Docket #: S20-432

STASH system: Enriching genetically modified cells with a single selectable surface marker

Many applications in cell therapy, synthetic biology, and gene therapy require extensive cell engineering, often with multiple vectors due to limitations in packaging capacity. The Mackall lab at Stanford have developed a molecular biology technique to sequester cells of interest into intracellular compartments - making it a powerful tool for protein characterization, while also enabling safer use of protein-based therapeutics. This technology supports precise, drug-induced control of engineered gene and cell therapies, which can help improve on existing safety profiles for novel treatments.

The Intracellular **S**torage by **TA**rgeted **SH**uttling (**STASH**) Select system can be used to isolate pure populations of cells with up to five modifications. Unlike current approaches that use multiple selectable markers or serial enrichment strategies, each component of the STASH Select system is encoded by a vector of interest, and cells that take up all the vectors then activate the system to express a selectable surface marker. Current approaches for isolating pure populations of cells engineered with multiple genetic modifications require the use of multiple selectable markers or serial enrichment strategies. These approaches are time consuming, costly, and often not compatible with current GMP-based systems for cell therapy. The STASH Select system is simple, scalable, cost effective, and compatible with current GMP systems for cell therapy. It is also versatile and has been demonstrated with two, three, and five-way selection.

Related Technology

Stanford Docket S19-343- STASH Tag: A chemigenetic system for control of protein localization

Stage of Development: Research - in vitro
Researchers in the Mackall Lab continue in vitro/ in vivo system valiudation for CAR-T applications.

Applications

- CAR-T, TCR, and NK cell therapy
- Stem cell therapy for regenerative medicine
- Gene therapy
- Viral vectors
- Gene engineering
- Molecular biology research tool for protein characterization
- Yeast engineering for biomanufacturing of products

Advantages

- Simple, scalable, cost effective, and compatible with current GMP systems for cell therapy
- Versatile selection pathways
- Cell surface receptor localization

Patents

- Published Application: WO2022216866
- Published Application: 20240377394

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