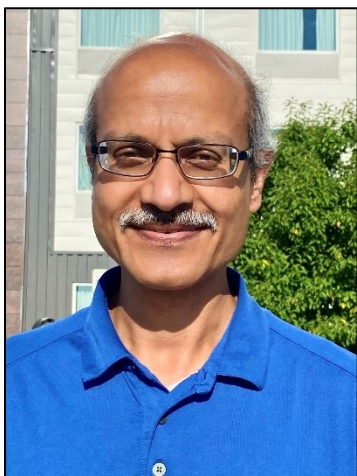


Nanoparticle Research Hits the Target: DaCCoTA award leads to successful renewals of NIH R01 and COBRE grants



Dr. Sanku Mallik is a professor of Pharmaceutical Sciences at North Dakota State University and was a DaCCoTA Ready-to-Go project awardee. He researches hypoxia-responsive polymer nanoparticles for targeting and drug delivery to solid tumors. He collaborates with Dr. Sathish Venkatachalem (NDSU Pharmaceutical Sciences) to conduct biochemical mechanistic studies. His research focuses on drug delivery to the hypoxic solid tumors of triple-negative breast cancer and pancreatic ductal adenocarcinoma.

Rapid cell division, abnormal vasculature, and insufficient blood flow contribute to oxygen deprivation in solid tumors, developing hypoxic regions. The hypoxia in triple-negative breast cancer and pancreatic ductal adenocarcinoma triggers the formation of a fibrous extracellular matrix, epithelial-to-mesenchymal transition, increased cell survival, metastasis, and formation of tumor progenitor cancer stem cells. The collagen-rich, fibrous extracellular stroma shelters the cancer stem cells, making it very difficult for anticancer drugs to reach the hypoxic niches, leading to poor patient outcomes. Hence,

a unique drug delivery system is critically needed to penetrate the hypoxic regions of solid tumors and release therapeutic drugs for killing cancer stem cells and malignant cells.

Mallik's R01 award for developing hypoxia-responsive polymer nanoparticles was due for renewal. However, without demonstrating the efficacy of the targeted nanoparticles in mice tumors, the chance of a "fundable score" was low. Another impending problem was also beginning to manifest. Mallik was the PI and the Director of a Phase I COBRE award on pancreatic cancer, and the renewal application for Phase II was also due. However, the PI for Phase II COBRE applications must have an active R01 award.

So, he decided to defer the renewal applications for R01 and COBRE awards by a year, requested no-cost extensions from NIH, and decided to apply for a DaCCoTA grant for the animal experiments. DaCCoTA funded the ready-to-go award "*nanoparticles for drug delivery to triple-negative breast cancer.*" The award, in collaboration with an oncologic surgeon at Sanford Broadway Clinic (Dr. Daniel M. Tuvin), allowed Mallik to research the translational aspects of the project. He determined the efficacy of targeted nanoparticles in reducing triple-negative breast cancer in a mouse model. He received six patient samples of triple-negative breast cancer to generate patient-derived xenografts (PDX) for testing the nanoparticles.

The DaCCoTA award led to three peer-reviewed publications in American Chemical Society journals. The published results formed the critical "Progress Report and Preliminary Studies" component for successful NIH R01 award renewal. In addition, the R01 grant allowed him to continue to serve as the PI for a successful COBRE Phase 2 application (2 P20 GM109024; Center for Diagnostic and Therapeutic Strategies for Pancreatic Cancer). He also "drafted" Dr. Venkatachalem to serve as the Co-Director of the COBRE Center.

Core Component Highlight: Pilot Projects Program

The goal of the Pilot Projects Program is to stimulate the growth of expertise and engagement in clinical and translational research by funding a variety of awards and providing a mechanism for clinician/non-clinician teams to develop promising new translational research projects focused on health-related projects.

Funding Mechanisms:

- **Introduction to Research Pilot Award:** This award is intended to allow non-faculty clinicians or early-stage investigators (ESIs; residents/postdoctoral scholars) to engage in research.
- **Feasibility Pilot Award:** This award is intended to provide support to allow a clinician/non-clinician team to form around a novel hypothesis.
- **Ready-to-Go Pilot Award:** This award is intended for those projects with existing significant preliminary data in support of a novel hypothesis.
- **TREE Pilot Award:** This award is intended to provide seed funding for a public health/laboratory scientist team towards highly innovative projects that seek to translate promising epidemiological findings at the population level to relevant *in vitro* and/or *in vivo* experiments and/or the reverse, from *in vitro* and *in vivo* observations to a population setting.

