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PRINCIPAL INVESTIGATOR: Shiv Srivastava

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14. ABSTRACT: In second year of the award (2016), 4 meritorious students were selected under HBCU Summer Undergraduate Training Program in Prostate Cancer by USU-CPDR and UDC selection committee to provide motivating experience in the state-of-the-art CaP research. The main **objectives** are: **(a)** Recruit and motivate highly qualified undergraduate trainees from UDC, **(b)** expose UDC students to an intellectual environment that promotes state-of–the-art hands-on training and education in CaP research through special lectures by CPDR scientists and guest lectures, **(c)** motivate summer interns to contribute to CaP research centers at HBCUs, **(d)** to ensure that the new generation of biomedical scientists are properly trained to continue the fight against CaP **Specific Aims: Aim 1**. Selection of students and exposure to the state-of-the-art CaP research environment; **Aim 2**. Assignment of mentors and research project; **Aim 3**. Progress report preparation and presentation. **Results:** During the current reporting period, 4 students were selected from a pool of applicants, recruited to participate in the program. Students were paired with mentors and exposed to training in Laboratory safety, performing experiments in basic techniques of cell biology, experimental design, and how to conduct key experiments pertaining to their research projects. Students presented their research goals and objectives and experimental and progress in biweekly presentations. At the end of the training, each student made final presentation of the completed project. Each student was given a certificate of completion of achievement. The students presented their experimental results at the Institutional and National meetings focusing the HBCU training and research. **Conclusions:** Total of 4 students were selected for the year 2016 based on an essay they wrote on their interest in understanding conducting research in the field of prostate cancer, GPA and letters of recommendations. They were exposed to the state-of-the art comprehensive prostate cancer research program along with hands-on research within the ongoing projects. During this period, the students have displayed tremendous of interest in the field of prostate cancer and have given a total of 4 presentations. The results obtained from their experiments will be presented as posters in upcoming HBCU conferences at national level.One of the last year students presented a poster in AACR-2016 and won 3rd place. Overall, this has been extremely rewarding experience for the students, mentors and for collaborating Institutions.

15. SUBJECT TERMS HBCU-Prostate Cancer Training, Center for Prostate Disease Research (CPDR), University of District of Columbia (UDC), DoD-PCRP, Uniformed Services University (USU), Department of Surgery, Walter Reed National Military Medical Center (WRNMMC), Basic Science Research Program (BSRP).

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HBCU Summer Undergraduate Training Program in Prostate Cancer: A Partnership between USU-CPDR and UDC

2nd Annual Progress Report
2016

Shiv Srivastava, PhD,
Principal Investigator/Program Director (USU-CPDR)

Deepak Kumar, PhD,
Partnering PI (UDC)

Taduru Sreenath, PhD,
Co-Investigator (USU-CPDR)

HBCU Summer Undergraduate Training Program in Prostate Cancer Research

INTRODUCTION

The goals of HBCU Summer Undergraduate Training Program in Prostate Cancer Research training grant is to develop active collaborations between the Uniformed Services University/Center for Prostate Disease Research (USU/CPDR) and the University of District of Columbia (UDC) to train undergraduate students in prostate cancer research. CPDR has been in the forefront in major scientific breakthroughs and continue to unravel new gene defects that have potential as new biomarkers and/or therapeutic targets in improving the diagnosis and management of prostate cancer (CaP). In addition to the identification of alterations of the ETS related gene (ERG), CPDR scientists have been instrumental in identifying differences of major prostate cancer driver genes (*ERG and PTEN*) including discovery of a novel genomic alterations (e.g., *LSAMP)* that are enriched in African American prostate cancers. Our research goals are aligned with national priorities of reducing health disparity in African Americans through improving the understanding the biology of the disease in understudied patient populations. Embedded in our comprehensive prostate cancer translational research activities is the training of the next generation of physicians and scientists. **The DoD-PCRP HBCU Summer Training Program** at our Center continues to provide unique opportunities for highly motivated UDC college students to gain exposure to the state-of-the-art biomedical research in prostate cancer. Similar to the first year, during the second year of this grant reporting period, the collaborative team of USU-CPDR and UDC identified critical areas of prostate cancer research and developed structured research projects for students focusing on: molecular genetics and biological mechanisms of prostate cancer development and progression impacting prognosis and treatment; delineation of prognostic markers to distinguish indolent disease from aggressive prostate cancer; development of biomarkers to enhance prostate cancer diagnosis in African American patients. The integrated basic science and clinical research programs of the CPDR led by Shiv Srivastava, PhD and COL Inger Rosner, MD is credited with leading accomplishments in CaP research, state-of-the-art patient care and education and the training of next generation of CaP researchers. Students were trained by USU-CPDR faculty members with outstanding credentials in basic or clinical prostate cancer research. **The main objectives** of this training program are to: (1) recruit and motivate highly qualified undergraduate students from UDC; (2) expose the selected students to a stimulating and intellectual environment that promotes state-of –the art training and education in CaP research; (3) motivate young researchers, who may contribute to CaP research centers at HBCUs.

Specific Aims of the Original Grant Proposal:

- **Selection of students and exposure to the state-of-the-art CaP research environment.** Meritorious students (4 per year) will be selected and exposed to a structured, well-rounded training program that integrates expertise, tools and motivation to pursue careers in prostate cancer research.
- **Assignment of mentors and research project.** The students will be paired with the mentors and will be assigned a specific short-term research project. Student will conduct experiments in their respective laboratories under the supervision of the mentors. During the 12 weeks period, the students will learn key issues in CaP research and will gain hands on experience in CaP molecular biology experiments.
- **Progress report preparation and presentation.** At the completion of training, the students will prepare a written report and present their research at institutional and national conferences.

