lectures. The following represents the course schedule with lecturers:

Iowa-Lincoln Summer Research Training Program - 2016
Prostate Cancer Course
Room – 2156 MERF*

Lecture	**Date**	**Time**	**Subject**	Lecturer
Week 1	June 14	9:00 am	Introduction to cancer	Spitz
Week 2	June 21	9:00 am	Epidemiology of prostate cancer	Gupta
Week 3	June 28	9:00 am	Pathology of prostate cancer	Dahmoush
Week 4	July 5*	9:00 am	Genetics of prostate cancer	Qi
Week 5	July 12	9:00 am	Clinical treatment of prostate cancer	Nepple
Week 6	July 19	9:00 am	Immunotherapy of prostate cancer	Lubaroff

Summer Research Training Program - 2017
Course on Cancer

Lecture	**Date**	**Time**	**Subject**	Lecturer
Week 1	June 12	9:00 am	Introduction to prostate cancer	Spitz
Week 2	June 20	9:00 am	Epidemiology of prostate cancer	McDowell & West
Week 3	June 27	9:00 am	Pathology of prostate cancer	Dahmoush
Week 4	July 5	9:00 am	Genetics of prostate cancer	Qi
Week 5	July 10	8:00 am	Clinical treatment of prostate cancer	Nepple
Week 6	July 18	9:00 am	Immunotherapy of prostate cancer	David Lubaroff

Summer Research Training Program - 2018
Course on Cancer

Lecture	Date	Time	Subject	Lecturer
Week 1	June 12	9:00 am	Introduction to cancer	Spitz
Week 2	June 19	9:00 am	Epidemiology of cancer	McDowell & West
Week 3	June 26	9:00 am	Pathology of cancer	Dahmoush
Week 4	July 3	9:00 am	Genetics of cancer	Spies
Week 5	July 10	9:00 am	Clinical treatment of cancer	Nepple
Week 6	July 17	9:00 am	Immunotherapy of cancer	Lubaroff

Key Research Accomplishments

Each of the students worked on research projects that were part of an overall program within the laboratory of their mentors. As such, it is difficult to identify key research accomplishments for each student research project. Continuation of the research program by each mentor will certainly produce important research findings, aided in part by the summer research of the Lincoln University students. What is key is the mentoring and counseling of the students to aid in their future as scientists in the area of prostate cancer research. The high percentage of the students that are graduate programs or medical schools is an outstanding accomplishment as these future scientists will most certainly provide key research accomplishments in the years to come.

Reportable Outcomes:

The students have reported their findings to the University of Iowa faculty, to the faculty and students at Lincoln University, and at national competitions and conferences. The student's research resulted in her being an author on publications.

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Eric J. Devor, PhD, Henry D. Reyes, MD, Jesus Gonzalez-Bosquet, MD, PhD, Akshaya Warrier, Susan A. Kenzie, **Nonye V. Ibik**, Marina D. Miller, MD, Brandon M. Schickling, Michael J. Goodheart, MD, Kristina W. Thiel, MD, and Kimberly K. Leslie, MD. Int J Gynecol Cancer 2017;27: 784-790

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Lincoln Student Follow-Up

Name	Year	Outcome	School	Current Status
Oluwaseun Adekanye	2006	medical school	U. Michigan	Physician
Shaynah Browne	2006	graduate school	U. Mass	research scientist at Mt. Sinai Med. Ctr.
Nikesha Haynes	2006	graduate school	U. Rochester	research scientist at the Univ. of Rochester
Shivaughn Johnson	2006	medical school	Ross University Medical School	working
Briquel Sherman	2006	medical school	University of West Indies	Physician
Shaan Spence	2006	graduate school	U. South Florida	graduate school
Bisola Awoyemi	2007	graduate school	Univ. of the District of Columbia	research associate at Dana Farber
Seme Diallo	2007	graduate school	Drexel University	Research scientist at Medimmune
Caroline Dias	2007	working	none at this time	working
Titilope Idowu	2007	working	Morehouse College	Consultant

Patrick Ndungu	2007	graduate school	University of Iowa	research scientist at Catalyst, Inc
Elizabeth Okyne	2007	nursing school	U. Iowa	nursing
Katrina Probherbs	2007	graduate school	Adelphi University	working in healthcare
Bukola Fatunmbi (Now Kole Fatunmbi)	2008	graduate school	U. Mass	working in science industry
Katherine Foster	2008	laboratory research	Fox Chase Cancer Center	research assistant in science
Theon Francis	2008	teaching science	none at this time	teaching science
Michelle Gray	2008	graduate school	Johns Hopkins	graduate school
Julia Greenfield	2008	graduate school	U. Maryland	graduate school
Gladys Murage	2008	graduate school	U. Mass	graduate school
Brittany Stokes	2008	working in healthcare	none at this time	working in healthcare
Stacy-Ann Wright	2008	medical school	Ross University Medical School	medical school
Kaylene Baugh	2009	nursing school	Duke Univ.	nursing school
Christina Chisolm	2009	graduate school	U. Mass	graduate school
Seme Diallo	2009		see 2007	
Elizabeth Okyne	2009		see 2007	
Stephen Sangster	2009	teaching science	none at this time	teaching science
Keyana Tyree	2009	graduate school	Delaware State U./Nebraska	graduate school
Neja White	2009	working in healthcare	none at this time	working in healthcare
Akede, Theresa	2010	graduate school	U. Maryland Baltimore	research scientist
Awoyemi, Christiana	2010	graduate school	U Texas-Dallas	graduate school
Sangster, Stephen	2010		see 2009	
Rand, Stephanie	2010	medical school	Thomas Jefferson	resident physician
McKnight, Danielle	2010	working	none at this time	working
Markes, Jhanelle	2010	graduate school	U. of Iowa	research associate
Holsey, Danielle	2010	graduate school	Xiamen Univ.	graduate school
Diallo, Chalwe	2010	laboratory research	Penn State	research assistant in science
Brown, Nakita	2010	post baccalaureate	U. Pittsburgh	working in healthcare
Baugh, Kaylene	2010		see 2009	
Cooper, Jhoneil	2011	graduate school	Drexel University	graduate school
Doubt-Swinton, Darah	2011	working in healthcare	none at this time	research assistant in science
Foster, Jodi-Ann	2011	working in science	none at this time	research assistant in science
Ihejirika, Patrick	2011	graduate school	univ of delaware	graduate school
Lynch, Candice	2011	graduate school	Nova Southeastern Univ	graduate school
Raeburn, Ayanna	2011	nursing school	Lincoln	nursing
Sangster, Nathaniel	2011	teaching science	none at this time	research assistant in science

Davis, Lauri-Ann	2012	teaching science	Lincoln	working in science
Diallo, Chalwe	2012		see 2010	
Ebanks, Shauna	2012	graduate school	Penn State	graduate school
Ellis, Ashley	2012	nursing school	Lincoln	nursing school
Jones, Shakeema	2012		???	unknown
Lynch, Candice	2012		see 2011	
Markes, Jhanelle	2012		see 2010	
Smith, Rasheid	2012	graduate school	U of Iowa	graduate school
Appeah, Daniel	2013	medical school	St. George's & Northumbria	medical school
Cummings, Precious	2013	graduate school	Univ. of South Florida	graduate school
Foster, Jodi-Ann	2013		see 2011	
Linkins, Jehnae	2013	graduate school	U. of Delaware	graduate school
Onukwhuga, Chinenye	2013		Lincoln	unknown
Raeburn, Ayanna	2013		see 2011	
Sangster, Nathaniel	2013		see 2011	
Wahome, Josphat	2013	post baccalaureate	Fox Chase Cancer Center	post baccalaureate
Brower, Jasmine	2014	graduate school	Wilmington University	graduate school
Frimpong, Kojo	2014	graduate school	Thomas Jefferson	graduate school
Joseph, Tisha	2014	Graduate school	Pace U – NY	Science teacher
Lindsay, Brittany	2014	medical school	UK	medical school
Onukwhuga, Chinenye	2014		Lincoln	See 2013
Payne, Cashel	2014	teaching science	Lincoln	teaching science
Smith, Rasheid	2014	graduate school	U of Iowa	graduate school
Edi, Seighe	2015	graduate school	Lincoln	graduate school
Endoni, Benney	2015	working in science	Univ. of Delaware	working in science
Hason, Lai Quannah	2015	graduate school	Drexel University	graduate school
Ihejirika, Nnamdi	2015		Lincoln	not yet graduated
Little, Abreah	2015	graduate school	Drexel University	graduate school
Mwanza, Lisa	2015		Lincoln	not yet graduated
Slater, Hasan	2015		Lincoln	not yet graduated
Yakie, Joy	2015	graduate school	U. Michigan	graduate school
Driver, Kimoni	2016		Lincoln	not yet graduated
Ibik, Nonye	2016	Working-medicine	Lincoln	Working-medicine
McLaren, Ayanna	2016		Lincoln	not yet graduated
Obidike, Chinonso	2016	Teaching science	Lincoln	Teaching science
Obidike, Prisca	2016	Medical school	Penn State U.	Medical school
Snaith, Siani	2016		Lincoln	not yet graduated
Taylor, Destiney	2016		Lincoln	not yet graduated
Aruma, Jane-Frances	2017		Lincoln	not yet graduated
Collie, Ceryce	2017	Graduate school	Temple U	Graduate school
Garner, Nile	2017		Lincoln	not yet graduated
Nkanta, Ime	2017	Healthcare	Lincoln	Healthcare
Ikechukwu, Emmanuella	2018		Lincoln	Not yet graduated
Murray, Sarina	2018		Lincoln	Not yet graduated
Oladimeji, Oreoluwa	2018		Lincoln	Not yet graduated
Rouse, Cieara	2018		Lincoln	Not yet graduated

