Western University of Health Sciences
College of Osteopathic Medicine of the Pacific

A Moving Target: Tracking Cancer Plasticity in Cells and in Patients

Presented by

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Friday, October 18, 2019

12:00pm – 1:00pm

HEC Classroom A, Pomona

Lecture Hall 1, Lebanon

Lunch will be served with RSVP to jdowling@westernu.edu (Pomona) or kmack@westernu.edu (Lebanon) by noon, October 15, 2019

Amir Goldkorn, M.D.

is a physician-scientist and board-certified medical oncologist specializing in genitourinary malignancies. He is a tenured Associate Professor of Medicine at the University of Southern California (USC) Keck School of Medicine and Associate Director for Translational Research at the USC Norris Comprehensive Cancer Center. His laboratory focuses on elucidating mechanisms of cancer plasticity and developing new liquid biopsy techniques to track evolving cancer phenotypes in patients. Dr. Goldkorn founded and directs the first NCI-designated Liquid Biopsy Research Core in the U.S., and he leads liquid biopsy studies in phase III national cancer trials conducted by the NCI Southwest Oncology Group (SWOG), where he serves as Translational Medicine Chair for prostate cancer.

A Moving Target: Tracking Cancer Plasticity in Cells and in Patients

Cancer stem-like cells (CSCs), a subset of tumor cells with uniquely aggressive, highly tumorigenic, drug resistant properties, play a key role in cancer recurrence and drug resistance. Our laboratory discovered that cancer cells can cyclically lose and regain CSC properties independently of DNA mutation. This phenotypic plasticity suggests that – beyond the canonical model of passive clonal selection – additional important mechanisms of rapid dynamic adaptation are at work, with significant implications for therapeutic efforts. In early studies, we found that PI3K/AKT (upstream) partners with β-catenin/CBP (downstream) to mediate phenotypic plasticity in our models. More recently, we applied broader epigenomic, transcriptomic, and metabolomic techniques together with functional microscopy to profile and track these phenotypic transitions in real time. In parallel to these in vitro studies, we have developed new liquid biopsy techniques for tracking evolving cancer phenotypes over time in our patients. Peripheral blood samples are processed to enrich circulating tumor cells (CTCs), cell-free DNA (cfDNA), or cell-free RNA (cfRNA), which are analyzed to profile individual patients' tumors. Initially, our group developed and patented a new microfilter for CTC capture with colleagues at Caltech, but ultimately we founded a new Liquid Biopsy Research Core that employs multiple technology platforms to enrich and analyze CTCs, cfDNA, and cfRNA from cancer patient blood samples. Using these capabilities in national multi-center clinical trials, our team demonstrated the prognostic value of CTC enumeration and CTC telomerase activity in metastatic prostate cancer. Currently, we are integrating cellular, genetic, and epigenetic liquid biopsy assays to generate multi-parametric tumor profiles from single blood draws. With this integrated comprehensive approach, we hope to enable more effective non-invasive tracking, analysis, and treatment of cancers based on their evolving molecular profiles.