

INVESTIGATOR INSIGHT

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Shworak is director of the Heart and Vascular Research Center at Dartmouth. His lab studies the role of a specific type of polysaccharide within the cells of arteries. He joined the faculty at Geisel in 2001.

Can you describe your research?

The polysaccharide that we study (called HS^{AT+}) coats the inner surface of blood vessels. We are testing an “anti-inflammatory theory” that HS^{AT+} protects blood vessels from inflammation. For these studies, we treat mice with a compound that rapidly induces blood-vessel inflammation. We find that mice lacking HS^{AT+} develop much more inflammation than mice that have HS^{AT+}. We are now working on identifying the molecular mechanisms by which HS^{AT+} protects against inflammation. We believe this work will help in developing new diagnostics and therapeutics for cardiovascular disease.

What's your favorite nonwork activity?

Running. I've been doing it for several years now, first thing in the morning, usually three or four times a week for about an hour. It's a great way to clear the head and put things into perspective. Besides, if you study cardiovascular disease and know the health benefits of exercise, you really should “walk the walk” (“run the run”!).

What is a talent you wish you had?

I wish I could play a musical instrument by ear. That is something my father and brother can do, but I never got those genes.

What has been your research team's best idea or theory?

It's known that inflammation drives the development of blood-vessel plaques, which are the cause of heart attack and stroke. Our mouse studies indicate that HS^{AT+} protects blood vessels from inflammation, so we predict that humans' HS^{AT+} should normally protect against the development of blood-vessel plaques. We further predict that some people with cardiovascular disease may have genetic variations that reduce blood-vessel production of HS^{AT+}. We're presently testing if cardiovascular patients have variations in the gene responsible for HS^{AT+} production. If we are correct, then

our findings could contribute to personalized diagnostic approaches to identify and treat patients before they develop blood-vessel plaques. Such a preventative approach could save millions of lives.

When you were very young what did you think you wanted to be?

It seems like I always wanted to be a doctor and initially I went to college with that as my career objective. Then in the summer of my second year I worked in the lab of a reproductive biologist and got bitten by the research bug. My mentor was also a rancher and applied techniques of in vitro fertilization that were worked out in his lab to the process of importing exotic European cattle strains. In Europe, he arranged for cow eggs to be fertilized in a petri dish then inserted in the uterus of rabbits. The pregnant rabbits were shipped to his ranch in Canada where the cow embryos would be harvested from the rabbits, and then inserted into foster mother cows. Needless to say, the money saved by shipping rabbits instead of cows made this process extremely cost effective. So, since seeing the practical application of science, my goal has always been to try to make new scientific discoveries and then use them to improve diagnosis or treatment of disease.

National Public Radio. “I think we need to help physicians learn the importance of practicing as a high-functioning team. You know, we do not think of health care as a team sport yet. We practice as individuals. We walk into the room. We talk to the patient. We go back out. We write our orders, and assume the nurse is going to translate those, and that the next physician will come along and read that order. That simply is not the case in most settings.”



A *New York Times* blog on parenting covered a study showing that “taking some antidepressants during pregnancy doubles the risk of a baby developing pulmonary hypertension. Researchers have long suspected a link between the use of selective serotonin reuptake inhibitors, or

S.S.R.I.'s, and the condition, but previous studies have been small and inconclusive. . . . Pulmonary hypertension, Dr. **Juliette Madan**, a pediatrician at the Dartmouth Hitchcock Medical Center explained, is diagnosed when an infant struggles to get enough oxygen into her lungs, and therefore into her bloodstream. The condition can be deadly, although Dr. Madan said that it's usually treatable—with possible lifelong consequences.