CENTER *for* APPLIED MOLECULAR MEDICINE

University of Southern California Physical Sciences in Oncology Center

2015 Monthly Seminar Series

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"Computational modeling of anti-angiogenic cancer therapeutics"

FRIDAY, APRIL 17, 2015

NOON - 1:00 P.M.

Q & A to follow

PIZZA AND BEVERAGES WILL BE SERVED FOR ATTENDEES AT 11:45 A.M.

HARKNESS AUDITORIUM

HSC - Clinical Sciences Building, **2nd Floor**
2250 Alcazar Street, Los Angeles, CA

ABSTRACT:

One hallmark of cancer is angiogenesis, the formation of new blood capillaries from pre-existing vessels. Through angiogenesis, the tumor generates its own blood supply and is able to obtain oxygen and nutrients from the surrounding microenvironment. The formation of new blood vessels is a tightly regulated series of distinct steps governed by specific signaling pathways. Cancer therapies aimed at inhibiting angiogenesis signaling pathways have not been successful in all cancer types. In fact, an agent targeting vascular endothelial growth factor (VEGF), a key promoter of angiogenesis, is no longer approved for the treatment of breast cancer. This disappointing outcome demonstrates the need to better understand the effects of VEGF-neutralizing agents and anti-angiogenic drugs in general.

Systems biology approaches, including computational models, provide a framework to test biological hypotheses and optimize effective therapies that aim to inhibit tumor vascularization and growth. I will discuss my work in developing a mechanistic, compartment model of VEGF kinetics and transport in the human body and applying the model to investigate the effects of anti-angiogenic therapies targeting VEGF and its receptors. Interestingly, the model predicts that VEGF in the tumor interstitium can increase or decrease following administration of the VEGF-targeting agent, depending on properties of the tumor microenvironment. The model is useful for understanding the dynamics of VEGF distribution in the body in response to anti-VEGF agents, generating clinically relevant predictions in the areas of drug mechanism of action, biomarker identification, and personalized medicine. I will also present recent work in studying other angiogenic factors to obtain a more comprehensive understanding of the balance of promoters and inhibitors of tumor angiogenesis.

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