

## Cancer stem cells and genes responsible for their development

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### 【Outline of survey】

Cancer cells are derived from a minor population of cells capable of self-renewal, called "cancer stem cells" (CSCs). CSCs have limited differentiation activity, which results in accumulation of immature cells in cancer tissues. This study is undertaken to define genes responsible for transformation of normal stem cells into CSCs in hematopoietic malignancies. We will identify CSCs within primary acute leukemia cells by using a multi-color flow cytometry, and will extensively analyze their mRNA expression profile to identify genes specifically expressed in CSCs. We will also transduce RNAi libraries into purified normal hematopoietic stem cells to find genes that should be downregulated to develop CSCs. Finally, we will transduce identified genes or RNAi constructs into normal human hematopoietic stem cells, and will transplant them into immunodeficient mice, in order to test whether the alteration of expression of these genes can directly induce CSC development in the xenograft model.

### 【Expected results】

To improve treatment outcomes of patients with malignant diseases, it is critical to understand the biology of cancer stem cells (CSCs). These studies will enable us to develop new treatment strategies in which identified CSCs and genes are cellular and molecular targets, respectively. Furthermore, understanding of CSC biology might also help develop new methods for controlling self-renewal and differentiation of normal stem cells.

### 【References by the principal researcher】

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【Term of project】 FY 2005 - 2009

【Budget allocation】 92,300,000 yen

【Homepage address】 none