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Cancer Researcher Receives \$3.8 Million Award from Department of Defense

A \$3.8 million Innovator Award, from the Department of Defense, is being granted over five years to an internationally renowned cancer researcher at the University of California, Santa Barbara.

Erkki Ruoslahti, recipient of the award, is known for his innovative, interdisciplinary research. "This is a special award because there are only four of them," said Ruoslahti. "I am very happy at being chosen." The award is designed to further his current research.

Ruoslahti's lab made a major advance in the past year. "I think that was part of the reason why the grant was awarded to me, is that we can now make probes, typically peptides," he said. "These are small pieces of protein that not only bind the particles to the vessels in the tumor, but they also carry the particles into the interior of the tumor, outside the blood vessels."

He recently showed that targeting a nanoparticle drug into a tumor is more effective than if it isn't targeted. "What we are working on now, as an additional function, is that we'd like to make the particles respond to a signal so that they would release a drug when we want it to be released," he said. "But we haven't solved what would have to be done to get that technology to work."

"We work a lot with nanoparticles; that is one of the reasons why I am here at UCSB," said Ruoslahti. "There are a lot of materials scientists here who are collaborating with us in designing the smart nanoparticles that seek out and zero in on the tumor."

Tumors have -- and this is one of the main problems in chemotherapy, or any other kind of tumor therapy --

a very high interstitial pressure. That pushes tissue fluid from the tumor out to the surrounding tissue. "That means that if you just have a drug, that you would like to enter into a tumor, this flow of fluid works against it and tends to push it out," he said. "We have now solved that problem with our newest peptides. We can get nanoparticles or just plain drugs to go through the tumor as if there were no obstacles there."

At Burnham-UCSB, Ruoslahti opened the Vascular Mapping Center which focuses on developing applications for vascular "zip codes," based on technology discovered in his laboratory. Vascular zip codes are molecular signatures in blood and lymphatic vessels (vasculature) that are specific to individual tissues and disease sites. Ruoslahti has discovered ways to selectively target drugs to tumor blood vessels in mice and suppress the growth of those tumors. He has also found a way to selectively target the lymphatic vessels in tumors. The hope is that this very specific delivery of therapeutics to tumor blood and lymphatic vessels will increase the efficacy of cancer therapies and decrease side effects.

Ruoslahti joined the faculty at UCSB as an adjunct professor in the Department of Molecular, Cellular, and Developmental Biology in 2006. He is affiliated with The Burnham Institute for Medical Research, an institute that is located both at UCSB and in San Diego. This type of collaboration, involving a highly ranked university and a nonprofit, independent research institute, exemplifies the inherent value of interdisciplinary research and the enhanced potential created when two such entities join force. Ruoslahti also belongs to the faculty of UC San Diego as a distinguished professor.

About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community

of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.