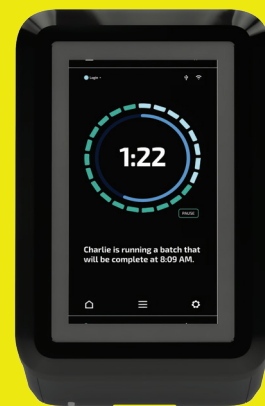


Comparison of various conventional and chemically-defined T cell medias.



BACKGROUND

T cells are lymphocytes that have special cell surface receptors that recognize antigens, which is vital for an immune response. Recently, chimeric antigen receptor (CAR) T cells have been created to target particular antigens on tumor cells as a type of immunotherapy. CAR-T cell therapies are currently involved in numerous clinical trials as a potential breakthrough therapy across a wide variety of malignancies. CAR-T cells are commonly grown and expanded in RPMI (Roswell Park Memorial Institute) 1640 basal media supplemented with up to 10% fetal bovine serum (FBS). For clinical applications, there is a desire to use cell media platforms that allow for higher expansion rates, have more lot-to-lot consistency between batches, and exclude FBS and other animal-derived components due to concerns over contamination. Chemically-defined media provides improved batch-to-batch results and removes some regulatory concerns since it excludes serum products. However, serum-free media may yield lower CAR-T efficacies, so understanding how to optimize the media to improve the therapy is a necessary step.

THE EXPERIMENT

In this study, the Rebel was used to probe the essential amino acid content of RPMI + FBS, combo (both base and expansion) media with and without human serum albumin (HSA), base media alone, and expansion media alone. All media samples were handled following the manufacturers' instructions. The samples were diluted 25x before analysis on the Rebel with no additional sample preparation. Each media sample was run five times. (Figure 1)

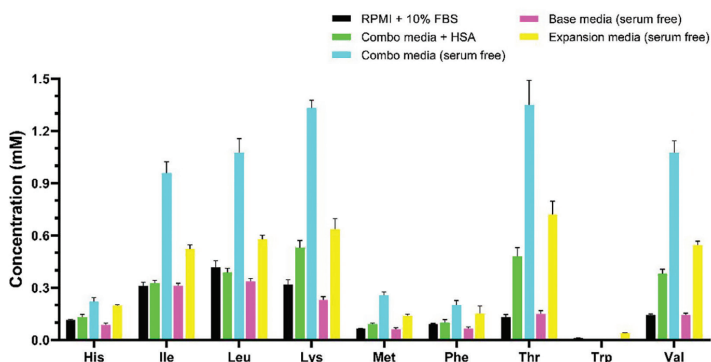


Figure 1: The concentrations of the essential amino acids in five cell media platforms used for T-cell culturing. Error bars are from the standard deviation of n = 5 replicates.

DISCUSSION

There were significant differences in the essential amino acid content between the traditional RPMI with 10% FBS media and the chemically-defined media for T cell growth. The serum-free combination media (used as both a base and expansion media, blue) had the highest levels of most essential amino acids. The serum-free expansion media (yellow) had the second-highest levels of all the media and had the highest levels of Trp. In fact, other than the serum-free expansion media, only the RPMI + 10% media had Trp detected in the formulations. RPMI + 10% serum media (black) and the serum-free chemically-defined base media (pink) had the lowest levels of the essential amino acids. A combination of media that included HSA (green) had essential amino acid levels that were moderate when compared to the highest and lowest media. With this quick insight from the Rebel, researchers can make informed decisions about which media platform is best for growing CAR T-cells.

