

Big dreams

Undergraduate wants to save lives through medicine and research

By Marcia Locke

Vaithish Velazhahan, a senior in microbiology, medical biochemistry and pre-medicine at Kansas State University, is working hard to make his dreams a reality.

Growing up in India, Velazhahan saw people with treatable illnesses kicked out of hospitals because they couldn't afford the services. While a heartbreaking occurrence, it also inspired him. He has two big dreams: to become a physician-scientist and to make health care more accessible.

Thanks to hard work and support, including three undergraduate Cancer Research Awards from the Johnson Cancer Research Center at K-State, he is well on his way to achieving both.

Velazhahan never planned on leaving India to attend a university. However, despite scoring very high on the nation's medical entrance exam, he couldn't attend government-sponsored medical school because he wasn't an Indian citizen, and his family couldn't afford private medical school.

So, he returned to his birthplace, Manhattan, Kansas, where his father had been a postdoctoral researcher at K-State until Velazhahan was 1 year old.

"Coming to K-State was the best decision I could've made because the impact it has made on my life I don't think I would've gotten that anywhere else," Velazhahan said. "Everybody really cares about me, and the type of attention K-State gives its students is really terrific."

Velazhahan started working in a laboratory right away. He currently studies dietary flavonoids with Kathrin Schrick, associate professor in the Division of Biology.

Flavonoids are compounds abundantly found in fruits and vegetables. They have anti-cancer and other health-promoting properties, and research has shown they can cause cancer cell death.

Velazhahan's research focuses on the flavonoid Fisetin, which is found in strawberries and blueberries. He said his main goal is to

gain mechanistic insight into how exactly this compound works in tumor suppression.

He has uncovered that Fisetin causes cell death by directly interacting with the transcription factor HSF1 and changing its conformational dynamics. Transcription factors are master regulators of genes, and HSF1 controls several genes that are overexpressed in cancer cells, according to Velazhahan.

"Flavonoids are both safe for human consumption and known to kill cancer cells, so we need to understand how they work so we can design drugs that mimic them but are more efficient," Velazhahan said.

Velazhahan appreciates the Johnson Cancer Research Center's support, which included an Innovative Research Award for Schrick, allowing her to make this research a priority for her lab.

"Without that funding, I don't think our cancer research would've gotten started — or at least not the same momentum," Velazhahan said.

Velazhahan's love for research inspired him to broaden his medical career dream and also become a structural biologist.

"In science, when discoveries and the treatments they lead to work, you are making this huge impact you couldn't make as just a medical doctor seeing patients," Velazhahan said. "Plus, I want to be part of the entire pharmaceutical pipeline, translating basic science into clinical discoveries and making sure they reach the most vulnerable people."

Velazhahan is already working to reach vulnerable people. He has started a charity called We Save. His philosophy is that no one doctor can help hundreds of people for free, but many doctors could help a few patients each. We Save is developing an app to connect volunteer doctors with needy patients.



\$100,000 a year goes toward training 50 undergraduates to do scientific research.

Velazhahan has received many honors and awards, including the Barry M. Goldwater Scholarship and scholarships from the National Science Foundation and National Institutes of Health Kansas-INBRE program.

He attributes much of his success to Schrick, who, he says, has been influential in his growth as a scientist.

"Without Dr. Schrick, I wouldn't have gotten this far," Velazhahan said. "She not only allowed me to work on research that was new to her lab, she even found me funding and co-advisors. She does excellent research, but also makes sure her students are successful too."

Velazhahan has received a prestigious Gates-Cambridge Scholarship for doctoral studies in the MRC Laboratory of Molecular Biology at Cambridge University in England. He plans to attend medical school in the U.S. after he completes his doctoral program.