Docket #: S18-082

Use of Polyvinyl Alcohol for Chimeric Antigen Receptor T-Cell Expansion

Researchers at Stanford have developed chemically defined, polyvinyl alcohol (PVA)-based media for culturing hematopoietic stem cells and immune cells (e.g., T cells). Confirmed in studies using both mouse and human cells, the PVA replaces the use of fetal bovine serum, bovine serum albumin, and recombinant serum albumin in media – all of which display batch-to-batch variability and are not GMP-grade reagents. **Advantages of using PVA include that it is a lower cost, biologically inert reagent that is available at high-purity with minimal batch-to-batch variability.** The new, PVA-based media will be useful for culturing cells for clinical bone marrow or HSC transplantation as well as T cell therapies that require large-scale expansion of T cells.

Stage of Development
The researchers have shown that PVA can replace serum albumin in a range of blood and immune cell cultures including cell lines, primary leukemia samples and human T lymphocytes. PVA can even replace human serum in the generation and expansion of functional chimeric antigen receptor (CAR) T cells, offering a potentially safer and more cost-efficient approach.

Applications

- Immune cell expansion for cell therapies (e.g., CAR T cell therapies)
- Ex vivo maintenance/expansion of HSCs in the context of clinical bone marrow or HSC transplantation, as well as basic research

Advantages

- Chemically defined

- Minimal batch-to-batch variability
- Suitable for clinical-grade manufacturing/applications
- Significantly less expensive than GMP-grade recombinant serum

Publications

- Nishimura T, Hsu I, Martinez-Krams DC, et al. **Use of polyvinyl alcohol for chimeric antigen receptor T-cell expansion**. *Exp Hematol.* 2019;80:16-20. doi:10.1016/j.exphem.2019.11.007

Patents

- Published Application: WO2021126841
- Published Application: 20230030773

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