Services:

- Introduce potential applicants to Pilot Project Awards
- Connect applicants to extensive resources and insightful personnel
- Provide notifications and constructive feedback during the application/approval process

Current Initiatives:

- A new pilot award mechanism was introduced in the Fall 2022 application cycle: The **Introduction to Research** pilot award.
- **Pathway to Success:** In collaboration with the Professional Development Core, the PPP will begin selecting awardees that have successfully progressed through the pilot award mechanisms for promotion to the PDC's larger scholar awards.
- The PPP will advance collaboration with the Community Engagement and Outreach Core and the DaCCoTA Navigator to identify community needs and locate researchers to enter our program and develop projects to begin to address these needs.



Dr. Holly Brown-Borg
Director



Dr. Satish Venkatachalem
Co-Director

"The PPP as part of the DaCCoTA is committed to improving the health of our communities by increasing awareness of translational research opportunities in the Dakota region and engaging and supporting new scientists and research."

-Dr. Holly Brown-Borg, Core Director

Recent Training Resources

DaCCoTA Data Navigator Seminar: Understanding Community Health Centers

Database Spotlights: Strong Heart Study (January 2023)

Database Spotlights: SEER (February 2023)

Database Resources (<https://med.und.edu/daccota/berdc-databases.html>)



Statistical Training Resources (<https://med.und.edu/daccota/berdc-resources.html>)

News & Updates

Mentor of the Year:



The Professional Development Core (PDC) awarded its inaugural Mentor of the Year award to Dr. DenYelle Kenyon, Associate Dean of Diversity and Inclusion and Master of Public Health Program Director at the University of South Dakota (USD). Dr. Kenyon is a mentor for PDC Community Engagement Scholars awardee Dr. Soonhee Roh, who is a Professor of Social Work at USD. Dr. Roh's award is a clinical trial intervention to promote breast cancer screen among American Indian women of the Yankton Sioux Tribe of South Dakota.

In Dr. Roh's nomination, she praises Dr. Kenyon's commitment to excellence in mentoring and research with American Indian tribes. Dr. Roh also cites Dr. Kenyon's care for her staff and mentees, supporting them in creating new, quality research.

AICoRN update:

- Dr. Allison Kelliher has transitioned to Johns Hopkins School of Nursing and Bloomberg School of Public Health Center for Indigenous Health as a Research Professor
- **Interim director:** Dr. Daniel Henry
 - Interim co-director: Dr. Marc Basson
- New [trifold handout available](#)
- Formed and convened first **External Advisory Committee** meeting
- Working with an evaluation team (**ACET**) and waiting on their findings

Social Media:

- DaCCoTA has a presence on **Twitter** and **Facebook**. Follow for news and resources.
- The Biostats Core has a channel on **YouTube**. Follow for training videos on statistics and research, as well as recorded training sessions from other DaCCoTA cores.
- The Biostats Core also has a podcast, **Science Research Weekly**, which covers the topics of research articles, research tools, and research funding. It is available on Spotify and other common podcasting platforms.



Recent Events

- February 2023
 - **Core Training Event: *Writing for Publication***, hosted by the Pilot Projects Program and Professional Development Core (February 15th)

Upcoming Events

- March 2023
 - **National COVID Cohort Collaborative (N3C) Engagement Event**, hosted by the N3C Investigator Navigators (March 28th)
- April 2023
 - **rETHICS Training**, hosted by the Community Engagement and Outreach Core and the Professional Development Core (April 20th)
 - **Research in Diverse Communities**, hosted by the Community Engagement and Outreach Core and the Professional Development Core (April 21st)
 - **Core Training Event: *Open Science***, hosted by the Professional Development Core (April 25th)
- May 2023
 - **Mock Peer Review: *Scenarios***, hosted by the Professional Development Core (May 16th)
 - **Core Training Event: *Logistics of Clinical Trials***, hosted by the Clinical Research Recourses and Facilities Core and the Biostatistics, Epidemiology, and Research Design Core (May 24th)
- June 2023
 - **Center for American Indian Research and Native Studies (CAIRNS) Bus Tour**, hosted by Community HealthCare Association of the Dakotas (CHAD) (June 5th – June 7th)

