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March 12, 2020

UM Neurosurgeon Receives $3 Million NIH Grant for Innovative Research on Aneurysms

A neurosurgeon at the University of Miami Miller School of Medicine has been awarded a $3 million grant from the National Institutes of Health to study innovative approaches to treating cerebral aneurysms.

“Our laboratory will be taking a close look at the cellular and genetic factors that lead to life-threatening aneurysms,” said Robert M. Starke, M.D., professor of neurological surgery and neuroradiology, co-director of endovascular neurosurgery at UM/Jackson Memorial Hospital, and director of neurovascular research. “We will also use innovative endovascular imaging techniques to examine aneurysms from inside the blood vessels.”

Dr. Robert M. Starke

Dr. Starke was one of 20 neurosurgeons in the U.S. to receive a five-year NIH grant. His grant focuses on finding better ways to prevent or treat cerebral aneurysms, which occur in 2 to 3 percent of the population, but may exceed 19 percent in high-risk groups. A ruptured aneurysm produces a devastating form of stroke with high rates of mortality and morbidity.

Dr. Starke treats more than 600 patients a year for aneurysms using leading-edge surgical techniques to address dangerous bleeding by closing the neck of the aneurysm. Along with the new NIH grant, Dr. Starke has five other grants supporting his research, which is done in collaboration with Miller School specialists in genetics, proteomics, and vascular biology.

The NIH grant will support Dr. Starke's ongoing research on endothelial cells that line the interior surface of blood vessels. "Dysfunction of these cells occurs early in the development of cerebral aneurysms and leads to inflammation," he said. "What initiates this process is not fully defined, so an increased understanding of the basic biology is critically necessary to developing new interventions to improve outcomes of cerebral aneurysm patients."

Currently, many patients require retreatment due to the inability to promote cellular growth across the aneurysm neck, resulting in continued inflammation, added Dr. Starke. "One of the goals of our research is to come up with a medical treatment to address inflammation and prevent aneurysm progression or rupture."

With the new grant, Dr. Starke will study the use of an innovative stent he helped develop that includes a controlled-drug release reservoir for biological agents and a surface

scaffold for improved cellular interactions. “This provides the backbone for a novel stent that can promote the growth of endothelial cells, reduce inflammation, and improve vascular healing,” he said.

The grant also supports the development of new imaging devices or methods to identify unstable aneurysms so they can be treated prior to rupture. “We will use a laser-imaging system inside a endovascular catheter and look at the cells on the inside of the blood vessel to see if they change over time,” said Dr. Starke.

Other aims of the grant include developing a blood test or genetic screening tool to identify patients at high risk for aneurysms in the future. “Drawing on cellular samples from patients undergoing treatment here, we are studying several potential medications for aneurysms, some of which can be delivered through endovascular stents or coils,” said Dr. Starke. “That’s one of the ways our extensive clinical practice supports our research into these life-threatening disorders.”