HBCU Summer Undergraduate Training Program in Prostate Cancer: A Partnership between USU-CPDR and UDC is led by Dr. Shiv Srivastava, PhD, Principal Investigator/Program Director (USU-CPDR), Dr. Deepak Kumar, PhD, Partnering PI (UDC) and Taduru Sreenath, PhD, Co-Investigator (USU-CPDR) in the management and administration of the award, selection of the students and mentors, pairing the students with the mentors, selection of the realistic and achievable projects, as well as the continued development and enhancement of this collaborative training program.

BODY

Task 1: Selection Process: To recruit the undergraduate students, who were interested in pursuing an advanced education in medicine or medical research through the HBCU Summer Undergraduate Training Program in Prostate Cancer Research, the announcements for 2016 were made at the UDC and on social media (Attachment # 1). The applications consisting of essay of interest, transcripts and letters of recommendation were considered for selection process. Four meritorious students were selected by USU-CPDR and UDC the selection committee composed of the faculty advisors for the summer Undergraduate Training Program, and PI and the Co-PI of the grant, based on their interest in research, transcripts, letters of recommendation. The following were the successful applicants for the second year of the proposal:

These applicants were assigned to faculty members of the USU-CPDR to set-up goals to carry out a specific research projects.

Task 2: Assignment of Mentors and Projects: Four of USU-CPDR faculty members were selected as mentors to the students by the PIs. The projects were selected on the basis of the research interests of the students within the CPDR research focus areas. The goals for the students to carry out a specific research projects were set-up by the mentors with approval from the PIs. These projects were short-term realistic projects within our ongoing Basic Science and Translational Research that provided the students with the knowledge, expert guidance and tools for successful completion.

Mentors: Highly dedicated scientists from USU/CPDR with over 15-30 years of research experience, widely recognized in the clinical and basic science research in prostate cancer field served as mentors. All of these scientists have extensive experience in teaching and training urology residents from the Walter Reed National Military Medical Center and postdoctoral fellows and medical and undergraduate students from Uniformed Services University of the Health Sciences.

The following are the Assignment of mentors, research projects:

Student:	**Ms. Dagmawit Betru,** Rising Junior, Major: Biology University of District of Columbia, Washington DC
Mentors:	Ms. Denise Young Dr. William Gesztes, MD Dr. Isabell Sesterhenn, MD
Project title:	Defining early predictive traits of metastatic prostate cancer.
Student:	**Ms. Oluwatosin Dairo** Senior, Major: Biology University of District of Columbia, Washington DC
Mentor:	Dr. Taduru Sreenath, PhD
Project title:	Mechanisms of ERG induced Cancer Cell Survival.
Student:	**Mr. Ryan Johnston** Senior, Major: Chemistry University of District of Columbia, Washington DC
Mentors:	Dr. Hua Li, MD, PhD Dr. Shiv Srivastava, PhD
Project title:	Baseline expression of Pmepa1 in mouse tissue panel.

Student:	**Mr. Randy Ricks** Senior, Major: Biology University of District of Columbia, Washington DC
Mentor:	Dr. Jennifer Cullen, PhD, MPH Dr. Indu Kohaar, PhD.
Project title:	Single-nucleotide Polymorphisms in p53 Pathway and Association with Prostate Cancer.

Mentors and students (left to right): *Dr. Indu Kohaar (mentor), Mr. Randy Ricks (student), Dr. Jennifer Cullen (mentor), Dr. William Gesztes (mentor), Ms. Dagmawit Bitru (student), Dr. Shiv Srivastava (Principle Investigator/Program Director and mentor), Mr. Ryan Johnston (student), Dr. Shashwat Sharad (mentor), Ms. Oluwatosin Dairo (student) and Dr. Taduru Sreenath (Co-Investigator and mentor).*

Task 3: Training, **Goals and Objectives:** The realistic goals and achievable objectives were designed for the students on the importance of understanding basic and translational aspects of prostate cancer research. During this training, students were educated on the current understanding of the main issues and challenges in the field of prostate cancer with an emphasis on the principles and practice of methods associated a specific research question and addressing them through a sound hypotheses, research design, methodologies, data collection, analysis, and data interpretations.

Student:	**Ms. Dagmawit Betru**
Objectives:	To identify early predictive mutations of metastatic prostate cancer.
Student:	**Ms. Oluwatosin Dairo**
Objectives:	To identify the potential mechanisms for ERG induced cell survival.
Student:	**Mr. Ryan Johnston**
Objectives:	To establish the expression pattern of Pmepa1 in mouse prostate tissue.
Student:	**Mr. Randy Ricks**
Objectives:	To identify SNPs in p53 pathway associated with CaP onset in AA and CA.

Laboratory meetings: Through laboratory meetings, seminars and personal discussions the students interacted with other fellow students, faculty members and staff.

- **Weekly meetings:** Students participated in department seminars presented by the USU-CPDR faculty and researchers as well as guest speakers to understand the research activities and the progress in the field of prostate cancer.
- **Biweekly seminar presentations:** Students presented their goals and objectives and experimental plan for the training period in the first presentation and progress in subsequent presentations.

At the end of the summer experience, each student prepared and presented their research findings as PowerPoint presentations.

- **Final seminar presentation:** Students presented the complete project report, and conclusions.
- **Report Submission:** Each student submitted the entire project as a hard copy and an electronic version to the supervisors.

