

HEP internship project 4:

The contribution of specific cell types to the expansion of erythroblasts from PBMC during the first days of culture.

Introduction: Erythropoiesis is a process occurring in the bone marrow which end point is the production of erythrocytes (red blood cells). During erythropoiesis the erythrocyte precursor undergoes significant changes among which are cytoskeleton and membrane remodeling, expulsion of the nuclei and degeneration of organelles like mitochondria and the golgi apparatus.

We have observed that the expansion of erythroblasts from total peripheral blood mononuclear cells is increased 20 fold compared to cd34+ cells isolated from the same amount of blood. Interestingly, these CD34- cells in the PBMC when grown at high cellular densities will become CD34+ and contribute to the erythroblast expansion. However the CD34- cells are not capable to form erythroid colonies on their own. This suggests that cell-cell contact or specific secreted cytokines by helper cells in these cultures is crucial for the differentiation of the CD34- cells to erythroblasts. Immunodepletion of PBMCs for specific cell types by magnetic beads identified several hematopoietic effector cells that can contribute to the differentiation of CD34- and CD34+ hematopoietic cells.

Aim: The aim of this study is to further identify the sub cell type or cell types that are necessary for this particular effect. We will look at cell-contact vs. secreted cytokines by these cell types through growth in transwells or in direct co-culture. In addition, if secreted cytokines are key to the differentiation of CD34- cells, we aim to investigate the supernatant of these cells for the presence of growth factors by mass spectrometry and test the found cytokines for their potential to differentiate CD34- cells to erythroblasts.

Techniques: This project involves cell culture, protein gels, flow cytometry, isolation of specific hematopoietic populations.

Duration: 6 – 9 months. Students from the University or HLO who are looking for a dynamic and interesting internship and are interested in the above project are encouraged to contact the group leader, Emile van den Akker, either by e-mail: e.vandenakker@sanquin.nl or phone: (+31) 20-512 7004.