As is evident from the table, of the 67 students that have graduated from Lincoln, 7 (10.5%) are, or have, attended medical schools; 32 (47.8%) are, or have, attended graduate schools; the great majority of the remaining students are in some aspects of science and healthcare. These latter include nursing school, laboratory research, post baccalaureate programs, teaching science, or working in the healthcare environment. Only a relatively few have not continued in science. We are proud of the fact that 58.3% of the graduated students entered medical or graduate schools and overall greater than 95.5% have moved into a medical science career.

It should be noted that all of the students do graduate from Lincoln University. We are basing our calculations on those that have finished matriculating at the school.

Conclusion

This award was highly successful as evidenced by the amount of work accomplished by each student and by their motivation to continue in a science career. The PI applied, and received funding, for an additional HBCU training grant that will enable us to continue accepting students for a number of years, thus increasing the number of African American scientists in the area of prostate cancer.

Appendices: Brochures for 2016, 2017, 2018

University of Iowa Health Care

Holden Comprehensive Cancer Center

The Lincoln University 1854

2016

Prostate Cancer Research Summer Training Program

A Collaboration Between the University of Iowa and The Lincoln University

Students in the 2015 Program

Summary of Program: The partnership of the University of Iowa and The Lincoln University is designed to provide an outstanding atmosphere to train undergraduate students from Lincoln in prostate cancer research. We propose to have twenty-two mentors available for each of the trainees to choose from for their summer research project. The mentors are from seven departments and three colleges at the University of Iowa and the prostate cancer research in their laboratories covers a wide area of interest. The proposed mentors have extensive training experience at all levels; undergraduate, graduate, medical, and postdoctoral.

In addition to the twenty-two faculty mentors both the University of Iowa and Lincoln University have designated Faculty Advisors for the students. Dr. Paul Heidger serves as the advisor at the University of Iowa and Dr. Karen Baskerville and Dr. Derrick Swinton serve as the advisors at Lincoln University. All of the individuals are available for advice and assistance throughout the summer and the regular academic year. The faculty members are listed below as well as a brief description of research in the laboratories of each University of Iowa mentor.

At this point in time the program is 8 weeks long, beginning on Monday, June 6, 2016 and ending on Friday, July 29, 2016.

Faculty Advisors at Lincoln University:

Karen Baskerville, PhD; Associate Professor and Chair, Department of Biology (484-365-7507)

Derrick Swinton, PhD; Professor and Dean, College of Science & Technology (484-365-7642)

Drs. Baskerville and Swinton are the contact people for the summer program at Lincoln University. They are active in the recruitment, retention, and career planning for our summer students. They also visit the University of Iowa during the summer program.

University of Iowa Faculty and Their Research

Director and Research Mentor: David Lubaroff, PhD; Professor, Department of Urology & Director of the Summer Research Program (319-335-8423)
http://www.medicine.uiowa.edu/dept_primary.aspx?appointment=Urology&id=907659

The work in this laboratory concentrates on the area of tumor immunology with an emphasis on immunotherapy. We have constructed microbial vaccines to be used for the investigation of gene and immunotherapy of prostate cancer. Investigations on the ability of immunized animals to produce immune responses to the transgene product induced by the vaccine are underway. Additionally, we are carrying our "translational" research in the form of clinical trials of our adenovirus vaccine in men with prostate cancer. Important in these trials is the safety of the vaccine and its ability to induce anti-tumor immunity. We have recently completed a Phase I clinical trial of the vaccine that demonstrated its safety. We have initiated a therapeutic Phase II trial. Finally, we have been collaborating on studies of psychosocial effects on immune status in cancer patients.

Faculty Advisor: Paul Heidger, PhD; Emeritus Professor, Dept. of Anatomy & Cell Biology (319-335-7722)
http://www.anatomy.uiowa.edu/personnel.shtml?id=heidgerp

Dr. Heidger will assist in the recruitment and evaluation of summer students and will assist students in career planning. He works with students during the summer to facilitate interviews with members of the graduate training programs, the MD/PhD program, and the Carver College of Medicine.

Research Mentors - Primary

James Brown, MD; Professor, Department of Urology (319-353-7295)
http://www.medicine.uiowa.edu/facultyfocus.aspx?id=3554

Dr. Brown is a Professor in the Department of Urology and the Andersen-Hebbeln Professor of Prostate Cancer Research whose research interests include tumor immunology and prostate cancer genetics. He has been an integral part of the clinical trial team examining the therapeutic effectiveness of the adenovirus/PSA vaccine and a co-investigator on the pending grant application on combining the vaccine with some of the new therapies for castrate-resistant prostate cancer. Dr. Brown is also collaborating with industry partners to identify genetic markers for prostate cancer.

Paloma Giangrande, PhD; Associate Professor, Department of Internal Medicine (319-384-3243)
http://molcellbio.grad.uiowa.edu/faculty/Paloma-Giangrande

Dr. Giangrande is an Associate Professor in the Hematology/Oncology Division of the Department of Internal Medicine. The long term research goals of the Giangrande laboratory are to develop RNA-based tools to modulate cellular pathways underlying pathological cell proliferation in the setting of cancer. Current efforts are focused on selecting RNA aptamers to antigens expressed on the surface of target prostate cancer cells with SELEX (Systematic Evolution of Ligands by Exponential Enrichment) for the purpose of (1) modulating receptor function and/or (2) delivering therapeutic molecules (e.g. siRNAs, antimers, small

molecule drugs) into specific cell types. A major project in the lab is targeted therapy of prostate cancer using PSMA-guided aptamers.

Amit Gupta, MD, MPH; Assistant Professor, Department of Urology (319 384 5251)
https://www.icts.uiowa.edu/Loki/research/browseResearch.jsp?id=229473
Dr. Gupta is an Assistant Professor of Urology with a joint appointment in the Department of Epidemiology in the College of Public Health. Dr Gupta's research interests lie in the Epidemiology and Outcomes of prostate and kidney cancers. Specifically he is interested in the long-term adverse effects of therapy in bladder cancer patients and in PSA screening for prostate cancer. Dr Gupta is currently studying standardization of the PSA assay and how that that may impact decision making in Prostate cancer. He is also studying whether patients undergo appropriate counseling prior to PSA testing. He has published extensively in these areas.

Yi Luo, MD, PhD; Associate Professor, Department of Urology (319-335-9835)
http://www.uihealthcare.com/depts/med/urology/urologymds/luo.html

Dr. Luo is an Associate Professor of Urology. A major research project in the Luo laboratory is to develop a novel therapeutic strategy to cope with the limitations of the current modalities for prostate cancer treatment. The lab uses both bacillus Calmette-Guérin (BCG, a bacterial vaccine strain) and adenovirus (Ad, a replication-defective strain) to deliver PSA for animal immunization. Both BCG and Ad microbes have been demonstrated to be safe and effective for antigen delivery in humans and mice. Dr. Luo has previously observed a robust induction of PSA-specific T cell responses by vaccination with combined BCG-PSA (primer vaccine) and Ad-PSA (booster vaccine) in mice.

Kenneth Nepple, MD; Assistant Professor, Department of Urology (319-356-2114)
http://www.medicine.uiowa.edu/dept_primary_apr.aspx?appointment=Urology&id=nepplek

Dr. Nepple is an Assistant Professor in the Department of Urology whose clinical and research interests are in prostate cancer and other genitourinary neoplasms. His primary research interests are in the effects of comorbidities on treatment outcomes, particularly in prostate cancer. He and Dr. Lubaroff are collaborating on the analysis of the comorbidities in the Phase II trial of the adenovirus/PSA vaccine. He is a collaborator on the Phase II trial and a co-investigator on a pending research grant application. Dr. Nepple is new to this SRTP, but has experience in the research training of residents who spend a year of their training on laboratory research projects.

