

Study leukemia metastasis by in vivo microscopy/flow cytometry
Xunbin Wei, Ph.D., Wellman Labs of Photomedicine, Harvard Medical School,
Massachusetts General Hospital, Boston, MA 02114
xunbin@helix.mgh.harvard.edu

Cytotoxic chemotherapy agents are the foundation of contemporary leukemia therapy. For a large number of adult and elderly patients, however, treatment options are poor. These patients may suffer from disease that is refractory to conventional chemotherapy or may not be candidates for curative therapies because of advanced age or comorbid medical conditions. To control disease in these patients, we must develop new therapies that are selectively targeted to unique characteristics of leukemic cell growth and metastasis.

A large body of elegant work in the field of immunology has demonstrated the mechanisms whereby leukocytes traffic to specific sites within the body. Vascular cell adhesion molecules (addressins) and chemical attractants (chemokines) combine to direct white blood cells to appropriate environments in which to mature, expand or enact immune effector functions. Although it has been hypothesized that leukemic white blood cells home to hematopoietic organs using mechanisms similar to those of their benign leukocyte counterparts, detailed study of leukemic cell transit through hematopoietic organs has yet to be undertaken. Our current study is to define the mechanisms that govern leukemic cell spread through the hematopoietic organ microenvironment *in vivo* (in live animal) in real-time, using confocal and two-photon fluorescence imaging. A home-built *in vivo* flow cytometer is also being used to assess leukemic metastasis. New therapeutic interventions are being sought to selectively target leukemic cell growth and metastasis.