UNIVERSITY OF WYOMING
Wyoming Technology Transfer and Research Products Center

Microbial Stem Cell Technology

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Patent Status:
Patent Pending

Description of Technology

Stem cells have no specific job or function, but they do have the potential to become any other cell in a human body. Our bodies generally use stem cells to replace worn out cells when they die. Scientists hope stem cells can be used to create a very personalized kind of medicine, one that allows a person's body parts to be replaced with exact replicas of their own body parts grown from stem cells. This growing process requires that additional stem cells—more than what is naturally in our bodies—are used. Due to the shortage, stem cells must be created artificially. Currently, the most popular industrial fermentation processes for stem cell creation involve batch microbial cultures producing a biosynthetic product. Problems arise with this method when trying to obtain high product yield because of the rapid accumulation of nonproducing genetic mutations. Such substandard cells lower the product yield, eventually leading to stopping the process to renew the cultures and start over.

Researchers at the University of Wyoming invented a way to grow stem cells called Microbial Stem Cell Technology. This technology does produces stem cells continuously instead of encountering the problems faced when producing in batches. The technology works by enabling the growth of a microbial culture to stably maintain two or more distinct cell types in a ratio that can be genetically programmed and/or dynamically controlled during cultivation. Maintaining such a ration increases product yield in microbial fermentations and enables advanced engineering of biomaterials using genetically engineered microbial cells.

Applications

Stem cells do not have a specific job or function, but they can become any other cell in the human body and perform that cells function. Stem cells they are not however present enough in the human body to repair lost or heavily damaged organs. Scientists are currently manufacturing stem cells and using them in large quantities to create replica body parts for patients that are exactly like the original. This University of Wyoming technology is a way for producers of stem cells to produce stem cells continuously, instead of a batch approach, which can significantly increase the production of stem cells. This can increase the production value of the process and require less continuous input from a worker. The technology can be useful to any company in the stem cell production field that wants to increase their production. It can also be used by researchers to create more stem cells for testing purposes.

Features & Benefits

- Creates stem cells in a continuous process
- Increases yield of stem cells produced
- Cell types can be grown in a ratio that can be genetically programmed and/or dynamically controlled during cultivation

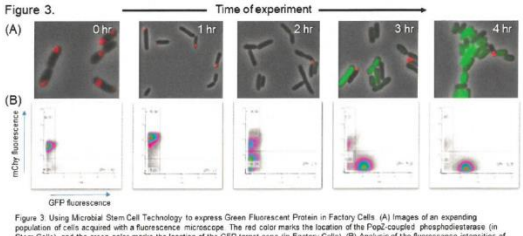

Figure 3. Using Microbial Stem Cell Technology to express Green Fluorescent Protein in Factory Cells. (A) Images of an expanding population of cells acquired with a fluorescence microscope. The red color marks the location of the PopZ-coupled phosphodiesterase (in Stem Cells), and the green color marks the location of the GFP target gene (in Factory Cells). (B) Analysis of the fluorescence intensities of thousands of cells from (A) using flow cytometery.

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