Task 4: Periodical meetings of Faculty advisors to monitor Student's progress: During the 12 weeks of the student training program, mentors interacted with students on a daily basis to review the results and design experimental plan for the day. Students and mentors met with Dr. Shiv Srivastava (PI/PD) and Dr. Taduru Sreenath (Co-Investigator) once a week to discuss the progress towards achieving goals and objectives of the project. Additionally, the students met with PI/PD and Co-Investigator for advises on specific academic goals and individual development plan (IDP). The monthly meetings were conducted to ensure periodic assessments of each student and assist the faculty mentors in determining appropriate interventions in order for the students to accomplish their goals and objectives.

Monitoring students' progress after the training period: PIs, Co-Investigators, faculty members and mentors continued to stay in touch through emails and on phone to monitor the to address any concerns towards their IDPs, selection of the study programs (graduate or professional), writing research statements and providing recommendation letters. The extended mentoring program will help in two important ways: (1) faculty mentoring for scientific exchanges and career advice, and (2) peer connection and peer mentoring where students will exchange their experiences and ideas with fellow students.

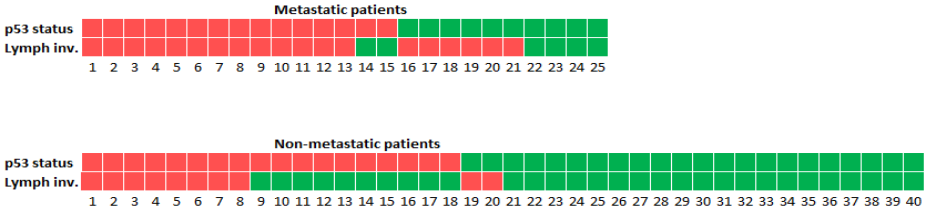
KEY RESEARCH ACCOMPLISHMENTS:

All four students selected under the HBCU Summer Undergraduate Training Program in Prostate Cancer Research have successfully completed their projects assigned to them.

Highlights of their project outline and experimental results were the following:

Student: Ms. Dagmawit Betru: Rising Junior, Major in Biology, UDC
Mentors: Ms. Denise Young, Dr. William Gesztes, MD and Dr. Isabell Sesterhenn, MD
Project title: Defining early predictive traits of metastatic prostate cancer.

Background: P53 is one of several gene alterations which can aid in predicting biochemical recurrence in prostate cancer. Overexpression of p53 was shown to associate with the poorer prognosis in other cancers such as hepatocellular carcinoma, extrahepatic bile duct carcinoma, upper urinary tract urothelial carcinoma, osteosarcoma, lung carcinoma and bladder carcinoma of tumor. Studies also have suggested that p53 mutation an independent prognostic factor for progression and recurrence predicts independently of tumor stage and correlates with increased risk of tumor recurrence and mortality. **Objectives:** The main objective of the research project was to define early traits of metastatic prostate cancer. **Methods:** Expression of p53 gene along with lymphatic invasion in 65 prostate cancer patients by Immunohistochemistry. **Results:** Among all 65 patients, 25 of them had metastasis (15 patients who have positive for p53, and 10 patients with negative for p53). Out of 25 patients with metastasis, 19 displayed Lymphatic Invasion. On the other hand, among the 40 non-metastatic patients 18 of them were positive for p53, and 22 of them were negative for p53. LI was noticed in 10 out of 40 patients with non-metastatic group.



Red = positive (+) status; Green = negative (-) status

Figure 1: *IHC analysis of p53 protein expression and its correlation to the lymphatic invasion*

TP53/LI group	Metastasis	
	No	Yes
TP53+/LI+	8 (38.1)	13 (61.9)
TP53+/LI-	10 (83.3)	2 (16.7)
TP53-/LI+	2 (25.0)	6 (75.0)
TP53-/LI-	20 (83.3)	4 (16.7)

Table 1: *Combined p53 and LI groups for metastatic status*

Conclusion: Overall this study indicated that p53 does not predict metastasis in high risk patients. Combining lymphatic invasion with p53 may improve the prediction of metastasis in prostate cancer.

Student: Ms. Oluwatosin Dairo, Senior, Major in Biology, UDC
Mentor: Dr. Taduru Sreenath, PhD
Project title: Mechanisms of ERG induced Cancer Cell Survival.

Background: Over 50% of prostate cancer patients have a chromosomal rearrangement that involves the gene fusion between the regulated TMPRSS2 promoter and the Ets related gene (ERG). Luminal epithelial cells of prostate glands from ERG transgenic mice display continued endoplasmic reticulum stress. Engineered expression of ERG in LNCaP cells also display similar phenotype of ER stress and aggregation of androgen receptor (AR). Although ER stress and AR aggregation have been demonstrated by ERG, the precise mechanism of ERG mediated prostate carcinogenesis is not clearly understood. **Objectives:** The main objective of the research project was to identify the potential mechanisms for ERG induced cell survival. The goal of this project is to identify the ERG interacting domains of AR and their role in inducing AR aggregation and subsequently leading to ER stress **Methods:** Analysis of various domains of AR that may interact with ERG and their role in inducing AR aggregation as a mechanism of ER stress in COS-7 and HEK293 cells were performed by AR and ERG plasmid transfections. Protein expression was analyzed by Western blot and immunofluorescence analyses, AR aggregation assay was performed by dot-blot assay, AR-ERG interactions were performed by Proximal Ligation Assay (PLA). **Results:** Expression of all 5 constructs of AR with various deletions and ERG in COS-7 and HEK293 showed a faithful pattern. AR deletion (#3) of 566-919 displayed significantly less AR aggregation by dot-blot assay. Subsequent co-immunoprecipitation experiments indicated positive interaction between ERG and all deletion mutants of AR. Similarly, Proximal Ligation Assay indicated positive interaction between ERG and all forms of AR.

