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研究分野:	白血病の理解と克服、造血幹細胞の分化、ヒト免疫	

What's behind normal and diseased human blood and immunity?

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Immune system is complex and is constituted of diverse types of white blood cells. The complex immunity is created by blood stem cells. Finely-tuned blood cell production must require dynamic changes of 20,000 genes in response to stimuli such as infection, drug treatment and tumor development. Nevertheless, when stem cells are hit by critical genetic accidents (gene mutations, chromosome deletions, etc.), they are transformed to tumor stem cells and can no longer contribute to immunity. Therefore, in patients suffering from leukemia, which is known as “blood cancer”, immune surveillance is severely impaired.

In my presentation, I will first speak about how white blood cells are produced from normal blood stem cells. To understand complex and heterogenous blood system, we are examining expression levels of thousands of genes at a single cell resolution. In the latter half, I will introduce our work on leukemia biology. It is crucial to understand patient-specific disease status and mechanism underlying leukemia development and relapse. Finally, I propose to mathematicians and physicists that we may work together on how immune system fights with leukemia and by which means we can make immune system eliminate leukemic cells in organs such as bones, spleen and liver.