Enhancing the Production of Cell Therapies
2002 - 2014

Challenge/Motivation
Gene-modified cell therapies, like CAR-T therapies, use cells from a patient’s own immune system to target and kill cancer cells. These powerful therapies have shown exceptional promise in treating blood cancers, and three treatments have recently received FDA approval. Cell therapies have the potential to treat many of the 1.7 million Americans diagnosed with cancer each year, and may be used to treat many other diseases as well.

Unfortunately, the process to make these therapies is labor-intensive, using methods that are legacies of research and blood banking processes. During the initial separation of a patient’s cells before manufacturing the therapy, up to 90% of cells are lost, increasing costs and the risk of failure in making a dose for the patient.

Solution
Based in part on research by Colorado School of Mines professor David Marr, GPB Scientific has developed a prototype system that will reduce costs and the risk of human error or contamination at the start of cell therapy manufacturing. The system reduces cell loss to <5% with 1/5th the variability of current processes.

This invention produces a purer concentration of enriched white blood cells that can be genetically modified to become a therapy. As shown in the image to the right, the product from GPB’s process appears almost pure white, with >99% of the red blood cells and >95% of the platelets removed.

Real World Impact
The new process recovers almost 100% of the original cells from the patient’s blood, much more than current methods. The process also helps capture the type of T-cell most desired for cell therapy (the T-central memory phenotype). Because the process is fully automated, more T-cells can be made for cell therapy faster to treat the patient sooner and at much lower cost. The process can also be used to enrich white blood cells for other cell therapies under development to treat diseases such as Parkinson’s disease, sickle cell disease, hemophilia, and HIV/AIDS.

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