Steven Kleinstein

The Kleinstein group combines techniques from dynamic modeling, systems biology and bioinformatics to better understand the immune response. We are particularly interested in the generation and selection of high affinity B lymphocytes in health and disease (e.g., autoimmunity and cancer), as well as aberrant targeting of somatic hypermutation. Another major research area focuses on understanding how pathogen and host variation, cytokine environment, and genetics help shape the immune response to influenza infection and vaccination.

Rob Homer

Dr. Homer's research is focused on understanding how scar forms in the lung. It has been known for years that a molecule called transforming growth factor beta-1 is important in lung fibrosis. However, this molecule has so many functions that blocking it directly has many side effects, including the development of cancer. Dr. Homer is looking at co-factors that are needed for it to function properly and expects that blocking them will have fewer side effects.

Earl Glusac

Dr. Glusac's research involves clinical-pathologic correlation to identify to benign melanocytic lesions that mimic malignant melanoma.

Themis Kyriakides

The Kyriakides laboratory is investigating the interactions between synthetic biomaterials and tissues. In general, insertion of biomaterials into the body elicits a rejection-like response and our research focuses on identifying the cells and molecules that regulate this response. A major goal of our research is to identify molecular targets that can limit inflammatory responses and enhance blood vessel formation. In addition, in translational approaches we aim to generate novel modified synthetic blood vessels and networks of vessels for tissue engineering applications.

Wang Min

The primary goal in the Min laboratory is to dissect the signaling pathways in endothelial cells involved in atherosclerosis, vascular remodeling, and tumor progression, and develop therapeutic targets for treatment of vascular diseases. We have used both biochemistry and mouse genetic approaches to define the critical molecules mediating inflammatory response and their roles in vascular disease progression. We have focused on the following areas of inflammation: 1) dissecting TNF signaling pathways in EC; 2) understanding how shear stress inhibits TNF signaling to function as an atheroprotective factor; 3) defining the role of inflammation/oxidative stress in vascular diseases including atherosclerosis, graft arteriosclerosis, insulin resistance, and cardiomyopathy/heart failure; and 4) determining the mechanism of inflammation/ischemia-induced angiogenesis/arteriogenesis and vascular remodeling.

Qin Yan

The Yan laboratory is interested in epigenetic regulation by histone demethylases in cancer and stem cells. Aberrations in epigenetic processes often lead to cancer and other human diseases. In particular, we focus on the roles and regulatory mechanisms of histone demethylases from the JARID1/KDM5 protein family. These enzymes can remove tri- and di- methyl marks from lysine 4 in histone H3 (H3K4me3/2), the epigenetic marks for transcriptionally active chromatin.

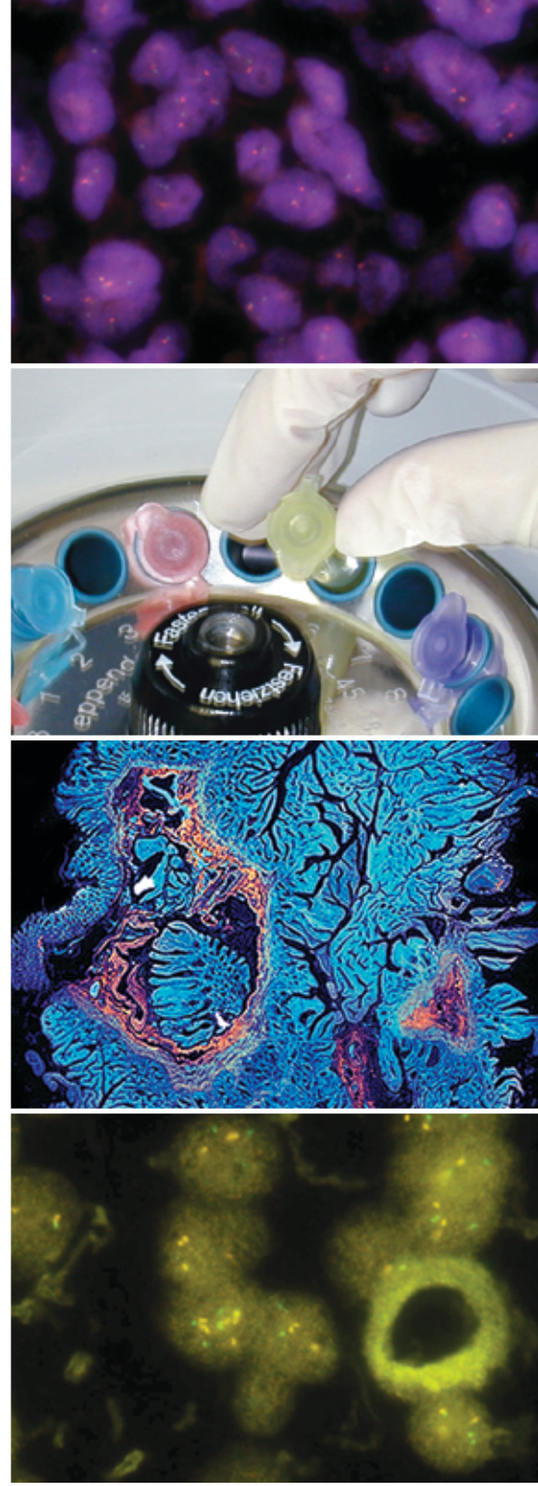
We have previously identified RBP2 (Retinoblastoma Binding Protein 2) as one of the first known histone demethylases for H3K4me3. To understand the in vivo function of this enzyme, we generated an RBP2-/- mouse model, which is the first knockout mouse model for lysine demethylases. We are currently studying how this enzyme contributes to oncogenesis using highly integrated mouse genetic, molecular and cellular biological, and biochemical approaches. Its functions will be better understood if we combine our findings at the organismal, cellular, and molecular levels. The other research activities of our laboratory focus on another H3K4me3 histone demethylase, PLU-1. PLU-1 is highly expressed in breast and prostate cancer samples. Knockdown of PLU-1 expression in breast cancer cells impairs their ability to form breast tumors in a syngenic mouse model. Similar approaches are undertaken to investigate its roles in cancer. These enzymes play critical roles in drug resistance and the maintenance of cancer stem cells, therefore are potential drug targets for cancer therapy.

José Costa

Dr. Costa is interested in elucidating how the somatic cells part of a multicellular organism are induced to evolve, an activity that should in principle be forbidden by the cooperation intrinsic in a multicellular organism. This interest stems from the fact that most common cancers in the human are formed by an evolutionary process that converts normal cells into tumor cells.

Don Nguyen

The goals of the Nguyen lab are to study thoracic malignancies which can spread aggressively to multiple distant organs with limited opportunity for effective therapeutic intervention. Metastatic lung cancer cells are believed to acquire complex biological properties by deregulating pleiotoropic genetic or epigenetic programs and interacting with their microenvironment. Our laboratory is interested in uncovering the molecular and biological determinants of metastasis by different lung cancers, including lung adenocarcinoma. In this endeavor, we utilize a variety of approaches such as animal modeling, cell culture assays, bioinformatics, and clinical validation. Finally, in the hopes of exploring new therapeutic possibilities, we are using biological insights gained through our experimental approach to try to better understand the link between the eventual resistance of some cancers to systemic therapy and metastatic relapse.



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