Hank Qi, MD, PhD; Assistant Professor, Department of Anatomy & Cell Biology (319-335-3084)
http://www.medicine.uiowa.edu/dept_primary_apr.aspx?appointment=Anatomy%20and%20Cell%20Biology&id=qih

Dr. Qi is an Assistant Professor in the Department of Anatomy and Cell Biology. He uses biochemistry, cell biology, bioinformatics and animal models to study the epigenetic mechanism that involves histone methylation modifications. They focus on the epigenetic role of PHF8 (PHD finger protein 8), a histone demethylase, which removes H4K20me1 (*mono-methylated Histone 4 Lysine 20*) and H3K9me1 at the transcription start site and actively regulates gene expression. Studies in the Qi laboratory are investigating how PHF8 co-ordinates transcription factors and signaling pathways to determine the specificity of transcriptional regulation. They are also studying the PHF8 mediated epigenetic regulation of microRNAs, and are also interested in the functions of histone demethylases in cancer developments. Specifically, they aim to understand how histone demethylase promotes cancer cell transformation and migration, particularly in prostate cancer.

Aliasger K. Salem, PhD; Professor, Division of Pharmaceutics, College of Pharmacy (319-335-8810)
http://www.pharmacy.uiowa.edu/pharmaceutics/people/Salem.htm

Dr. Salem's research interests are primarily focused on self-assembling systems, the rational design of novel drug and gene delivery systems and on the development of sophisticated scaffolds for tissue-specific regeneration. In tissue engineering, Dr. Salem's laboratory applies microfabrication techniques to novel biomaterials to provide spatial control over tissue formation and to integrate minimally invasive scaffold delivery strategies. In drug/gene delivery, he is currently exploring the synergistic application of degradable particle technology, CpG oligonucleotides and heat shock proteins for generating sustained immunotherapeutic responses against cancer. Dr. Salem's laboratory also collaborates with Dr. Lubaroff on the use of microparticles in association with cancer vaccines fro the induction of strong anti-tumor immune responses and tumor destruction.

Christopher Stipp, PhD: Associate Professor, Department of Biology (319-335-0192)
http://www.medicine.uiowa.edu/dept_secondary_apr.aspx?appointment=Molecular%20Physiology%20and%20Biophysics&id=cstipp

Dr. Stipp in an Associate Professor in the Department of Biology. His research examines how

integrin α3β1 promotes tumor cell adhesion, migration, and invasion on laminin isoforms. Several clinical studies have indicated a correlation between increased tumoral α3β1 integrin expression and tumor progression, metastasis, and poor patient outcomes. However, several other clinical and experimental studies have suggested that α3β1 can possess anti-metastatic activity in certain settings. To help define the range of α3β1 functions in tumor cells in vivo, the Stipp laboratory uses RNAi to silence the α3 integrin subunit in an aggressive, *in vivo*-passaged subline of PC-3 prostate carcinoma cells. Loss of α3 integrin impaired adhesion and proliferation on the α3β1 integrin ligand, laminin-332 *in vitro*. Increased colonization of α3-silenced tumor cells in vivo was recapitulated in 3D collagen co-cultures with lung fibroblasts or pre-osteoblast-like cells, where α3-silenced cells showed dramatically enhanced growth. New data suggest a scenario in which α3β1 regulates tumor-host interactions within the metastatic tumor microenvironment to limit growth, providing some of the first direct evidence that specific loss of α3 function in tumor cells can have pro-metastatic consequences *in vivo*.

Michael Wright, PhD; Assistant Professor, Department of Molecular Physiology & Biophysics (319-384-1764)
http://www.physiology.uiowa.edu/wright.shtml?menu=1&tab=facultyTab

The laboratory of Dr. Wright is applying cutting-edge quantitative mass spectrometry technologies to study cellular signaling at the molecular level in model systems of disease. They are developing novel experimental workflows to globally profile proteins and delineate protein complexes isolated from cells and tissues using directed and targeted mass spectrometry methods. Dr. Wright is particularly interested identifying post-translational modifications on proteins and determining how these modifications control the function, stability, and localization of proteins implicated in human diseases. The lab is elucidating androgen-signaling networks at three primary levels: 1) mapping androgen-sensitive protein pathways, 2) mapping androgen-sensitive kinase pathways, and 3) identifying androgen receptor-interacting protein complexes in model cellular systems of prostate cancer. The group is also interested in identifying plasma glycoprotein biomarkers to distinguish indolent and aggressive prostate cancer in patients with organ-confined disease. Overall, the long-term goal of Dr. Wright's research program is to identify prognostic and therapeutic biomarkers in the management and treatment of prostate cancer.

Yousef Zakharia, MD; Assistant Professor, Department of Internal Medicine (319-384-8076)
http://www.medicine.uiowa.edu/dept_primary_apr.aspx?appointment=Internal%20Medicine&id=yzakharia

Dr. Zakharia is an Assistant Professor in the Department of Internal Medicine, Division of Hematology, Oncology, and Bone Marrow Transplantation. He is a medical oncologist whose interests include clinical trials for castrate-resistant prostate cancer. Dr. Zakharia and Dr. Lubaroff have begun a new collaboration on the use of the adenovirus/PSA vaccine in combination with the new anti-androgen enzalutamide.

Additional Research Mentors

Gail Bishop, PhD; Professor, Department of Microbiology (319-335-7945)
http://immuno.grad.uiowa.edu/faculty/Gail-Bishop

Molecular mechanisms which underlie the processes of lymphocyte activation and tolerance as well as approaches to the design of better vaccination strategies.

Robert Cornell, PhD; Associate Professor, Department of Anatomy & Cell Biology (319-335-8908).
http://neuroscience.grad.uiowa.edu/faculty/robert-cornell

Dissecting the gene regulatory networks that govern cell lineage specification, cell survival and cellular differentiation.

Eric Devor, PhD; Research Assistant Professor, Department of Obstetrics & Gynecology (319-335-8212)
http://www.medicine.uiowa.edu/dept_primary_apr.aspx?appointment=Obstetrics%20and%20Gynecology&id=edevor

Role of a unique protein called placenta-specific 1 (PLAC1) in gynecologic cancers

Frederick Domann, PhD; Professor, Department of Radiation Oncology (319-335-8018)
http://molcellbio.grad.uiowa.edu/faculty/frederick-domann

How chromatin structure participates in the transcriptional regulation of cancer related genes including oncogenes and tumor suppressor genes.

Melissa Fath, PhD; Assistant Research Scientist, Department of Radiation Oncology (319-335-8025)
http://www.uiowa.edu/~frrbp/secondary/fath.html

Exploiting differences in cancer cell metabolism to develop new therapeutic regimens for the treatment of human cancers.

Prabhat Goswami, PhD; Professor, Department of Radiation Oncology (319-335-8025)

http://molcellbio.grad.uiowa.edu/faculty/prabhat-goswami

Investigating "*redox cycle within the cell cycle*", linking oxidative metabolic processes to cell cycle regulatory processes.

Siegfried Janz, MD, DSc; Professor, Department of Pathology (319-384-2869)
http://www.healthcare.uiowa.edu/pathology/site/faculty/janz/janz.html

Mouse models of human B cell and plasma cell neoplasms that are induced by the deregulated expression of the cellular oncogene MYC (c-myc).

Nitin Karandikar, MD, PhD; Professor and Chair, Department of Pathology (319-335-7630)
http://www.medicine.uiowa.edu/Karandikar_Lab/

Understanding immune interactions that underlie the pathogenesis and regulation of immune-based diseases.

Charles Lynch, MD, PhD; Professor, Department of Epidemiology (319-384-1558)
http://www.medicine.uiowa.edu/dept_secondary_apr.aspx?appointment=Pathology&id=clynch

Carcinogenesis, population studies, environmental epidemiology, and cancer surveillance,

Michael Schultz, PhD; Assistant Professor, Department of Radiology (319-356-4159)
http://www.medicine.uiowa.edu/Radiology/faculty-staff/faculty/schultz-michael.html

Identify key cell-surface receptor residues as targets for novel peptide- and aptamer-based receptor agonists and antagonists — and become proficient in manipulating the molecular characteristics of these targeting vectors in order to optimize their pharmacokinetic and biodistribution properties for imaging and therapy of cancer.

Andrean Simons-Burnett, PhD; Assistant Professor, Department of Radiation Oncology (319-384-4450)
http://www.medicine.uiowa.edu/dept_primary.aspx?appointment=Pathology&id=435085

Metabolic oxidative stress in tumors and the role oxidative stress plays in signal transduction pathways.