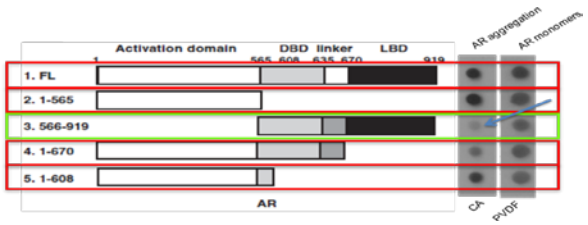


Figure 1: *AR protein aggregation studies with various AR domain deletions*

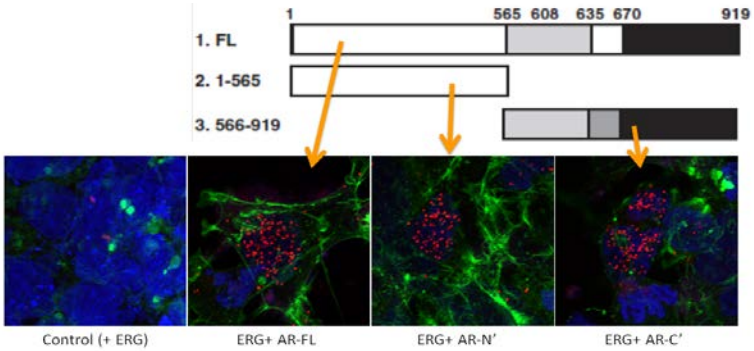


Figure 2: *Physical interaction study in HEK293-TE3 (6L) cells by Proximal Ligation Assay*

Conclusions: Overall, the results indicated that the various domain deletion AR proteins along with ERG in COS7 and HEK293-TE3 (6L) cells showed AR protein aggregation except with the C'-terminal protein. Interestingly all of these mutant AR proteins have shown physical interactions with ERG proteins by PLA assay.

Student: Mr. Ryan Johnston, Senior, Major in Chemistry, UDC
Mentors: Dr. Hua Li, MD, PhD, Dr. Shiv Srivastava, PhD
Project title: Baseline expression of Pmepa1 in mouse tissue panel

Background: Reduced or absence of the PMEPA1 expression is noted in two thirds of human prostate cancers and the loss of PMEPA1 function results in higher AR levels in prostate cancer cell lines. Pmepa1 conditional knock-out mice model will provide a direct in vivo confirmation toward the role of pmepa1 in prostate development and disease. **Objectives:** The main objective of this research project was to establish the tissue specific expression pattern of Pmepa1 knockout mouse tissues mouse tissues in comparison to the wild-type control litter-mates. **Methods:** Protein extractions from Pmepa1 knockout and wild-type mouse tissues such as adrenal gland, bladder, brain, heart, kidney, liver, prostate, stomach, testis, eye, lung, lymph node, salivary gland, skin, small intestine, spleen, thymus and muscle were analyzed for the expression of Pmepa1 protein by Westernblot and Immunohistochemistry using specific antibodies. **Results:** Pmepa1 expression in mice was detected in all the tissues except adrenal gland. Nkx3.1 expression was detected in all the tissues except brain, eye and muscle.

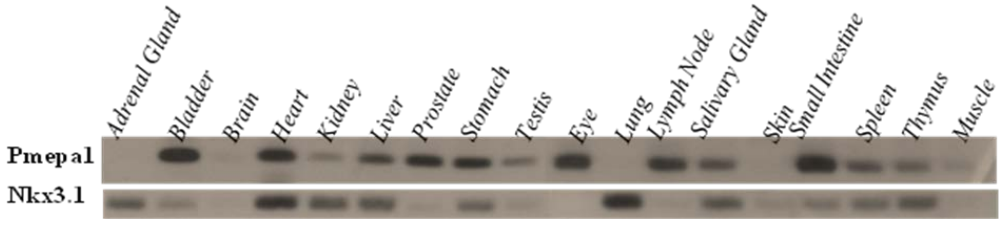


Figure 1: *Western blot analysis of Pmepa1 protein in wild-type mouse tissues.*

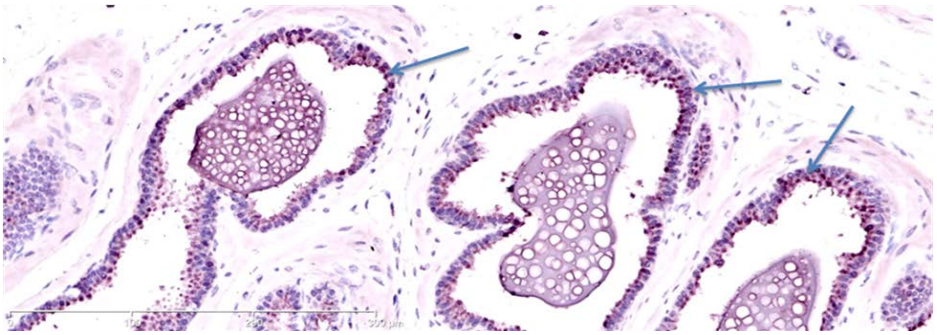


Figure 2: *Immunohistochemical analysis of Pmepa1 protein expression in the wild-type mouse prostate glands at 20X magnification*

Conclusions: The spatial expression Pmepa1 protein widespread in most of the tissues suggesting critical functions in addition to prostates. Immunohistochemical analysis revealed variation in the distribution in anterior, dorsal, lateral and ventral glands. The expression appears high in lateral and anterior glands.

