In Vivo Screen for Agents Affecting Erythroid Development and Disease

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Technology description

Summary

Causes of blood cell diseases range from genetic, as in myeloproliferative disorders (MPDs) and cancer, to infectious, as in malaria. In all cases, treatments are directed at modulating the survival or differentiation of the affected cell population. Unfortunately, drug and vaccine development are continuously hampered by the absence of good,in vivomodels that can mimic the complexity of the human immune system.

Description

UC San Diego researchers have utilized the non-receptor protein tyrosine kinase, JAK2, and a mutation thereof (JAK2 V617F) to develop a proprietaryin vivobioluminescent primitive stem-cell system (including iPS cells) for non-invasive, real-time analysis of human blood-cell development in a xenogeneic mouse. The system allows for use of either human wild type JAK2, or mutant JAK2 V617F that drives the myeloproliferative disorders polycythemia vera (PV), essential thrombocythemia (ET), and myelofibrosis (MF). These create mouse models for normal and aberrant human erythoid development, respectively.

Application area

This technology provides anin vivosystem to screen for factors that actively influence the human erythroid pathway, including but not limited to:
Drug toxicity to erythroid and progenitor cells.
Anti-malarial and other drugs that affect developing red-blood cells.
Agonists of hematopoietic stem cells and of myeloid and erythroid differentiation.
JAK2 and JAK2 V617F inhibitors.
Diagnostics for aberrant JAK2 signaling.

Institution

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