Douglas Spitz, PhD; Professor, Department of Radiation Oncology (319-335-8001)
http://www.uiowa.edu/~frrbp/spitz_lab.html

Cellular resistance to oxidative stress associated with cancer therapy; use of ketogenic diets to enhance cancer therapy based on basic science observations.

George Weiner, MD; Professor, Department of Internal Medicine and Director, Holden Comprehensive Cancer Center (319-353-8620)
http://www.healthcare.uiowa.edu/Labs/Weiner/

Evaluating the use of immunotherapy agents such as immunostimulatory CpG oligodeoxynucleotides (CpG ODN) and antibodies.

Nicholas Zavazava, MD, PhD; Professor, Department of Internal Medicine (319-384-6577)
http://www.int-med.uiowa.edu/Divisions/Immunology/Directory/NicholasZavazava.html

Understanding the mechanism by which NK cells are activated by a novel protein, Ym1 which abrogates tumor growth in multiple tumors.

Research Facilities - The research laboratories of the faculty mentors at the University of Iowa are located on the west side of Iowa City on the Health Sciences Campus. The facilities include the Medical Laboratories, Bowen Sciences Building, Pharmacy Building, UI General Hospital, Medical Education and Biomedical Research Facility, Carver Biomedical Research Building, and the Veterans Affairs Medical Center. Support for the research is provided by a large number of Shared Core Facilities that include the Gene Transfer Vector Core, DNA Core, Flow Cytometry Core, to name but a few. For research that includes laboratory animals, professional, humane veterinary care is provided by the Animal Care Facilities of the University of Iowa and the Veterans Affairs Medical Center.

Opportunities for Learning - Students will have a large number of opportunities to learn about research, prostate cancer, and cancer in general. These include meeting with other members of the HBCU SRT and mentors, joint laboratory meetings with other investigators collaborating with the mentor, journal clubs, and a six-week course designed to educate the students about prostate cancer, its origins, genetics, epidemiology, and treatment.

Living in Iowa City for the Summer

Housing and Meals - All students will be housed in the one of the residence halls on the campus of the University of Iowa. It will be conveniently located on the west campus near the research labs and is served by the free Cambus transportation system.

Arrival and Welcome – For the 8 week program, students will be expected to arrive on Sunday, June 5 2016. Flights by most major airlines are available to the Cedar Rapids Eastern Iowa Airport (CID). These include American, Delta, and United Airlines. We will

make flight plans for you. A welcoming barbecue will be held on Sunday, June 5th with members of other summer research programs that include the Iowa Biosciences Advantage, and the Student Summer Research Opportunities Program.

Activities In and Around Iowa City - There are a number of activities in the Iowa City Area that students can find during the summer research program. These include, but are not limited to, the following:

Friday and Saturday Night Concert Series – Free musical concerts held each Friday and Saturday night from 6:30 to 9:30 pm on the downtown Pedestrian Mall.

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Application to the Program - Application forms, distributed with this brochure, must be completed and returned either to Dr. Baskerville or Dr. Swinton at Lincoln University or to Dr. Lubaroff at the University of Iowa. **The deadline for submission is March 4, 2016.** A committee composed of Dr. Baskerville, Dr. Swinton, Dr. Lubaroff, Dr. Heidger and two additional faculty from the University of Iowa will meet and make final decisions. Students will be notified of the decisions no later than March 18, 2016 pending prompt receipt of all applications.

Financial Support - The housing and transportation costs will be paid by the program. Each student will receive a food allowance. In addition, each student will be provided a stipend, the amount of which is currently being negotiated with the University of Iowa and Lincoln University.

For additional information please contact one of the following:

David Lubaroff, PhD; Department of Urology, University of Iowa, 375 Newton Road, 3210 MERF, Iowa City, IA 52242; 319-335-8423; david-lubaroff@uiowa.edu

Paul Heidger, PhD; Department of Anatomy & Cell Biology, University of Iowa, 51 Newton Road, Iowa City, IA 52242; 319-335-7722; paul-heidger@uiowa.edu.

Karen Baskerville, PhD; Department of Biology, 1570 Baltimore Pike, Lincoln University, PA 19352; 484-365-7507; kbaskerville@lincoln.edu

Derrick Swinton, PhD; Office of the Dean, College of Science & Technology, 1570 Baltimore Pike, Lincoln University, PA 19352; 484-356-7642; jzysk@lincoln.edu

Diane Morman; Program Coordinator, Department of Urology, University of Iowa, 375 Newton Road, 3209 MERF, 319-335-8425; diane-morman@uiowa.edu

University of Iowa Health Care

Holden Comprehensive Cancer Center

The Lincoln University 1854







University of Iowa Health Care

Holden Comprehensive Cancer Center

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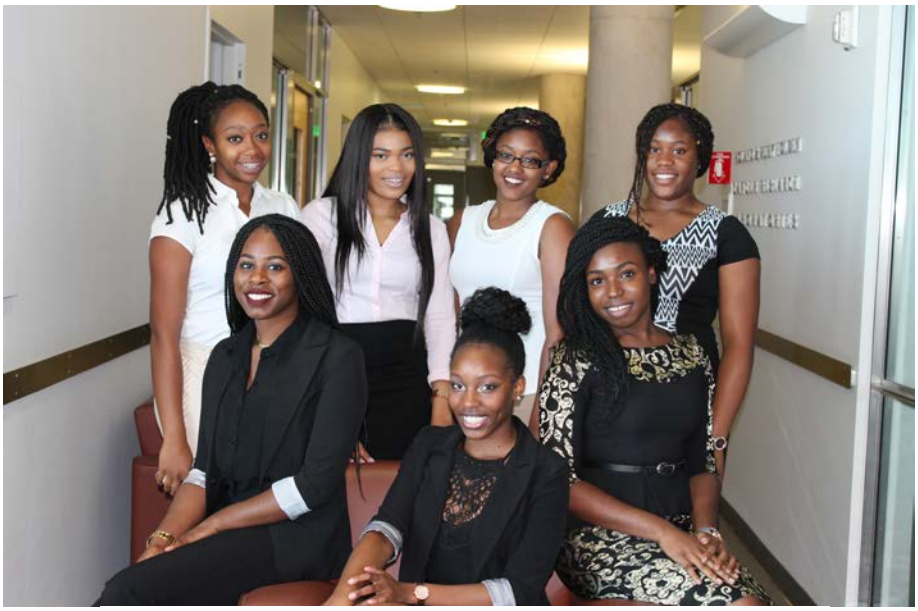
2017

Prostate Cancer Research Summer Training Program

A Collaboration Between the University of Iowa and The Lincoln University



Students in the 2016 Program

Summary of Program: The partnership of the University of Iowa and The Lincoln University is designed to provide an outstanding atmosphere to train undergraduate students from Lincoln in prostate cancer research. We propose to have twenty-two mentors available for each of the trainees to choose from for their summer research project. The mentors are from seven departments and three colleges at the University of Iowa and the prostate cancer research in their laboratories covers a wide area of interest. The proposed mentors have extensive training experience at all levels; undergraduate, graduate, medical, and postdoctoral.

In addition to the twenty-two faculty mentors both the University of Iowa and Lincoln University have designated a Faculty Advisor for the students. Dr. Paul Heidger serves as the advisor at the University of Iowa and Dr. Karen Baskerville serves as the advisor at Lincoln University. The individuals are available for advice and assistance throughout the summer and the regular academic year. The faculty members are listed below as well as a brief description of research in the laboratories of each University of Iowa mentor.

At this point in time the program is 8 weeks long, beginning on Monday, June 5, 2017 and ending on Friday, July 30, 2017.

Faculty Advisor at Lincoln University:

Karen Baskerville, PhD; Associate Professor and Chair, Department of Biology (484-365-7507)

Dr. Baskerville is the contact people for the summer program at Lincoln University. She is active in the recruitment, retention, and career planning for our summer students. She also visits the University of Iowa during the summer program.

University of Iowa Faculty and Their Research

Director and Research Mentor: David Lubaroff, PhD; Professor, Department of Urology & Director of the Summer Research Program (319-335-8423)
http://www.medicine.uiowa.edu/dept_primary.aspx?appointment=Urology&id=907659

The work in this laboratory concentrates on the area of tumor immunology with an emphasis on immunotherapy. We have constructed microbial vaccines to be used for the investigation of gene and immunotherapy of prostate cancer. Investigations on the ability of immunized animals to produce immune responses to the transgene product induced by the vaccine are underway. Additionally, we are carrying our "translational" research in the form of clinical trials of our adenovirus vaccine in men with prostate cancer. Important in these trials is the safety of the vaccine and its ability to induce anti-tumor immunity. We have recently completed a Phase I clinical trial of the vaccine that demonstrated its safety. We have initiated a therapeutic Phase II trial. Finally, we have been collaborating on studies of psychosocial effects on immune status in cancer patients.