Student: Mr. Randy Ricks, Senior, Major in Biology, UDC
Mentors: Dr. Jennifer Cullen, PhD, MPH, Dr. Indu Kohaar, PhD.
Project title: Single-nucleotide Polymorphisms in p53 Pathway and Association with Prostate Cancer.

Background: Growing evidence indicates the involvement of a genetic component for prostate cancer susceptibility. Quantitative estimates from twin studies have shown that about 42% of the variation in prostate cancer risk may be attributed to genetic components. Recently, using expanded study population and better statistical modeling, it has been demonstrated that the average genetic heritability is now 58%. **Objectives:** Our goal is to identify SNPs in p53 pathway associated with CaP onset in AA and CA. **Approach and Methodology:** p53 direct targets were selected from IARC p53 database. National Center for Biotechnology Information (NCBI)'s single nucleotide polymorphism database (dbSNP) build 146 and Entrez Gene databases were used to identify SNPs located in the vicinity of selected genes from p53 pathways. SNPs located in 10,000 base-pairs upstream and downstream of selected genes from p53 pathways were also included for the study from CPDR oncoarray SNP dataset. Association analysis of SNPs with AA and CA CaP was performed by chi-square analysis and comparative analysis was done based on minor allele frequency (MAF) distribution in our study in relation to global minor allele frequency (dbSNP). **Results:** A total of 616 SNPs (564 p53 target gene SNPs and 52 p53 SNPs) were analyzed on 321 prostate patients (AA = 216 and CA = 105). Preliminary association analysis using chi square test revealed that a total of 149 SNPs were found to be significantly associated with race. 3 genes - CDKN1A Cyclin-Dependent Kinase Inhibitor 1A (CDKN1A), Sestrin 1 (SESN1) and epidermal growth factor receptor (EGFR) were found to be highly polymorphic (13 SNPs in SESN1, 28 SNPs in EGFR and 9 SNPs in CDKN1A). MAF distribution showed that 5 SNPs in EGFR, 5 SNPs in CDKN1A and 6 SNPS in SESN1 were found to be relatively more frequent in AA CaP than CA CaP.

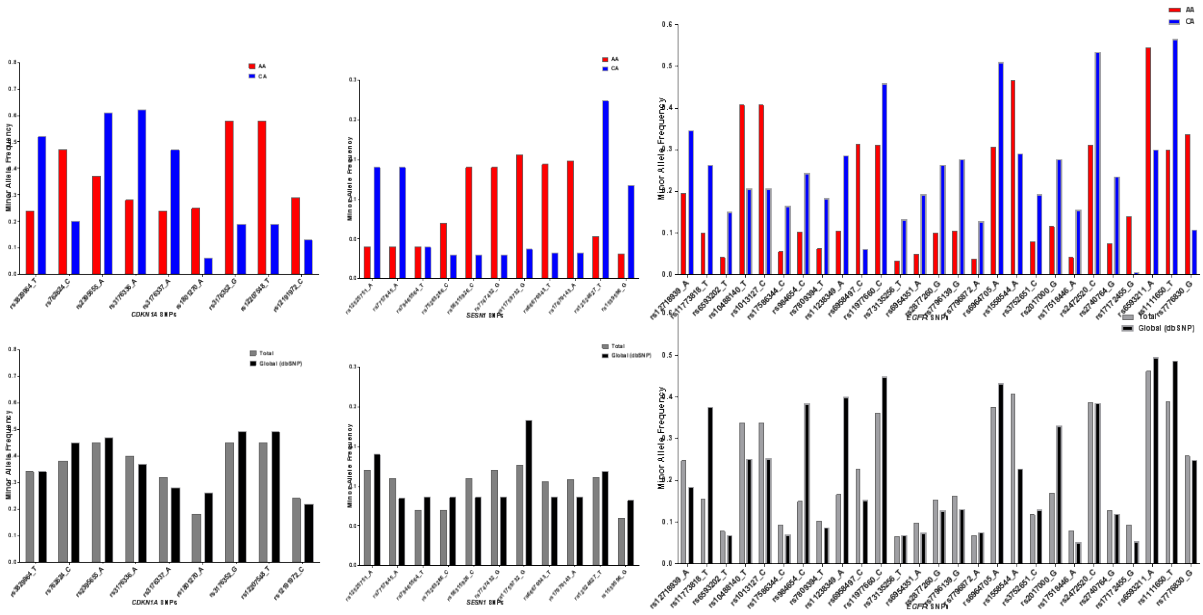


Figure 1: *Frequency of minor allele in SNPs in Cyclin-Dependent Kinase Inhibitor 1A (CDKN1A), Sestrin 1 (SESN1) and epidermal growth factor receptor (EGFR) in AA and CA patients*

Conclusions: These results suggested the importance of the genetic variants in p53 pathway towards prostate cancer susceptibility in AA and CA.

REPORTABLE OUTCOMES:

During this period, the students have displayed tremendous of interest in the field of prostate cancer and have gained experience. The results obtained from their experiments were presented as posters in conferences at national level and were awarded scientific merit awards.

- Oral presentations in the presence of faculty and staff of CPDR and senior leaderships of USU (Department Chairman) and UDC (Dean, College of Arts and Sciences)

- **American Association for Cancer Research Annual Meeting 2016 in New Orleans, Louisiana, USA. (Poster presentation):**
  Shahnoza Dusmatova, William Gesztes, Lauren Hurwitz, Huai-Ching Kuo, Denise Young, Inger Rosner, Jennifer Cullen, Deepak Kumar, Shiv Srivastava, Isabell Sesterhenn. Novel Appearance and Clinico-Pathologic Dynamics of TMPRSS2:ERG Hybrid Prostate Cancer.

