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High Risk, High Reward

*Pitt Faculty
Members Earn
Key NIH
Early-Career
Awards*

Platelet Biology Knowledge Boost

Doctors have long known that platelets drive blood clot formation, says **Matthew D. Neal, MD**, assistant professor of surgery. But it's more recent news that platelets help regulate the body's response to inflammation and act as immune cells. One indication of how intriguing platelets have become is that Neal, who earned his MD at the University of Pittsburgh School

of Medicine in 2006, is now the recipient of a **\$1.8 million** National Institutes of Health Maximizing Investigator's Research Award, which will further his lab's investigations into platelet biology and the mechanisms that regulate trauma patients' response to injury.

Trauma patients whose blood does not properly clot face life-threatening blood loss. Other trauma patients clot to excess, resulting in thrombosis, or a clotted blood vessel. Often, both conditions afflict the same patient. The NIH award will enable Neal to explore "the entire spectrum of disease," from the platelets' molecular signaling pathways that influence inflammation and thrombosis to the mechanisms that lead to blood clots following trauma. These avenues of research show a great deal of potential in several areas of medicine.

"Although the target is to devise strategies for early intervention in trauma, understanding some of the basic mechanistic response in platelets is going to have relevance to any disease where thrombosis plays a role, and that includes cardiovascular disease, cancer, sepsis, and many others," Neal says.

The NIH Director's New Innovator Award has been awarded to five Pitt investigators over the past 10 years.

Computing for a Rewarding Experience

Scientists recognize the rewards of good research, like publication in a top journal and recognition from their peers. But understanding how the human brain mechanistically computes the value of rewards isn't so clear. **William Stauffer, PhD**, assistant professor of neurobiology, received a prestigious **\$2.3 million** National Institutes of Health (NIH) Director's New Innovator Award in October 2016 to support his investigations into how the brain processes and makes choices based on rewards. (See story on page 48.)

Stauffer describes rewards as positive events that trigger repetition of a previous behavior or action. He says that the reward system in the human brain is connected to almost everything that we do. "Rewards play a huge role in determining the 'why' for a lot of what we do," he says. "There is an entire system in our brain that appears to be involved with processing rewards." While conducting postdoctoral research at the United Kingdom's University of Cambridge, Stauffer and colleagues demonstrated how the brain of a nonhuman primate tracks the subjective value of rewards. But he wanted to know more about the brain mechanisms that compute this value and how it's used to determine choice.

Now, he is employing optogenetics, among other tools, to identify the types of neurons involved in the rewards system and record their activity during demonstration of reward-based behaviors. Ultimately, he hopes to devise a paradigm that explains how the brain places value on rewards and then deliberates and exhibits more complex behavior based on this input. "If we can understand how reward circuits operate and go awry," Stauffer says, "we might enable new therapies for depression, drug addiction, Parkinson's disease, dystonia, and other disorders of those circuits." Biomedical research with such paradigm-shifting potential is identified and supported annually through the NIH Director's New Innovator Award, which has been awarded to five Pitt investigators over the past 10 years.