Faculty Advisor: Paul Heidger, PhD; Emeritus Professor, Dept. of Anatomy & Cell Biology (319-335-7722)
http://www.anatomy.uiowa.edu/personnel.shtml?id=heidgerp

Dr. Heidger will assist in the recruitment and evaluation of summer students and will assist students in career planning. He works with students during the summer to facilitate interviews with members of the graduate training programs, the MD/PhD program, and the Carver College of Medicine.

Research Mentors - Primary

James Brown, MD; Professor, Department of Urology (319-353-7295)
http://www.medicine.uiowa.edu/facultyfocus.aspx?id=3554

Dr. Brown is a Professor in the Department of Urology and the Andersen-Hebbeln Professor of Prostate Cancer Research whose research interests include tumor immunology and prostate cancer genetics. He has been an integral part of the clinical trial team examining the therapeutic effectiveness of the adenovirus/PSA vaccine and a co-investigator on the pending grant application on combining the vaccine with some of the new therapies for castrate-resistant prostate cancer. Dr. Brown is also collaborating with industry partners to identify genetic markers for prostate cancer.

Paloma Giangrande, PhD; Associate Professor, Department of Internal Medicine (319-384-3243)
http://molcellbio.grad.uiowa.edu/faculty/Paloma-Giangrande

Dr. Giangrande is an Associate Professor in the Hematology/Oncology Division of the Department of Internal Medicine. The long term research goals of the Giangrande laboratory are to develop RNA-based tools to modulate cellular pathways underlying pathological cell proliferation in the setting of cancer. Current efforts are focused on selecting RNA aptamers to antigens expressed on the surface of target prostate cancer cells with SELEX (Systematic Evolution of Ligands by Exponential Enrichment) for the purpose of (1) modulating receptor function and/or (2) delivering therapeutic molecules (e.g. siRNAs, antimers, small molecule drugs) into specific cell types. A major project in the lab is targeted therapy of prostate cancer using PSMA-guided aptamers.

Amit Gupta, MD, MPH; Assistant Professor, Department of Urology (319 384 5251)
https://www.icts.uiowa.edu/Loki/research/browseResearch.jsp?id=229473
Dr. Gupta is an Assistant Professor of Urology with a joint appointment in the Department of Epidemiology in the College of Public Health. Dr Gupta's research interests lie in the Epidemiology and Outcomes of prostate and kidney cancers. Specifically he is interested in the long-term adverse effects of therapy in bladder cancer patients and in PSA screening for prostate cancer. Dr Gupta is currently studying standardization of the PSA assay and how that that may impact decision making in Prostate cancer. He is also studying whether patients undergo appropriate counseling prior to PSA testing. He has published extensively in these areas.

Yi Luo, MD, PhD; Associate Professor, Department of Urology (319-335-9835)
http://www.uihealthcare.com/depts/med/urology/urologymds/luo.html

Dr. Luo is an Associate Professor of Urology. A major research project in the Luo laboratory is to develop a novel therapeutic strategy to cope with the limitations of the current modalities for prostate cancer treatment. The lab uses both bacillus Calmette-Guérin (BCG, a bacterial vaccine strain) and adenovirus (Ad, a replication-defective strain) to deliver PSA for animal immunization. Both BCG and Ad microbes have been demonstrated to be safe and effective for antigen delivery in humans and mice. Dr. Luo has previously observed a robust induction of PSA-specific T cell responses by vaccination with combined BCG-PSA (primer vaccine) and Ad-PSA (booster vaccine) in mice.

Kenneth Nepple, MD; Assistant Professor, Department of Urology (319-356-2114)
http://www.medicine.uiowa.edu/dept_primary_apr.aspx?appointment=Urology&id=nepplek

Dr. Nepple is an Assistant Professor in the Department of Urology whose clinical and research interests are in prostate cancer and other genitourinary neoplasms. His primary research interests are in the effects of comorbidities on treatment outcomes, particularly in prostate cancer. He and Dr. Lubaroff are collaborating on the analysis of the comorbidities in the Phase II trial of the adenovirus/PSA vaccine. He is a collaborator on the Phase II trial and a co-investigator on a pending research grant application. Dr. Nepple is new to this SRTP, but has experience in the research training of residents who spend a year of their training on laboratory research projects.

Hank Qi, MD, PhD; Assistant Professor, Department of Anatomy & Cell Biology (319-335-3084)
http://www.medicine.uiowa.edu/dept_primary_apr.aspx?appointment=Anatomy%20and%20Cell%20Biology&id=qih

Dr. Qi is an Assistant Professor in the Department of Anatomy and Cell Biology. He uses biochemistry, cell biology, bioinformatics and animal models to study the epigenetic mechanism that involves histone methylation modifications. They focus on the epigenetic role of PHF8 (PHD finger protein 8), a histone demethylase, which removes H4K20me1 (*mono-methylated Histone 4 Lysine 20*) and H3K9me1 at the transcription start site and actively regulates gene expression. Studies in the Qi laboratory are investigating how PHF8 co-ordinates transcription factors and signaling pathways to determine the specificity of transcriptional regulation. They are also studying the PHF8 mediated epigenetic regulation of microRNAs, and are also interested in the functions of histone demethylases in cancer developments. Specifically, they aim to understand how histone demethylase promotes cancer cell transformation and migration, particularly in prostate cancer.

Aliasger K. Salem, PhD; Professor, Division of Pharmaceutics, College of Pharmacy (319-335-8810)
http://www.pharmacy.uiowa.edu/pharmaceutics/people/Salem.htm

Dr. Salem's research interests are primarily focused on self-assembling systems, the rational design of novel drug and gene delivery systems and on the development of sophisticated scaffolds for tissue-specific regeneration. In tissue engineering, Dr. Salem's laboratory applies microfabrication techniques to novel biomaterials to provide spatial control over tissue formation and to integrate minimally invasive scaffold delivery strategies. In drug/gene delivery, he is currently exploring the synergistic application of degradable particle technology, CpG oligonucleotides and heat shock proteins for generating sustained immunotherapeutic responses against cancer. Dr. Salem's laboratory also collaborates with Dr. Lubaroff on the use of microparticles in association with cancer vaccines fro the induction of strong anti-tumor immune responses and tumor destruction.

Christopher Stipp, PhD: Associate Professor, Department of Biology (319-335-0192)
http://www.medicine.uiowa.edu/dept_secondary_apr.aspx?appointment=Molecular%20Physiology%20and%20Biophysics&id=cstipp

Dr. Stipp in an Associate Professor in the Department of Biology. His research examines how integrin α3β1 promotes tumor cell adhesion, migration, and invasion on laminin isoforms. Several clinical studies have indicated a correlation between increased tumoral α3β1 integrin expression and tumor progression, metastasis, and poor patient outcomes.

However, several other clinical and experimental studies have suggested that α3β1 can possess anti-metastatic activity in certain settings. To help define the range of α3β1 functions in tumor cells in vivo, the Stipp laboratory uses RNAi to silence the α3 integrin subunit in an aggressive, *in vivo*-passaged subline of PC-3 prostate carcinoma cells. Loss of α3 integrin impaired adhesion and proliferation on the α3β1 integrin ligand, laminin-332 *in vitro*. Increased colonization of α3-silenced tumor cells in vivo was recapitulated in 3D collagen co-cultures with lung fibroblasts or pre-osteoblast-like cells, where α3-silenced cells showed dramatically enhanced growth. New data suggest a scenario in which α3β1 regulates tumor-host interactions within the metastatic tumor microenvironment to limit growth, providing some of the first direct evidence that specific loss of α3 function in tumor cells can have pro-metastatic consequences *in vivo*.

Michael Wright, PhD; Assistant Professor, Department of Molecular Physiology & Biophysics (319-384-1764)
http://www.physiology.uiowa.edu/wright.shtml?menu=1&tab=facultyTab

The laboratory of Dr. Wright is applying cutting-edge quantitative mass spectrometry technologies to study cellular signaling at the molecular level in model systems of disease. They are developing novel experimental workflows to globally profile proteins and delineate protein complexes isolated from cells and tissues using directed and targeted mass spectrometry methods. Dr. Wright is particularly interested identifying post-translational modifications on proteins and determining how these modifications control the function, stability, and localization of proteins implicated in human diseases. The lab is elucidating androgen-signaling networks at three primary levels: 1) mapping androgen-sensitive protein pathways, 2) mapping androgen-sensitive kinase pathways, and 3) identifying androgen receptor-interacting protein complexes in model cellular systems of prostate cancer. The group is also interested in identifying plasma glycoprotein biomarkers to distinguish indolent and aggressive prostate cancer in patients with organ-confined disease. Overall, the long-term goal of Dr. Wright's research program is to identify prognostic and therapeutic biomarkers in the management and treatment of prostate cancer.