- **USU Research Week- May 16, 2016 (Poster presentation):**
  Shahnoza Dusmatova, William Gesztes, Lauren Hurwitz, Huai-Ching Kuo, Denise Young, Inger Rosner, Jennifer Cullen, Deepak Kumar, Shiv Srivastava, Isabell Sesterhenn. Novel Appearance and Clinico-Pathologic Dynamics of TMPRSS2:ERG Hybrid Prostate Cancer.

- **Awards:** Ms. Shahnoza Dusmatova, received The AACR Gary J. Miller Undergraduate Prize for Cancer and Cancer Related Biomedical Researchfor her poster presentation entitled “Novel Appearance and Clinico-Pathologic Dynamics of TMPRSS2:ERG hybrid Prostate Cancer”.

CONCLUSIONS

The program for the 2nd year of the grant period was initiated with the successful applicants meeting with Dr. Shiv Srivastava, Principal Investigator/Program Director, who provided the students with an overview of the DoD-PCRP funded HBCU Summer Undergraduate Training Program in Prostate Cancer: A Partnership between USU-CPDR and UDC goals and objectives. The following is the summary of student activities throughout the training fperiod:

- Students personal goals, objectives and their specific research interests were discussed
- CPDR orientation meeting was conducted by Program Manager to familiarize the students with HR related and personnel matters
- Laboratory safety training was given to the students by CPDR Laboratory Manager
- Short-term realistic projects within our ongoing **Basic and Translational research** were designed for students
- Mentors were selected by the PIs based on student's specific research interest.
- Mentors worked closely with students to identify a research project to include goals and objectives.
- Students presented their research progress to CPDR scientific staff and PI at CPDR Rockville location in biweekly meetings
- Students presented their complete project report and conclusions.
- At the completion of training, the students prepared a complete written report to the mentors in a manuscript format

During this period, the students have displayed tremendous of interest in the field of prostate cancer and have gained experience. The results obtained from their experiments will be presented as posters in HBCU conferences at national level.

In summary, this collaborative training program has cultivated sufficient interest in students to understand the importance of prostate cancer research.

REFERENCES:

None

APPENDICES:

Supporting Data:

Summer Research Opportunity Announcement: **Attachment#1**

CPDR Web News Release: **Attachment#2**

2016 SUMMER UNDERGRADUATE RESEARCH OPPORTUNITY

Summer research opportunity is available at the Department of Defense - Center for Prostate Disease Research (CPDR), Uniformed Services University (USU) *of Health Sciences* on a UDC-CPDR jointly funded program.

The Department of Defense, United States Army Medical Research and Materiel Command (USAMRMC), has awarded a new 3-year Prostate Cancer Research Program (PCRP) Collaborative Undergraduate Historically Black College And University Student Summer Training Program grant to the Uniformed Services University of the Health Sciences' (USU) Center for Prostate Disease Research (CPDR) and the University of the District of Columbia (UDC) collaborative team.

A successful collaborative effort between Dr. Deepak Kumar, from UDC and Dr. Shiv Srivastava, from USU/CPDR continues to provide a great opportunity for UDC students to take part in Prostate Cancer Training Program that is conducted during the summer break. The Program provides a 10-12 weeks summer research experience in prostate cancer research for undergraduates majoring in science, technology, engineering and mathematics (STEM) disciplines. The goal of this program is to prepare a diverse, highly talented, educated, and skilled pool of scientists interested in Prostate Cancer Research. The students will be exposed to cutting edge research methods in prostate cancer and will be mentored throughout their tenure at UDC. Several of past mentees are pursuing graduate and professional schools. More information about CPDR can be found at http://www.cpdr.org.

The Program has also been highlighted by the Department of Defense – CDMRP's Prostate Cancer Research Program. http://cdmrp.army.mil/pcrp/pbks/pcrppbk2014.pdf [page 13]

- **Four (4-6) students will be selected for summer, 2016 starting on June 1, 2016**

Eligibility Requirements

- The applicant must be a junior or senior at UDC when he/she returns to school in Fall 2016.
- Must be studying in STEM disciplines with an interest in Prostate Cancer Research.
- Must have a cumulative GPA of 3.0 or above at the time of application.

Stipend

- The participants to this program will receive a stipend @ $12/hr, 40h/week for 10-12 weeks.

Application

- Submit a letter of intent along with a short essay (1 page) on how this program will help you in achieving your career goals. The application must be submitted by email. The deadline for application is March 30, 2016. Selected applicants will be notified by April 30, 2016.

Submit your application to

Dr. Deepak Kumar
Co-PI and Director of the UDC-CPDR Summer Research Program
Division of Science and Mathematics
University of the District of Columbia
4200 Connecticut Avenue NW; Washington DC 20008
Email: dkumar@udc.edu

2016 NEWS ARCHIVE

June 23, 2016

Dr. Charles P. Xavier Takes the Robert A. Phillips Award and a Navy-wide Academic Research Competition Award

by Paula Amann
Published in the June 2016 issue of Military Medical Research News, a monthly newsletter of the Department of Research Programs, Walter Reed National Military Medical Center.

Fine-tuning facial transplants, predicting bone fractures, shrinking prostate cancers with new drugs and cutting the costs of surgical training with the right technology: These were among the problems probed by competition winners for 2016 Research and Innovation Month at Walter Reed National Military Medical Center (WRNMMC).

The events, during Poster Display Week on May 11 and the Research Symposia on May 18-19, drew abstracts for 178 projects. After winnowing by pre-selection judges, 22 finalists emerged in three categories: case reports, evidence-based practice and quality improvement (a crucial non-research area).

