

Abstract

Project Code: MRG5980061

Project Title: Exploring the effect of the interaction between erythroblasts derived from peripheral blood and OP9 stromal cells on the *in vitro* erythroid expansion

Investigator: Kongtana Trakarnsanga

E-mail Address: kongtana.tra@mahidol.ac.th

Project Period: 2 years

Abstract:

Development of *in vitro* culture systems for the generation of red blood cells has become a goal for scientists globally with the aim of producing clinical grade blood products for transfusions. At present extrapolated cell numbers produced fall short of the level required for therapeutics, due to limited proliferation capacity. Therefore, a number of studies have been performed to find a way to increase cell numbers obtained from the *in vitro* culture systems.

OP9 mouse stromal cell line is known to promote haematopoietic differentiation of pluripotent stem cells. However, there is no information regarding the effect of OP9 cells on erythroid cell expansion. In this study, we show that factors secreted by OP9 cells increase the proliferative potential of adult erythroid cells by delaying differentiation and hence maintaining self-renewing cells for an extended duration. The number of cultured reticulocytes obtained from cultures using OP9 conditioned media was approximately 3.5 fold higher than those using control media, bringing it closer to the number required for therapeutics. Using comparative proteomics (TMT labeling and Mass Spec) we also identified 18 factors in the OP9 conditioned media that may act on the erythroblasts to delay differentiation.

Keyword: *in vitro* erythropoiesis, OP9 stromal cells, erythroid expansion