Yousef Zakharia, MD; Assistant Professor, Department of Internal Medicine (319-384-8076)
http://www.medicine.uiowa.edu/dept_primary_apr.aspx?appointment=Internal%20Medicine&id=yzakharia
Dr. Zakharia is an Assistant Professor in the Department of Internal Medicine, Division of Hematology, Oncology, and Bone Marrow Transplantation. He is a medical oncologist whose interests include clinical trials for castrate-resistant prostate cancer. Dr. Zakharia and Dr. Lubaroff have begun a new collaboration on the use of the adenovirus/PSA vaccine in combination with the new anti-androgen enzalutamide.

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Financial Support - The housing and transportation costs will be paid by the program. Each student will receive a food allowance. In addition, each student will be provided a stipend, the amount of which is currently being negotiated with the University of Iowa and Lincoln University.

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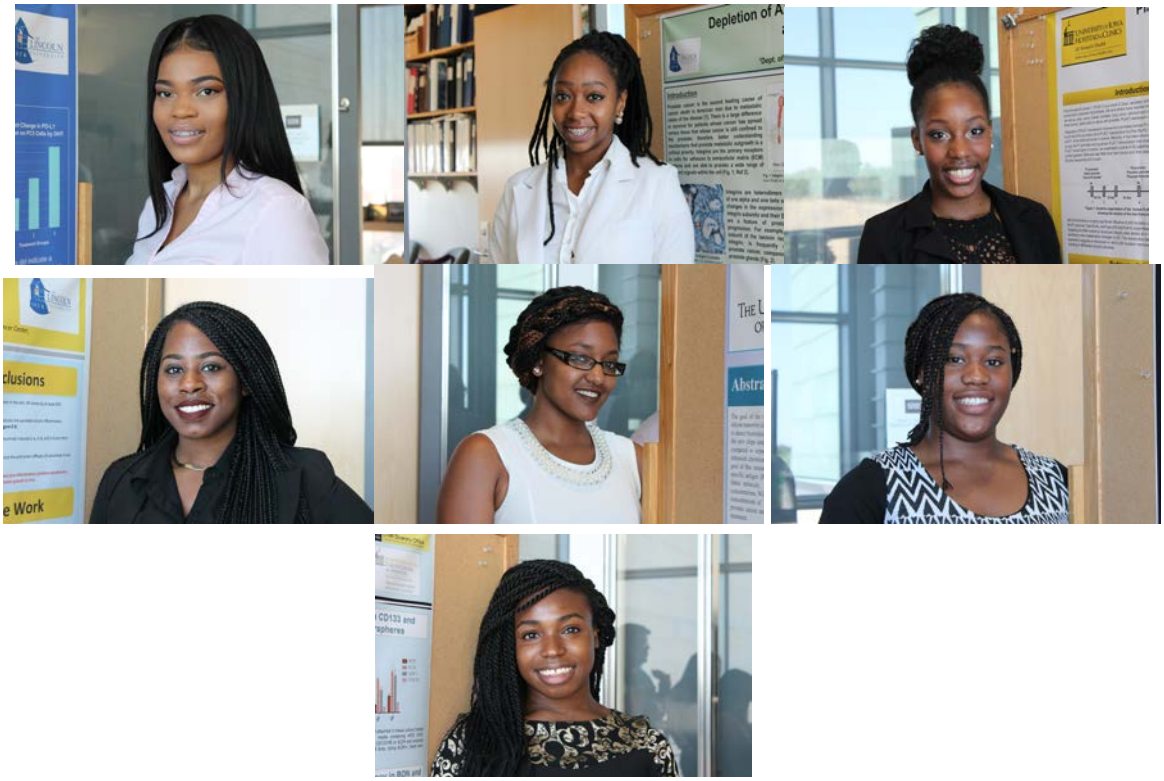
UNIVERSITY of IOWA HEALTH CARE

Holden Comprehensive Cancer Center

THE LINCOLN UNIVERSITY 1854



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2018

Prostate Cancer Research Summer Training Program

A Collaboration Between the University of Iowa and The Lincoln University

Students in the 2017 Iowa Summer Research Training Program

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The program is 8 weeks long beginning on the First Monday of June and ending on Last Friday of July.

Faculty Advisors at Lincoln University:

Karen Baskerville, PhD; Associate Professor and Chair, Department of Biology (484-365-7507)
Whelton Miller, PhD; Assistant Professor, Department of Chemistry and Physics (484-365-7496)

Drs. Baskerville and Miller are the contact people for the summer program at Lincoln University. They are active in the recruitment, retention, and career planning for our summer students. They also visit the University of Iowa during the summer program.

University of Iowa Faculty and Their Research

Director and Research Mentor: David Lubaroff, PhD; Professor, Department of Urology & Director of the Summer Research Program (319-335-8423)
http://www.medicine.uiowa.edu/dept_primary.aspx?appointment=Urology&id=907659

The work in this laboratory concentrates on the area of tumor immunology with an emphasis on immunotherapy. We have constructed microbial vaccines to be used for the investigation of gene and immunotherapy of prostate cancer. Investigations on the ability of immunized animals to produce immune responses to the transgene product induced by the vaccine are underway. Additionally, we are carrying our "translational" research in the form of clinical trials of our adenovirus vaccine in men with prostate cancer. Important in these trials is the safety of the vaccine and its ability to induce anti-tumor immunity. We have recently completed a Phase I clinical trial of the vaccine that demonstrated its safety. We have initiated a therapeutic Phase II trial. Finally, we have been collaborating on studies of psychosocial effects on immune status in cancer patients.

Faculty Advisor: Paul Heidger, PhD; Emeritus Professor, Dept. of Anatomy & Cell Biology (319-335-7722)
http://www.anatomy.uiowa.edu/personnel.shtml?id=heidgerp

Dr. Heidger will assist in the recruitment and evaluation of summer students and will assist students in career planning. He works with students during the summer to facilitate interviews with members of the graduate training programs, the MD/PhD program, and the Carver College of Medicine.

Research Mentors - Primary

James Brown, MD; Professor, Department of Urology (319-353-7295)
http://www.medicine.uiowa.edu/facultyfocus.aspx?id=3554

Dr. Brown is a Professor in the Department of Urology and the Andersen-Hebbeln Professor of Prostate Cancer Research whose research interests include tumor immunology and prostate cancer genetics. He has been an integral part of the clinical trial team examining the therapeutic effectiveness of the adenovirus/PSA vaccine and a co-investigator on the pending grant application on combining the vaccine with some of the new therapies for castrate-resistant prostate cancer. Dr. Brown is also collaborating with industry partners to identify genetic markers for prostate cancer.

Paloma Giangrande, PhD; Associate Professor, Department of Internal Medicine (319-384-3243)
http://molcellbio.grad.uiowa.edu/faculty/Paloma-Giangrande

Dr. Giangrande is an Associate Professor in the Hematology/Oncology Division of the Department of Internal Medicine. The long term research goals of the Giangrande laboratory are to develop RNA-based tools to modulate cellular pathways underlying pathological cell proliferation in the setting of cancer. Current efforts are focused on selecting RNA aptamers to antigens expressed on the surface of target prostate cancer cells with SELEX (Systematic Evolution of Ligands by Exponential Enrichment) for the purpose of (1) modulating receptor function and/or (2) delivering therapeutic molecules (e.g. siRNAs, antimers, small molecule drugs) into specific cell types. A major

project in the lab is targeted therapy of prostate cancer using PSMA-guided aptamers.

Yi Luo, MD, PhD; Associate Professor, Department of Urology (319-335-9835)
http://www.uihealthcare.com/depts/med/urology/urologymds/luo.html

Dr. Luo is an Associate Professor of Urology. A major research project in the Luo laboratory is to develop a novel therapeutic strategy to cope with the limitations of the current modalities for prostate cancer treatment. The lab uses both bacillus Calmette-Guérin (BCG, a bacterial vaccine strain) and adenovirus (Ad, a replication-defective strain) to deliver PSA for animal immunization. Both BCG and Ad microbes have been demonstrated to be safe and effective for antigen delivery in humans and mice. Dr. Luo has previously observed a robust induction of PSA-specific T cell responses by vaccination with combined BCG-PSA (primer vaccine) and Ad-PSA (booster vaccine) in mice.

Kenneth Nepple, MD; Assistant Professor, Department of Urology (319-356-2114)
http://www.medicine.uiowa.edu/dept_primary_apr.aspx?appointment=Urology&id=nepplek

Dr. Nepple is an Assistant Professor in the Department of Urology whose clinical and research interests are in prostate cancer and other genitourinary neoplasms. His primary research interests are in the effects of comorbidities on treatment outcomes, particularly in prostate cancer. He and Dr. Lubaroff are collaborating on the analysis of the comorbidities in the Phase II trial of the adenovirus/PSA vaccine. He is a collaborator on the Phase II trial and a co-investigator on a pending research grant application. Dr. Nepple is new to this SRTP, but has experience in the research training of residents who spend a year of their training on laboratory research projects.