Another 24 finalists, split evenly between laboratory and clinical research, vied for the Robert A. Phillips (RAP) and Bailey K. Ashford (BKA) Awards. The two BKA winners were LCDR Gabriel Santiago, MC (laboratory medicine), and LT Scott Wagner, MC (clinical medicine).

RAP winners included LT Daniel Griffin, MC (resident laboratory category); CPT Sarah Placek, MC (resident clinical); Charles P. Xavier, Ph.D. (staff laboratory); and Benjamin Sheffield (staff clinical).

Read Full Article

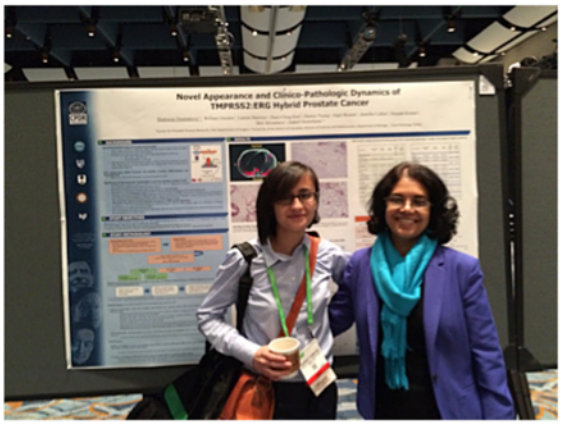
May 28, 2016

Highlights at the 2016 AUA Annual Meeting in San Diego, Ca

The Center for Prostate Disease Research (CPDR) multi-disciplinary team - together with collaborators - presented 13 abstracts in moderated poster or podium presentations at the American Urological Association (AUA) Annual Meeting, May 6-10, 2016, San Diego, CA. The team was co-led by COL David McLeod, (Ret), MD, CPDR Director and Professor of the Department of Surgery, Uniformed Services University of the Health Sciences (USU) and the Walter Reed National Military Medical Center (WRNMMC); Dr. Shiv Srivastava, CPDR Co-Director and Professor in the Department of Surgery at USU and WRNMMC; COL Inger Rosner, MD, Associate Director, CPDR and Associate Professor, Department of Surgery, USU and the WRNNMC; Dr. Jennifer Cullen, Director of Epidemiology Research Program, CPDR and Research Assistant Professor, Department of Surgery, USU and WRNMMC and Dr. Albert Dobi, Associate Director, CPDR and Research Assistant Professor, Department of Surgery , USU and WRNMMC.

Read Full Article

May 13, 2016



CPDR Student Participant Wins The AACR Gary J. Miller Undergraduate Prize for Cancer and Cancer Related Biomedical Research

A third place prize in the AACR Undergraduate Student Caucus and Poster Competition was awarded to Ms. Shahnoza Dusmatova, a CPDR participant in the DoD "Research and Education Program for Historically Black Colleges and Universities and Minority-Serving Institutions (HBCU/MI)". Her poster was entitled : "Novel Appearance and Clinico-Pathologic Dynamics of TMPRSS2:ERG hybrid Prostate Cancer". Her mentors include Dr. Kumar (UDC), Dr. Isabell Sesterhenn (JPC), Dr. Jennifer Cullen (CPDR), Dr. Shiv Srivastava (CPDR), and Dr. Taduru Sreenath (CPDR).

Shahnoza Dusmatova (left) with Dr. Rina Das, Ph.D. (National Institute on Minority Health and Health Disparities, Division of Scientific Programs, Office of Research Training and Capacity Building).

May 2, 2016

CPDR Presentations and Highlights at the 2016 AACR Annual Meeting in New Orleans, La.

The Center for Prostate Disease Team has presented their new findings in prostate cancer research at the American Association for Cancer Research Annual Meeting 2016 in New Orleans, Louisiana, USA.

The Team led by Dr. David G. McLeod, Director and Dr. Shiv Srivastava, Co-Director presented the ground breaking discovery of the first recurrent cancer genomic defect of prostate cancers of African American men revealed by whole genome sequencing. The title of the poster presentation was "LSAMP gene deletion is associated with rapid disease progression in prostate cancer of African American men".

Analyzing the thus far largest and most comprehensive whole mounted prostate cancer specimens for ERG expression, obesity, African American and Caucasian American ethnicity for associations with disease progression the team co-led by Dr. Isabell Sesterhenn and Dr. Jennifer Cullen reported new insights in their poster presentation "ERG-negative index tumor status combined with obesity predict prostate cancer progression in Caucasian American prostate cancer patients".

Along these lines presentations from the CPDR Team reported initial insights into the development of an ERG-selective inhibitor, ERGi-USU in their poster presentation "ERG oncogene-specific inhibitors for prostate cancer". Further report from CPDR assessed potential autoantibodies with the long-term goal of prostate cancer diagnosis in the poster presentation "Immunobiomarkers: novel autoantibody panel comprising oncogenic ERG, C-MYC, AMACR and HERV-K Gag for the detection of prostate cancer".

New insights into the mechanism of ERG action examining in vivo transgenic models of ERG highlighted the role of endoplasmic reticulum stress in the poster presentation of "ERG oncogenic activation leads to the endoplasmic reticulum stress and cell survival mechanisms".

