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Irvin B. Harrell (Editor)

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Jonathan Taylor, a Doctor of Nursing Practice student, serves as the IPC Clinic leader, running the bimonthly meetings with clinic participants at the Sentara Ambulatory Care Center in Norfolk.

IPC Clinic: 'It takes a village'

By Irvin B. Harrell

In a nondescript building across the light-rail tracks on Colley Avenue in Norfolk sits Sentara Ambulatory Care Center, a facility offering free medical services to adults who are low-income, uninsured or underinsured through Medicare and Medicaid.

But that's not all this facility offers.

Twice a month the clinic opens its doors to students from several healthcare disciplines – serving as an incubator of sorts for the future of caregiving. The program is called the Interprofessional Collaborative (IPC) Clinic. It is operated by students, and it has been improving lives for two years running.

After a year of planning – which included development and practice sessions with standardized patients

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In this Edition...

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ODU nursing student Vignette Kaltsas, center, meets with students participating in the IPC Clinic.

(patient actors) – the IPC Clinic began operating once a month from noon to 4 p.m. for its first year. Now it runs twice a month (every other Tuesday) from 1 to 3:30 p.m. The clinic got its start through grant money for a collaborative effort between Old Dominion University and Eastern Virginia Medical School (EVMS).

"This is truly a joint effort," said Tina Gustin, one of ODU's faculty spearheading the program. "Some faculty are grant funded and some are volunteers. Some of the students that attend the clinic are doing so as part of a class, others are attending as part of their clinical experience."

Gustin is just one of several moving parts of this clinical collaboration who ensures that it works effectively for students, educators, and, of course, patients. The clinic was founded after joint meetings with Gustin and Carolyn Rutledge from ODU's School of Nursing; Sharon Stull from ODU's School of Dental Hygiene; Dr. Ana Vazquez from Sentara; Drs. Bruce Britton and Jen Ryal from Eastern Virginia Medical School (EVMS); and Karen Kott from ODU's School of Physical Therapy & Athletic Training,

"The focus was to get a group of students together to ask real patients about their social determinants of health," Kott said. "The students would get real-life experiences. The students (from different disciplines) would learn to talk with patients and then with each other, and then offer recommendation for patient care."

Dr. Vazquez specializes in family medicine and is affiliated with several area hospitals, including Sentara Norfolk General and Sentara Virginia Beach General. She facilitates the care at the clinic which serves her patients. Dr. Jen Ryal from EVMS oversees medical students and residents participating in the clinic. ODU School of Nursing's Jamela Martin also has joined the initiative, working with undergraduate nursing students who participate at the clinic.

"As the students arrive to the clinic, I sit down with them and provide them an overview of the IPC Clinic, which includes a tour of the clinic space, a discussion of the broader purpose of the IPC, and what types of pa-

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tients are seen," Martin said. "I provide mentorship and guidance to the nursing students during their reports to the interprofessional teams and assist with organizational needs as they arise for the clinic overall."

Among the considerations when addressing social determinants of health for the clinic's patients are transportation, housing, oral health, physical needs such as mobility devices, obtaining food stamps and Medicaid.

Students participating at the clinic include EVMS students and family medicine residents, ODU family nurse practitioner students, adult gerontology clinical nurse specialist students, undergraduate nursing students, physical therapy students, masters level clinical counseling students, ODU dental hygiene students, and Hampton University social work students.

"Most importantly, we have a Doctor of Nurse Practitioner student leading the clinic for both their practicum experience and research," Gustin said.

Jonathan Taylor, the current DNP student leader, has many responsibilities at the IPC Clinic including: providing education to patients, physicians, nurses, and students of other programs about the clinic; attending and leading meetings with key leaders; developing and discovering new resources for clients; building and maintaining relationships for local and state agencies committed to helping patients; coordinating patient flow; and ensuring appointments and referrals are executed via follow-up. For Taylor, past his hefty slate of responsibilities comes an experience that he says has been more than inspirational.

"We are actually leading the change that we want to see in our nation's health care, all while setting the stage to influence global healthcare education," he said. "While most learners only come to our clinic for one or two visits, I have no doubt they take what they learn from our clinic and apply it to their practice. By providing care while working together, we are bringing the best options possible to patients while increasing our collective knowledge."

Katie Harris, a senior in ODU's School of Nursing, learned about the IPC Clinic in her Community Health class.