Hank Qi, MD, PhD; Assistant Professor, Department of Anatomy & Cell Biology (319-335-3084)
http://www.medicine.uiowa.edu/dept_primary_apr.aspx?appointment=Anatomy%20and%20Cell%20Biology&id=qih

Dr. Qi is an Assistant Professor in the Department of Anatomy and Cell Biology. He uses biochemistry, cell biology, bioinformatics and animal models to study the epigenetic mechanism that involves histone methylation modifications. They focus on the epigenetic role of PHF8 (PHD finger protein 8), a histone demethylase, which removes H4K20me1 (*mono-methylated Histone 4 Lysine 20*) and H3K9me1 at the transcription start site and actively regulates gene expression. Studies in the Qi laboratory are investigating how PHF8 co-ordinates transcription factors and signaling pathways to determine the specificity of transcriptional regulation. They are also studying the PHF8 mediated epigenetic regulation of microRNAs, and are also interested in the functions of histone demethylases in cancer developments. Specifically, they aim to understand how histone demethylase promotes cancer cell transformation and migration, particularly in prostate cancer.

Aliasger K. Salem, PhD; Professor, Division of Pharmaceutics, College of Pharmacy (319-335-8810)
http://www.pharmacy.uiowa.edu/pharmaceutics/people/Salem.htm

Dr. Salem's research interests are primarily focused on self-assembling systems, the rational design of novel drug and gene delivery systems and on the development of sophisticated scaffolds for tissue-specific regeneration. In tissue engineering, Dr. Salem's laboratory applies microfabrication techniques to novel biomaterials to provide spatial control over tissue formation and to integrate minimally invasive scaffold delivery strategies. In drug/gene delivery, he is currently exploring the synergistic application of degradable particle technology, CpG oligonucleotides and heat shock proteins for generating sustained immunotherapeutic responses against cancer. Dr. Salem's laboratory also collaborates with Dr. Lubaroff on the use of microparticles in association with cancer vaccines fro the induction of strong anti-tumor immune responses and tumor destruction.

Christopher Stipp, PhD: Associate Professor, Department of Biology (319-335-0192)
http://www.medicine.uiowa.edu/dept_secondary_apr.aspx?appointment=Molecular%20Physiology%20and%20Biophysics&id=cstipp

Dr. Stipp in an Associate Professor in the Department of Biology. His research examines how integrin α3β1 promotes tumor cell adhesion, migration, and invasion on laminin isoforms. Several clinical studies have indicated a correlation between increased tumoral α3β1 integrin expression and tumor progression, metastasis, and poor patient outcomes. However, several other clinical and experimental studies have suggested that α3β1 can possess anti-metastatic activity in certain settings. To help define the range of α3β1 functions in tumor cells in vivo, the Stipp laboratory uses RNAi to silence the α3 integrin subunit in an aggressive, *in vivo*-passaged subline of PC-3 prostate carcinoma cells. Loss of α3 integrin impaired adhesion and proliferation on the α3β1 integrin ligand, laminin-332 *in vitro*. Increased colonization of α3-silenced tumor cells in vivo was recapitulated in 3D collagen co-cultures with lung fibroblasts or pre-osteoblast-like cells, where α3-silenced cells showed dramatically enhanced growth. New data suggest a scenario in which α3β1 regulates tumor-host interactions within the metastatic tumor

microenvironment to limit growth, providing some of the first direct evidence that specific loss of α3 function in tumor cells can have pro-metastatic consequences *in vivo*.

Michael Wright, PhD; Assistant Professor, Department of Molecular Physiology & Biophysics (319-384-1764)
http://www.physiology.uiowa.edu/wright.shtml?menu=1&tab=facultyTab

The laboratory of Dr. Wright is applying cutting-edge quantitative mass spectrometry technologies to study cellular signaling at the molecular level in model systems of disease. They are developing novel experimental workflows to globally profile proteins and delineate protein complexes isolated from cells and tissues using directed and targeted mass spectrometry methods. Dr. Wright is particularly interested identifying post-translational modifications on proteins and determining how these modifications control the function, stability, and localization of proteins implicated in human diseases. The lab is elucidating androgen-signaling networks at three primary levels: 1) mapping androgen-sensitive protein pathways, 2) mapping androgen-sensitive kinase pathways, and 3) identifying androgen receptor-interacting protein complexes in model cellular systems of prostate cancer. The group is also interested in identifying plasma glycoprotein biomarkers to distinguish indolent and aggressive prostate cancer in patients with organ-confined disease. Overall, the long-term goal of Dr. Wright's research program is to identify prognostic and therapeutic biomarkers in the management and treatment of prostate cancer.

Yousef Zakharia, MD; Assistant Professor, Department of Internal Medicine (319-384-8076)
http://www.medicine.uiowa.edu/dept_primary_apr.aspx?appointment=Internal%20Medicine&id=yzakharia
Dr. Zakharia is an Assistant Professor in the Department of Internal Medicine, Division of Hematology, Oncology, and Bone Marrow Transplantation. He is a medical oncologist whose interests include clinical trials for castrate-resistant prostate cancer. Dr. Zakharia and Dr. Lubaroff have begun a new collaboration on the use of the adenovirus/PSA vaccine in combination with the new anti-androgen enzalutamide.

Additional Research Mentors

Gail Bishop, PhD; Professor, Department of Microbiology (319-335-7945)
http://immuno.grad.uiowa.edu/faculty/Gail-Bishop

Molecular mechanisms which underlie the processes of lymphocyte activation and tolerance as well as approaches to the design of better vaccination strategies.

Robert Cornell, PhD; Associate Professor, Department of Anatomy & Cell Biology (319-335-8908).
http://neuroscience.grad.uiowa.edu/faculty/robert-cornell

Dissecting the gene regulatory networks that govern cell lineage specification, cell survival and cellular differentiation.

Eric Devor, PhD; Research Assistant Professor, Department of Obstetrics & Gynecology (319-335-8212)
http://www.medicine.uiowa.edu/dept_primary_apr.aspx?appointment=Obstetrics%20and%20Gynecology&id=edevor

Role of a unique protein called placenta-specific 1 (PLAC1) in gynecologic cancers

Melissa Fath, PhD; Assistant Research Scientist, Department of Radiation Oncology (319-335-8025)
http://www.uiowa.edu/~frrbp/secondary/fath.html

Exploiting differences in cancer cell metabolism to develop new therapeutic regimens for the treatment of human cancers.

Prabhat Goswami, PhD; Professor, Department of Radiation Oncology (319-335-8025)
http://molcellbio.grad.uiowa.edu/faculty/prabhat-goswami

Investigating "*redox cycle within the cell cycle*", linking oxidative metabolic processes to cell cycle regulatory processes.

Siegfried Janz, MD, DSc; Professor, Department of Pathology (319-384-2869)
http://www.healthcare.uiowa.edu/pathology/site/faculty/janz/janz.html

Mouse models of human B cell and plasma cell neoplasms that are induced by the deregulated expression of the cellular oncogene MYC (c-myc).

Nitin Karandikar, MD, PhD; Professor and Chair, Department of Pathology (319-335-7630)
http://www.medicine.uiowa.edu/Karandikar_Lab/

Understanding immune interactions that underlie the pathogenesis and regulation of immune-based diseases.

Charles Lynch, MD, PhD; Professor, Department of Epidemiology (319-384-1558)
http://www.medicine.uiowa.edu/dept_secondary_apr.aspx?appointment=Pathology&id=clynch

Carcinogenesis, population studies, environmental epidemiology, and cancer surveillance,

Michael Schultz, PhD; Assistant Professor, Department of Radiology (319-356-4159)
http://www.medicine.uiowa.edu/Radiology/faculty-staff/faculty/schultz-michael.html

Identify key cell-surface receptor residues as targets for novel peptide- and aptamer-based receptor agonists and antagonists — and become proficient in manipulating the molecular characteristics of these targeting vectors in order to optimize their pharmacokinetic and biodistribution properties for imaging and therapy of cancer.

Andrean Simons-Burnett, PhD; Assistant Professor, Department of Radiation Oncology (319-384-4450)
http://www.medicine.uiowa.edu/dept_primary.aspx?appointment=Pathology&id=435085

Metabolic oxidative stress in tumors and the role oxidative stress plays in signal transduction pathways.

Douglas Spitz, PhD; Professor, Department of Radiation Oncology (319-335-8001)
http://www.uiowa.edu/~frrbp/spitz_lab.html

Cellular resistance to oxidative stress associated with cancer therapy; use of ketogenic diets to enhance cancer therapy based on basic science observations.

