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Targeting chronic myeloid leukemia stem cells

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Cancer stem cells in many hematologic malignancies and some solid tumors are associated with cancer initiation and insensitivity to chemotherapy and need to be eradicated for achieving a cure. A successful cancer therapy relies on targeting critical signaling genes that play a key role in the maintenance of cancer stem cell survive and proliferation. Thus, it will be important to fully understand the molecular mechanisms by which cancer stem cells survival and proliferate. Toward this goal, a physiological cancer stem cell disease model is required for identifying and testing genes/pathways that play an essential role in functional regulation of cancer stem cells and can be targeted for eradicating these stem cells. Human chronic myeloid leukemia (CML) induced by the BCR-ABL oncogene is derived from a stem cell, serving as a good disease model for studying the molecular biology of cancer stem cells. In CML, BCR-ABL tyrosine kinase inhibitors including imatinib mesylate (Gleevec) are highly effective in controlling chronic phase CML, but they fail to eradicate leukemia-initiating cells or leukemia stem cells (LSCs) in CML mice and patients. Clinically, a complete and sustained molecular remission (undetectable levels of BCR-ABL transcripts) is difficult to attain even after a complete cytogenetic remission achieved through imatinib treatment. It has become clear that BCR-ABL kinase inhibitors can effectively kill highly proliferating leukemia cells but are incapable of eradicating LSCs for cure. An anti-LSC strategy needs to be developed. Our laboratory has been focusing on understanding the biology of LSCs in CML to identify key genes that regulate survival and proliferation of LSCs, helping us to develop new therapeutic strategies by targeting LSCs.

Biography

Shaoguang Li has obtained his PhD degree from Tulane University, USA and completed his postdoctoral studies at Harvard Medical School. He is currently a Professor at University of Massachusetts Medical School, USA. He has published some seminal work related to leukemia stem cells in highly competitive journals such as Nature Genetics, JCI, PNAS, Blood, Leukemia, etc.

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