

Hematopoietic cell differentiation from embryonic and induced pluripotent stem cells

ABSTRACT

Pluripotent stem cells, both embryonic stem cells and induced pluripotent stem cells, are undifferentiated cells that can self-renew and potentially differentiate into all hematopoietic lineages, such as hematopoietic stem cells (HSCs), hematopoietic progenitor cells and mature hematopoietic cells in the presence of a suitable culture system. Establishment of pluripotent stem cells provides a comprehensive model to study early hematopoietic development and has emerged as a powerful research tool to explore regenerative medicine. Nowadays, HSC transplantation and hematopoietic cell transfusion have successfully cured some patients, especially in malignant hematological diseases. Owing to a shortage of donors and a limited number of the cells, hematopoietic cell induction from pluripotent stem cells has been regarded as an alternative source of HSCs and mature hematopoietic cells for intended therapeutic purposes. Pluripotent stem cells are therefore extensively utilized to facilitate better understanding in hematopoietic development by recapitulating embryonic development *in vivo*, in which efficient strategies can be easily designed and deployed for the generation of hematopoietic lineages *in vitro*. We hereby review the current progress of hematopoietic cell induction from embryonic stem/induced pluripotent stem cells.

Keyword: Hematopoietic cell; Embryonic stem cells; Induced pluripotent stem cells