Optimizing Bone Marrow Cryopreservation for Primitive Hematopoietic Stem Cell Compartment Studies Using Flow Cytometry Analysis

Lee, Dongwon (School: James Clemens High School)
Lee, Yewon (School: James Clemens High School)

Advances in the mobility of bone marrow transplants have benefited many different types of people from all aspects of the socioeconomic ladder. This project demonstrates the process of cryopreservation within the entire transplantation process in a new direction by testing the effectiveness of cryoprotectants in the freezing and thawing efficiency of mouse bone marrow cells. The efficiency is specifically measured through a cell cytometer where hematopoietic compartments including hematopoietic stem cells are analyzed for live cells after short term freezer storage and long term nitrogen tank storage. By testing the effects of cryoprotectants, type of storage, and the time of preservation, bone marrow cryopreservation can be optimized for higher survivability of the cells, specifically hematopoietic stem cells. Through my project it is demonstrated that a clear method and standard protocol must be developed regarding hematopoietic compartment cryopreservation although there are limitations in the amount of mouse bone marrow utilized. The results and conclusions of this project propose a standard protocol for bone marrow cryopreservation for humans modeled by mouse bone marrow to effectively improve the cost-effectiveness of various treatments, minimize undesirable outcomes, and develop a time-efficient standard for transplantation of human bone marrow in autologous and allogeneic settings.

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