George Weiner, MD; Professor, Department of Internal Medicine and Director, Holden Comprehensive Cancer Center (319-353-8620)
http://www.healthcare.uiowa.edu/Labs/Weiner/

Evaluating the use of immunotherapy agents such as immunostimulatory CpG oligodeoxynucleotides (CpG ODN) and antibodies.

Nicholas Zavazava, MD, PhD; Professor, Department of Internal Medicine (319-384-6577)
http://www.int-med.uiowa.edu/Divisions/Immunology/Directory/NicholasZavazava.html

Understanding the mechanism by which NK cells are activated by a novel protein, Ym1 which abrogates tumor growth in multiple tumors.

Research Facilities - The research laboratories of the faculty mentors at the University of Iowa are located on the west side of Iowa City on the Health Sciences Campus. The facilities include the Medical Laboratories, Bowen Sciences Building, Pharmacy Building, UI General Hospital, Medical Education and Biomedical Research Facility, Carver Biomedical Research Building, and the Veterans Affairs Medical Center. Support for the research is provided by a large number of Shared Core Facilities that include the Gene Transfer Vector Core, DNA Core, Flow Cytometry Core, to name but a few. For research that includes laboratory animals, professional, humane veterinary care is provided by the Animal Care Facilities of the University of Iowa and the Veterans Affairs Medical Center.

Opportunities for Learning - Students will have a large number of opportunities to learn about research, prostate cancer, and cancer in general. These include meeting with other members of the HBCU SRT and mentors, joint laboratory meetings with other investigators collaborating with the mentor, journal clubs, and a six-week course designed to educate the students about prostate cancer, its origins, genetics, epidemiology, and treatment.

Living in Iowa City for the Summer

Housing - All students will be housed in the Peterson Residence Hall on the campus of the University of Iowa. It will be conveniently located on the west campus near the research labs and is served by the free Cambus transportation system.

Arrival and Welcome – For the 8 week program, students will be expected to arrive on Saturday, June 2 2018. Flights by most major airlines are available to the Cedar Rapids Eastern Iowa Airport (CID). These include American, Delta, and United Airlines. We will make flight plans for you. A reception will be held on Sunday, June 3rd to welcome students to the University of Iowa..

Activities In and Around Iowa City - There are a number of activities in the Iowa City Area that students can find during the summer research program. These include, but are not limited to, the following:
Friday and Saturday Night Concert Series – Free musical concerts held each Friday and Saturday night from 6:30 to 9:30 pm on the downtown Pedestrian Mall.
Iowa City Jazz Festival – A free, three-day jazz concert featuring local, regional, and national jazz groups during the July 4th celebration. The festival will be held on the Pentacrest on the campus of the University of Iowa.
Saturday Night Free Movies Series – This is the newest addition to Iowa City's long tradition of free, outdoor family-friendly entertainment that literally brings our community together. It is held outdoors on the Pentacrest from June through August.
Other Activities – there are a large number of indoor & outdoor activities that can be accessed through the Cities of Iowa City and Coralville and the University of Iowa. These include exercise facilities (running, tennis, basketball, volleyball, handball/racquetball, weights, biking, and swimming), local beaches, and museums (art, natural history, and sports). In addition, there are

a large number of restaurants ranging from fast food to fine dining.

Application to the Program - Application forms, distributed with this brochure, must be completed and returned either to Dr. Baskerville or Dr. Swinton at Lincoln University or to Dr. Lubaroff at the University of Iowa. **The deadline for submission is January 19, 2018.** A committee composed of Dr. Baskerville, Dr. Lubaroff, Dr. Heidger and two additional faculty from the University of Iowa will meet and make final decisions. Students will be notified of the decisions at the end of January 2018 pending prompt receipt of all applications.

Financial Support - The housing and transportation costs will be paid by the program. Each student will receive a food allowance. In addition, each student will be provided a stipend, the amount of which is currently being negotiated with the University of Iowa and Lincoln University.

For additional information please contact one of the following:

David Lubaroff, PhD; Department of Urology, University of Iowa, 375 Newton Road, 3210 MERF, Iowa City, IA 52242; 319-335-8423. David-lubaroff@uiowa.edu

Paul Heidger, PhD; Department of Anatomy & Cell Biology, University of Iowa, 51 Newton Road, Iowa City, IA 52242; 319-335-7722; pmheidger@q.com

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Karen Baskerville, PhD; Department of Biology, 1570 Baltimore Pike, Lincoln University, PA 19352; 484-365-7507; kbaskerville@lincoln.edu

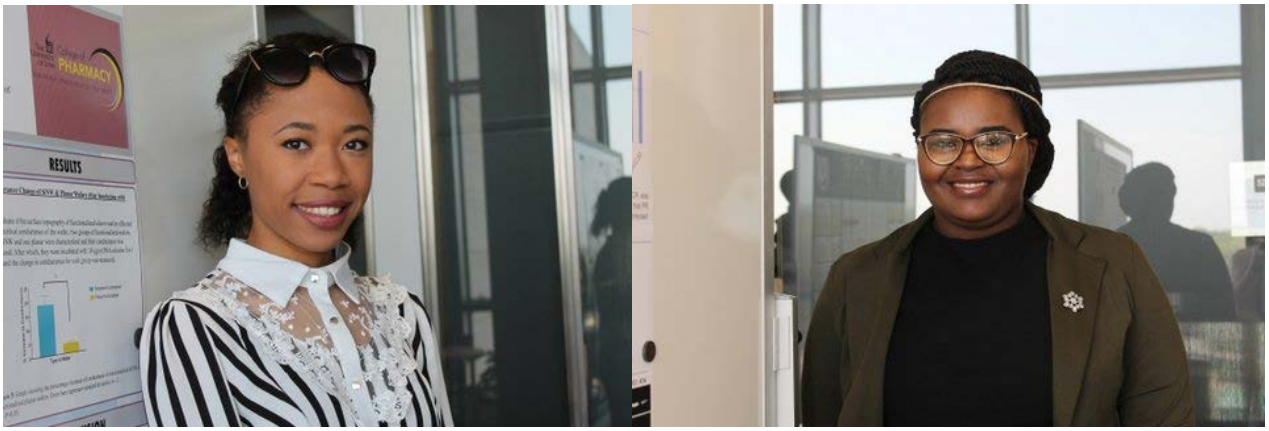
Whelton Miller, PhD; Department of Chemistry & Physics, 1570 Baltimore Pike, Lincoln University, PA 19352; 484--365-7496; wmiller2@lincoln.edu

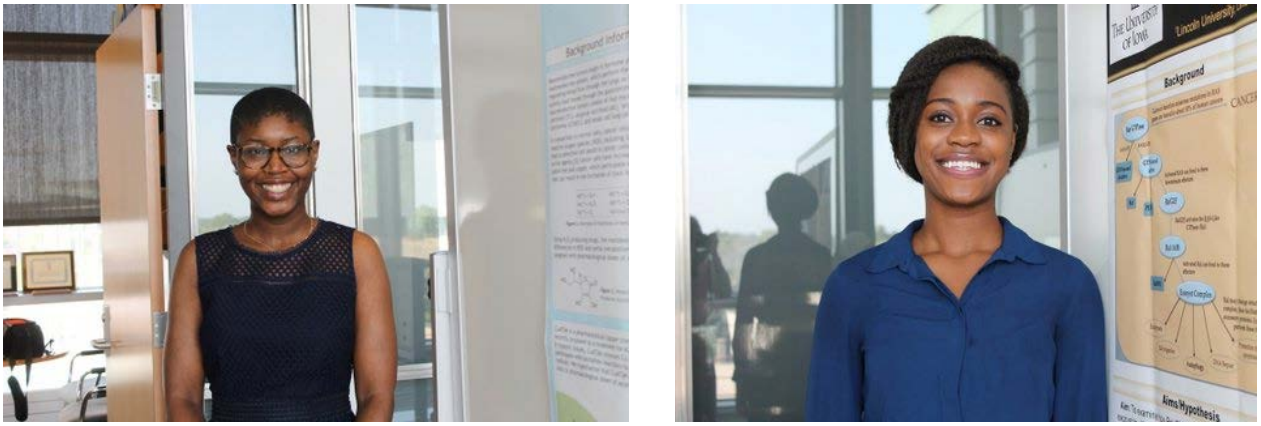
Diane Morman; Program Coordinator, Department of Urology, University of Iowa, 375 Newton Road, 3209 MERF, 319-335-8425; diane-morman@uiowa.edu

UNIVERSITY of IOWA HEALTH CARE

Holden Comprehensive Cancer Center

THE LINCOLN UNIVERSITY 1854





2017 Students from Lincoln University