

Human blood stem cell expansion: Empowering new technology for stem cell medicine

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Hematopoietic stem cells (HSCs) are one of the somatic stem cells that drive regenerative medicine because they can supply whole blood and cells of the immune system that exist in vivo. Also, HSCs are already clinically applied in hematopoietic stem cell transplantation and is known to many people. However, details regarding the characteristics and functions of HSC are still unclear, and some problems remain in its clinical application. The cause of the problem is that only a small number of HSCs can be extracted from the living body. This problem makes it difficult to develop gene therapy using HSC, establish HSC transplantation method, production of sufficiently mature cells in vitro, and analyze HSC in more detail biochemically. As a result, there are many limitations to the clinical application of HSC. Last year, we succeeded in developing a significant in vitro amplification technology for mouse HSCs with the support of AMED. We believe that this new cell culture system can be a “breakthrough” that solves the problems of HSCs. This project will clarify the molecular and functional characterization of mouse and human HSCs by utilizing the expertise of researchers in Japan and the UK to ensure that this technology will be applied clinically to humans.

