

Manufactured Red Blood Cells

A BioFabUSA Project / Department of Defense Manufacturing Innovation Institutes



Technology: Manufactured red blood cells

Project Participants: ARMI|BioFabUSA Deep Tissue Characterization Center, Pluristyx Inc., Trailhead Biosystems Inc.

Institutes' Role: The institute is developing a cost-effective, scalable process for manufacturing red blood cells (RBCs). The project is leveraging Pluristyx's expertise in the scalable production of pluripotent stem cells as a starting material and Trailhead's expertise in high density screening methodologies to replace expensive media components required for the differentiation process that converts stem cells into red blood cells. The project also leverages the institute's internal expertise in deep cell and tissue characterization and cell culture process development to characterize and control the production process at the extremely high cell densities that will be required to minimize the manufacturing footprint and drive down manufacturing costs.

Technology Description: Red blood cells for transfusion following trauma or for the treatment of chronic conditions.

Impact: The ability to cheaply manufacture many units of RBCs from a small amount of safe, patient-compatible starting material would greatly improve the robustness of the blood supply chain. Manufactured red blood cells would reinforce the supply of RBCs for transfusion, especially as the eligible donor population ages, during times of crisis like the recent pandemic, or in environments with a limited population of eligible donors. The significant decreases in cost associated with high density cell culture developed in this project will be applicable to other cell types.

