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Efficient release of affinity-captured cells

A method to effectively release affinity-captured cells.

IP Status: Issued US Patent; **Issued Patent No.** 11,280,789

Applications

- Cell separation for research
- Cell separation for cell-based therapy
- Microfluidics

Key Benefits & Differentiators

- **Isolate virtually any cell type** using a release mechanism that is independent of capturing components
- **Unaltered cells**: label-free, chemical-free, enzyme-free release process. No addition or removal of surface biomarkers presented on the cells. Cells are viable and culturable.
- **Simplified extraction**: no additional pre-/post-isolation steps. Isolated cells are ready for downstream processing.
- **High release efficiency**: >97% release efficiency ensures no cells are wasted; excellent for isolating scarce cells.
- High specificity of affinity-based capturing is retained
- Suitable for microfluidic and non-microfluidic platforms

Problem

Affinity-based cell separation is a technique in which affinity between a cell-surface biomarker and a complimentary, substrate-bound capture ligand is used to capture specific cells. Affinity-based cell separation offers key advantages such as simplicity, high specificity and label-free isolation. The captured target cells are released via a variety of methods including shear force, substrate deformation, chemical or enzymatic treatment. However, these approaches have several disadvantages, such as

- severely altering the surface components of the isolated cells (removal or modification of native components, addition of non-native molecules, or presence of residual antibody),
- damaging the cells, and/or
- cause undesired phenotypical and functional properties of the cells.

Solution

Researchers at the University of Minnesota have developed a method to release affinity-captured cells using a molecular release mechanism that does not damage or alter the cells. This technology uses a molecular recognition and release trigger approach that is independent of the capture mechanism, thereby making this method versatile and readily adaptable for any cell type. After capturing the cells, large, specific, non-toxic “molecular trigger” compounds are immobilized adjacent to the ligand-cell complexes; as the captured trigger compounds adopt an extended conformation, the ligand-biomarker bond is broken, releasing the captured cells. Combined with affinity-based cell capturing, this release technology offers a comprehensive, widely-adaptable platform for effective cell sorting.

Technology ID
20160236

Category
Engineering & Physical Sciences/Instrumentation, Sensors & Controls
Life Sciences/Biomarkers
Life Sciences/Diagnostics & Imaging
Life Sciences/Human Health
Life Sciences/Medical Devices
Life Sciences/Pharmaceuticals
Life Sciences/Research Tools
Life Sciences/Therapeutics
Agriculture & Veterinary/Veterinary Medicine

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Phase of Development

In vitro assessment: human umbilical vein endothelial cells (HUVECs) were successfully isolated from a solution containing HUVECs and OVCAR3 cells. A release efficiency of over 97% is reported.

Researchers

Wei Shen, PhD
Associate Professor, Biomedical Engineering
External Link (cse.umn.edu)

Publications

Efficient Release of Affinity Captured Cells Using a Coiled Coil Based Molecular Trigger. *Macromolecular bioscience* , 17.3 (2017): 1600330.

Ready for Licensing

This technology is now available for license! The University is excited to partner with industry to see this innovation reach its potential. Please contact us to share your business' needs and your licensing interests in this technology. The license is for the sale, manufacture or use of products claimed by the patents.