Human serum albumin potentially maintain CD34 hematopoetic stem/progenitor cell stemness in vitro

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Background & Aim

Umbilical cord blood (UCB) banking has been established in National General Hospital Ciptomangunkusumo Indonesia for 7 years. Maintaining ex vivo HSCs culture stability primarily depends on medium composition. This study aims to compare the effect of HSA as serum replacement in comparison to FBS for maintaining stemness of HSC in 7 days in vitro culture.

Methods, Results & Conclusion

This study has been approved by ethical committee Faculty of Medicine Universitas Indonesia and all participating patients have signed the informed consent of the study. The mononuclear cells were isolated from human UCB by a density gradient method. CD34+ cell isolation was performed using magnetic separation of human CD34 microbead-magnetic labelling. The sample size is three and in vitro culture was performed in duplication. Enriched CD34+ UCB stem cells from cryopreserved mononuclear cells and direct culture of thawed cryopreserved CD34+ UCB stem cells were done in separate set. The CD34+ cells were resuspended in complete medium composed of RPMI 1640 biowest supplemented with 10% FBS or 10% HSA, 1% antibiotic-antimycotic and seeded in 24 well plate with equal number of cell density. The cell culture was incubated in CO₂ incubator for 7 days. After 7 days, the cells
were harvested. Viable cell count was described using trypan blue exclusion method. Phenotype of CD34+ cells were done by flow cytometry analysis. Giemsa staining was performed on harvested cells day 7 and on the well for morphology analysis. Our result showed lower viable cell count in HSA culture, however the percentage of day 7 harvested CD34+ cells were higher than FBS culture. Giemsa staining showed morphology of differentiated blood cells were least frequently found in HSA supplemented medium. These results indicated HSA supplemented medium was superior to FBS in preserving HSC's stemness.