

**“Facile, Comprehensive, Tunable,  
and Versatile Therapies for Cancer:  
Multi-modal Gene/chemotherapy and  
Cell-free, Cell Therapy”**

Friday, January 13<sup>th</sup>, 2023  
12:00 – 1:00 p.m.

McDonnell Douglas Auditorium



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UCI School of Pharmaceutical  
Sciences

**Abstract:** Gene and cell therapies are emerging, promising therapeutic modalities. In addressing complex molecular dynamics in disease development and progress, we put together various therapeutic components into delivery platforms that are optimally engineered. The first part of the seminar presents how to rebalance the broken molecular homeostasis in chronic myelogenous leukemia (CML) as a simple, well-documented cancer model by simultaneously expressing and silencing pro-apoptotic and pro-survival genes, respectively, using a viral/nonviral chimeric nanoparticles (ChNPs). In addition, targeted chemotherapeutics for CML, dasatinib, was additionally administered for combined multimodal gene and chemotherapy, especially for a rapidly progressing disease stage of blast crisis. The second part of the seminar demonstrates the use of chemically and physically induced extracellular blebs (EBs), which are efficient, fast, and scalable in the production of highly homogeneous cell-like vesicles, for vaccination against cancer and COVID-19. Micro EBs produced from bone marrow-derived dendritic cells (BMDCs) presented antigenic peptides to T cells in vitro and successfully protected animals from tumor. DC-derived vesicles are easily amendable to vaccination against infectious disease such as COVID-19. The seminar will highlight the crucial roles of interdisciplinary approaches to the development of synergistic drug development especially in treating challenging diseases.

**Biography:** Dr. Young Jik Kwon is a professor at UCI in the Pharmaceutical Sciences, Chemical & Biomolecular Engineering, Biomedical Engineering, and Molecular Biology & Biochemistry departments. Following his undergraduate education in Biological Engineering at Inha University, Dr. Kwon received his Ph.D. in Chemical Engineering from the University of Southern California in 2003 and did post-doctoral training in department of chemistry at UC Berkeley. He started his academic career in Biomedical Engineering at Case Western Reserve University in 2005 where he was the M. Frank and Margaret Rudy assistant professor and moved to UC Irvine in 2007. Dr. Kwon's work was awarded a Faculty Early Career Development Award (CAREER) from the National Science Foundation in 2010 and a Medical Research Award from Gabrielle's Angel Foundation for Cancer Research in 2011. He was also an invited scholar to Federal University of Minas Gerais (UFMG) in Brazil and a Brain Pool Scholar in Korea University in Korea. He was also selected to be a Faculty Innovation Fellow of the Beall Applied Innovation at UCI.