Poster Presentations:

- **Distinguing features of ERG oncoprotein expression among matched cohorts of African-American and Caucasian-American prostate cancer patients**
  Taduru L. Sreenath, Albert Dobi, Shiela S. Macalindong, Natallia Mikhalkevich, Shashwat Sharad, Parameet Kumar, Denise Young, Rishita Gupta, Shilpa Katta, Ahmed Mohamed, Shyh-Han Tan, Gyorgy Petrovics, Charles J. Bieberich, Isabell A. Sesterhenn, Peter Nelson, David G. McLeod, Valeri Vasioukhin, Shiv Srivastava

- **ERGi-USU, A Selective Inhibitor Of ERG Oncogene Positive Cancer Cells**
  Ahmed A. Mohamed, Gauthaman Sukumar, Charles P Xavier, Shilpa Katta, Lakshmi Ravindranath, Muhammad Jamal, Taduru Sreenath, David G. McLeod, Gyorgy Petrovics, Meera Srivastava, Albert Dobi, Clifton L. Dalgard and Shiv Srivastava

- **Interaction between ERG Status, Obesity & Race in Predicting Prostate Cancer Progression in a Military Cohort**
  Jennifer Cullen, Denise Young, Yongmei Chen, Michael Degon, James Farrell, Jason Sedarsky, Wagner Baptist, Philip Rosen, Vladimir Tolstikov, Michael Kiebesh; Jacob Kagan, Sudhir Srivastava, Huai-Ching Kuo, Joel T. Moncur, Inger L. Rosner, Niven Narain, Viatcheslav Akmaev, Gyorgy Petrovics, Albert Dobi, David G. McLeod, Shiv Srivastava, Isabell A. Sesterhenn

- **LSAMP gene deletion is associated with rapid disease progression in prostate cancer of African American men**
  Albert Dobi, Gyorgy Petrovics, Hua Li, Shyh-Han Tan, Tanja Stümpel, Denise Young, Shilpa Katta, Qiyuan Li, Kai Ying, Bernward Klocke, Lakshmi Ravindranath, Indu Kohaar, Yongmei Chen, Dezső Ribli, Korbinian Grote, Hau Zou, Joseph Cheng, Clifton L. Dalgard, Shimin Zhang, István Csabai, Jacob Kagan, David Takeda, Massimo Loda, Sudhir Srivastava, Matthias Scherf, Martin Seifert, Timo Gaiser, David G. McLeod, Zoltan Szallasi, Reinhard Ebner, Thomas Werner, Isabell A. Sesterhenn, Matthew Freedman, Shiv Srivastava

- **Autoantibodies Against ERG, AMACR, C-MYC and HERV-K Gag in the Sera Of Prostate Cancer Patients: Potential Use in Diagnosis/Prognosis**
  Anshu Rastogi, Shyh-Han Tan, Amina Ali, Yongmei Chen, Jennifer Cullen, Sreedatta Banerjee, Ahmed A. Mohamed, Lakshmi Ravindranth, Denise Young, Isabell A. Sesterhenn, Jacob Kagan, Sudhir Srivastava, David G. McLeod, Gyorgy Petrovics, Albert Dobi, Shiv Srivastava, Alagarsamy Srinivasan

- **Novel Appearance and Clinico-Pathologic Dynamics of TMPRSS2:ERG Hybrid Prostate Cancer**
  Shahnoza Dusmatova, William Gesztes, Lauren Hurwitz, Huai-Ching Kuo, Denise Young, Inger Rosner, Jennifer Cullen, Deepak Kumar, Shiv Srivastava , Isabell Sesterhenn

February 2, 2016

CPDR Urology Residents Take Top Awards at 2016 James C. Kimbrough Urological Seminar

Urology Residents conducting research at The Center for Prostate Disease Research (CPDR), Department of Surgery, Uniformed Services University of the Health Sciences and the Walter Reed National Military Medical Center presented their research at the Residents Competition category of the James C. Kimbrough Urological Seminar, San Diego, 2016.

LT Travis Allemang, MD, a fifth-year resident at the Naval Medical Center Portsmouth and Eastern Virginia Medical School, won 1st place for his presentation titled "Prostate Cancer Gene Expression Signatures Associated with Seminal Vesicle Invasion and Biochemical Recurrence after Radical Prostatectomy". CPT Jason Sedarsky, MD, a fifth-year resident at Urology Service Walter Reed National Military Medical Center won 3rd place for his presentation "Racial Differences of ERG Frequencies in Prostate Cancer. CPT Daniel Kim, MD, a fourth-year Urology Resident presented his research findings on "Patterns in Treatment Decision-Making and Longitudinal Regret for Low Risk Prostate Cancer Patients Managed on Active Surveillance". Congratulations to all!

Since 1993, CPDR, Department of Surgery, USUHS, and the Urology Service at WRNMMC have been training next-generation urologists and future leaders in the field through the state-of-the-art Urology Resident Training and Education Program. Urology Residents trained at CPDR have been following the great traditions of excellence with their award-winning research work focused on prostate cancer translation research, within the Basic Science Research Program, led by Dr. Shiv Srivastava, Co-Director, CPDR, and Dr. Isabell Sesterhenn, Chief, Genitourinary Pathology at the Joint Pathology Center.

Dr. Albert Dobi, PhD, Associate Director BSRP, CPDR said, "The recognition of these exceptionally innovative research achievements highlight the success of the CPDR multi-disciplinary program and demonstrates the commitment of CPDR, Department of Surgery, USUHS and the WRNMMC to serve DoD patients with prostate cancer by nurturing talents from all arms of the U.S. Armed Forces."

January 11, 2016

A Novel Gene Alteration Associates with Aggressive Prostate Cancer in African American Men

The USU, Walter Reed-Bethesda and JPC collaborative team, through comprehensive evaluations of matched cohorts of African American and Caucasian American prostate cancers, previously established a higher frequency of ERG alterations in Caucasians (50-70%) and its significantly lower frequency in African Americans (20-25%). These intriguing observations actually provided the rational for the current study focusing on whole genome evaluations of prostate cancers from these two patient populations.

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