Mechanisms of stem cell self-renewal and pluripotency The fundamental mechanisms that control the behavior of stem cells remain poorly understood. CSCB investigators are engaged on multiple fronts in an effort to explore basic questions related to stem cell self-renewal and differentiation, the acquisition and maintenance of pluripotency, the developmental progression of stem cell fates, and the properties of the stem cell niche.

Directed differentiation and stem cell-based models of development CSCB investigators have pioneered many of the currently available strategies to direct the fate of stem cells into specialized cell types such as cells of the central and peripheral nervous system or into various mesenchymal lineages. The strength of our expertise in mouse genetics in vivo imaging at the Sloan Kettering Institute links developmental and stem cell-based approaches toward controlling cell-fate specification

IPS cells and disease modeling The use of induced pluripotent stem cells (iPSCs) and cell fate programming offers unprecedented opportunities for modeling human disease and for generating matched tissues for transplantation. Modeling human disease for drug discovery is a particular focus of CSCB investigators. A close collaboration between the CSCB and the Center for Cell Engineering (CCE) will facilitate translation toward cell-based therapies in the future.

Stem Cells and Cancer Insights from stem cell biology can provide a novel understanding of the mechanisms that underlie tumor biology. In particular the study of stem-like cells within tumors may spur the development of new therapeutic approaches aimed at therapy-resistant populations of tumor cells. Access to human stem cells and precise tools for genetic manipulation enable a new generation of human stem cell-based models of cancer. Such human cancer models can complement animal studies and may result in novel strategies for drug discovery.

NEXT

Translational Labs & Core Facilities