

Establishment of a cord-blood bank and possibility of using genetically regulated hematopoietic stem cells through transcription factor mediated differentiation system: an internet-based study

Anjana Shankar^{1,2*}, Gauri Kandambi¹, Hasanka Madubashetha¹, Wickramasinghe P.D.S.U.⁴, Ruwini Cooray¹, Nimali De Silva⁵, Athula Sumathipala^{3,6}

¹*Section of Genetics, Institute for Research and Development in Health and Social Care, Colombo, Sri Lanka*

²*Faculty of Applied Sciences, UCSI University, Malaysia*

³*Section of Epidemiology, Institute for Research and Development in Health and Social Care, Colombo, Sri Lanka*

⁴*Department of Chemistry, Faculty of Science, University of Colombo, Sri Lanka*

⁵*Department of Nanotechnology, Faculty of Technology, Wayamba University of Sri Lanka, Kuliyaipitiya, Sri Lanka*

⁶*School of Medicine, Faculty of Medicine and Health Sciences, Keele University, UK*

System level priorities need to be implemented on cancer control and prevention as around 78% upsurge in new cancer cases are predicted by 2030 in Sri Lanka. One such priority is developing capacity of national health researchers to use genetic advancements in manipulating biologics for cancer treatment. The objective of this study is to highlight the clinical implications of establishment, development and effective Patient, Public Involvement and Engagement (PPIE) in a Cord Blood Bank (CBB), thereby, facilitating the use of genetically regulated Hematopoietic Stem Cells (HSCs) through Transcription Factor Mediated Differentiation System (TFMDS) derived from Umbilical Cord Blood (UCB) as a novel, state of the art approach in restoring post oncological patient immunity in Sri Lanka. Published literature in PubMed and Google-Scholar on the effect and impact of HSC, UCB, CBB and application of TFMDS genetic regulation in clinical oncology was analyzed. Analysis showed that application of TFMDS to *RUNX1*, *FOSB*, *SPI1* transcription factors in HSC triggers formation of *CD43+* cells contributing to enhanced immunity. Furthermore, UCB is an excellent source of HSC due to speedy availability and reduced incidence of graft versus host disease allowing transplantation of grafts with limited HLA disparity, extending donor pool. Authors suggest that establishment of a CBB and recruitment of UCB to obtain and administer genetically regulated HSCs through TFMDS as an effective clinical tool in boosting collapsed immunity in pediatric and geriatric post oncological patients. Remarkable stress is suggested on strategies to implement PPIE in this regard, allowing practicality in Sri Lankan context.

Key words: *Cancer-Immunity, Sri Lanka, HSC, CBB, TFMDS*

*Corresponding author: anjanashankar09@gmail.com