Taylor says the clinic's schedule allows for seven patients per clinic day (14 a month). The clinic encounters can take anywhere from 1 ½ to 4 hours. While transportation is often a problem for many patients, "if they show up, we see them," Taylor adds.

Katie Harris, a senior in ODU's School of Nursing, says she heard about the clinic through her Community Health nursing class. The holistic approach to working with patients was of particular interest to her. Among her takeaways from the clinic experience was something as seemingly simple as the importance of keeping patients informed about the care they receive, but also the sobering reality that "you cannot force someone to receive care, no matter how much you think they need it."

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A little football therapy

Two patients at Monarch Physical Therapy Clinic had a chance to meet with President John R. Broderick and watch the ODU Monarch football team dismantle VMI by the score of 77-14 on Saturday, Nov. 17, at Foreman Field at S.B. Ballard Stadium. ABOVE: Michael Sheffield sits with his nephew Junior. RIGHT: Sam Warren takes a photo with the president.

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In the fall of 2016, Stull, an ODU dental hygiene lecturer, was invited by Professor Rutledge to the IPC Clinic. One of the things that really impressed her, she says, was how the students handled the experience.

"When the student team is assigned to a patient, they were quiet, introspective, a little nervous and unsure of what value this experience would provide," she said. "After the direct patient-centered interaction and engagement portion of the clinic, the student team came out of the room as one — centered, focused, caring, and moved."

Physical therapist Kott says that many students who have taken part in the clinic were surprised at how complicated the patients' needs were. Additionally, they learned the overlapping roles of health professionals and where certain professions play bigger roles depending on the issue.

School of Nursing's Gustin puts it succinctly among her biggest takeaways: "It takes a village."

Cancer researcher rewarded for his work

NIH grants in millions fuel Heller's quest to solve bioelectric questions

By Irvin B. Harrell

Professor and Eminent Scholar Richard Heller.

For Old Dominion University researcher Richard Heller, breakthroughs can happen in one billionth or one trillionth of a second. And if you lend him your ear, in a mild-mannered, disarming tone he can describe to the layman some of the intricacies of his life's work.

Heller, a professor and eminent scholar at the Frank Reidy Center of Bioelectrics, has been doing biomedical research at ODU for about a decade. One area of his research has been utilizing an electric field to destroy tumors.

The Center of Bioelectrics lured Heller to ODU in the summer of 2008 and he has not only been moving the needle on research related to gene therapy for cancer and other diseases, but has attracted multimillion-dollar funding along the way. He currently has three of National Institutes of Health R01 grants – "Efficient Delivery of Plasmid DNA to Achieve Appropriate Transgene Expression", "Thermal Assisted Gene Electro Transfer to the Skin" and "Controlled Delivery of Plasmid DNA via Low-Temperature Ion Deposition"– receiving about $1.8 million, $1.4 million and $1.7 million respectively. He also was the 2018 recipient of the ODU Research, Scholarship, and Creative Achievement Award.

"The center is a multidisciplinary center, a university-level center where engineers, biologists, and physicists work together," he said.

So how does some of his research work? Heller provides some insight.

"All cells are surrounded by a membrane," he said. "If you apply an electric field to the membrane, the mem-

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brane can become permeable. This can allow you to do things like introduce a drug or a gene into a cell. For example, you can deliver an agent into a tumor cell and destroy it."

While the process might sound simple, the practice is far from easy and quite delicate. The electric pulses used in this type of cellular research fall into two categories. Short pulses in the millisecond (one thousandth of a second) to microsecond (one millionth of a second) typically used to deliver molecules to cells and nanoseconds (one billionth of a second) to picoseconds (one trillionth of a second) typically used to alter the function of a cell or directly kill the cell. The shorter the pulse, the higher the voltage. Such research could provide answers to effectively treating melanoma and other cancers, replacing deficient proteins, delivering vaccines and improving poor blood circulation, Heller says.

Heller and his colleagues at the center work together as well as with other scientists nationally and internationally. He raves about ODU's international recognition as a big player in bioelectrics.

"We collaborated with many people, such as researchers in California, Florida, France, Germany, Japan, Denmark, Slovenia," he said.

Over the years, Heller's research has moved from delivering chemotherapeutics into cells to introducing DNA, which when done effectively can result in systemic changes by destroying malignant cells while preventing other bad cells from reforming elsewhere in the body. Recently, Heller and his collaborators discovered that by applying external heat they could lower the voltage of the electrical pulse and DNA delivery into the cell becomes more efficient, he says.

> **"Even when you're not at work, the thoughts are still there, because there's always a problem to solve. You may ask a question and find a solution, but it's going to generate three or four more questions."**
>
> **Richard Heller**

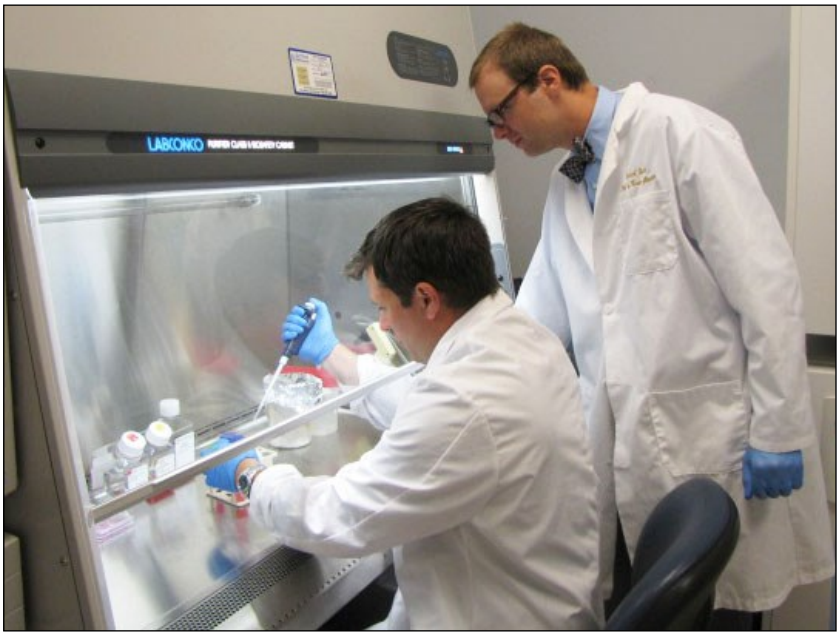
Heller says he became interested in bioelectrics during his time at the University of South Florida, where he received both his master's and Ph.D. in Medical Sciences. While in grad school his mentor was working on a project to fuse human cells to animal tissue, something that no one had done. His successful work on the project planted the seed to his future, he says.

When you work in the field of gene therapy and cancer and cardiovascular research, it isn't easy to come up for air, Heller says, emphasizing his never-ending quest to find answers. His knee-jerk reaction to the question "What do you do when you're not doing research?" was "That's a good question." After a little more thought, "watching movies and baseball, travel" came to mind.

"Even when you're not at work, the thoughts are still there, because there's always a problem to solve," said Heller, who is married and resides in Norfolk. "You may ask a question and find a solution, but it's going to generate three or four more questions. If you solve all the questions, then what is there?"

Researchers forge ahead in cancer research

The Virginia-Pilot (Nov. 2018)



From left, ODU researchers Robert Bruno and Patrick Sachs.

NORFOLK - Xavier-Lewis Palmer held up a small, clear container to the light, bringing into view 48 holes filled with a clearish -pink fluid.

The culture had been stored in a 98.6-degree-Fahrenheit incubator at an Old Dominion University laboratory. As the ODU doctoral student in biomedical engineering slid the container under a microscope, a line of what looked like dark bubbles appeared through the lens.

The particles - human cells - were submerged in a specialized gel made of reconstructed breast tissue. Inside the clear tray, invisible to the human eye, they are developing and forming structures while researchers closely watch.

It's all part of a quest by an ODU team to better understand how and why some breast cancer cells develop into tumors while others do not. Though the scientists have no definitive conclusions yet, they are hoping their findings will help inform cancer research from the front end and eventually lead to "preventing breast cancer whatsover."

The team developed a 3D bioprinter to precisely place the cells into the gel and observe how they interact over time.

"What all this stuff essentially allows us to do is kind of, in a way, turn back the clock" on cell growth, said Robert Bruno, an assistant professor of medical diagnostic and translational sciences. "We can detect things in the cancer cells that have changed. ... What's changed and how can we target that?"

For Bruno, the research started back when he worked at the National Cancer Institute.

He and colleagues there put breast cancer cells into a normal breast environment in mice to see what would happen. The cancer cells regenerated normally, avoiding development into something dangerous.

"We put them in a good environment and they start acting good again," Bruno said.

It got Bruno thinking: Is the same true for humans?

"We think it's really interesting from a cancer perspective because most cancer approaches are targeted kill-

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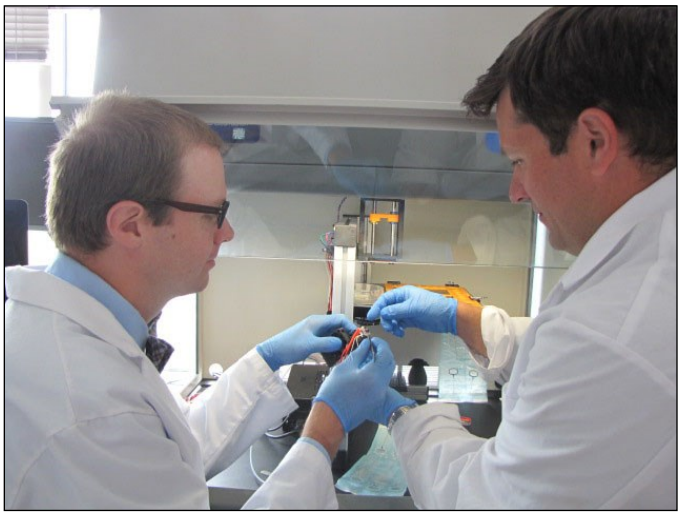

ing. They try and figure out what's mutated in the cancer cells and how to eliminate it," Bruno said. "But in this case the cells have all the mutations but they're not making tumors."

Cancer researchers know there are many cells in our bodies "that could become tumors but they don't."

The question is why. That's what the ODU research aims to probe.

Key to the process is a bioprinter the team developed.

"Basically a fancy cell injector," Bruno said, it allows them to very precisely inject cells into a three-dimensional location inside the gel.

Patrick Sachs, an assistant professor in medical diagnostic and translational sciences, developed the gel using reconstituted human breast tissue, which comes primarily from Eastern Virginia Medical School after mastectomies.

He likes to think of the gel as a framework telling cells what to do - a building that has a purpose, like a school. People in a school building know they should be doing education-related work. If you take them out and put them in a sports arena, will they act accordingly?

"The structure somewhat dictates the function of things within it," Sachs said. "By rebuilding that, we can put cells into it and see what they do. We can then determine whether the cells are doing what we want them to do."

The bioprinter came after previous attempts involved simply mixing the cells randomly. It was difficult to get them to interact in a meaningful way, Sachs said.

Much testing in the field has been done in a 2D environment, said Palmer, an ODU doctoral student in biomedical engineering. But that "doesn't properly mirror what happens in our body."

The bioprinter is "a platform by which we can run experiments many times over and more efficiently," Palmer said.

"If we can take cells we know can make a tumor and make them normal again, we can ask questions about what's different about them, what's changed, can we harness that for therapy or diagnosis," Bruno said.

"If we're truly going to talk about curing something like breast cancer, it can't just be, 'Let's wait until they appear and treat them with drugs.' It has to be a comprehensive approach of, 'Let's diagnose it better, prevent it and let's treat it.' We think we have potential applications for all of that."

Harvest Fest a Huge Success

Harvest Fest replaced the college's Welcome Back Picnic this year, attracting faculty, staff, students, and guests for a afternoon of camaraderie, games and food. The event was held on Halloween, and some of the participants came dressed for the occasion.

Photos courtesy of Tammie E. Smith

HARVEST FEST 2018

CALENDAR

December 2018

Dec. 7	Fall Classes end
Dec. 8-14	Final Exams
Dec. 14	Student Honors and Awards, 6 p.m., Hampton/Newport News Room
Dec. 15	Fall Commencement, 9 a.m. & 2 p.m., The TED
Dec. 18	University Faculty & Staff Holiday Reception, Noon, Broderick Dining Commons

HUGH L. VAUGHAN SCHOLARSHIP LUNCHEON 2018-2019

Donors Carol and Jordan Levitin pose with scholarship winners at this semester's scholarship luncheon. From left are Sutarto Soeng, Carol Levitin, Ki Slusher, Jordan Levitin, and Michelle Dierkes.