Multus Media

Project Information

Abstract

Nowadays, the main bottleneck of many biotech companies in the cellular agriculture industry is their culture media. The unsustainable and unethical nature of animal-serum based culture media makes them the biggest obstacle for these “clean-meat” products to reach public market. The vision of this project - Multus Media, is to create a new, animal-free growth medium using novel engineering techniques. By synthetically engineering new strains of yeast that are naturally rich in biological signalling compounds, we will be able to build a scalable process to produce all the key ingredients necessary for mammalian cell growth. We hope this will pave the way for innovation in food and healthcare industries, and ultimately accelerate the development of a sustainable future.

Typical culture media contain a high concentration of amino acids, vitamins and carbohydrates. Yeast extract based culture media contains all essential nutritions needed and has already being widely used for microbiological cell culture. The premise of this project is to engineer specific yeast strains to create a synthetically modified yeast library for the production of regulatory compounds (growth factors). One could then (auto-)lyse these modified yeast cells to create a more cost-effective and sustainable way of producing culture media that is applicable to both mammalian cell culture and industrial production systems.

Other Applications

The main bottleneck of many biotechnology company is the high cost of their culture media. Other than above mentioned cellular agriculture industry, the outcome of this project is also applicable for other mammalian cells. Statistics have showed the production of recombinant proteins for use as biopharmaceuticals to be a multi-billion dollar industry. It is estimated that today, there are > 300 biopharmaceutical proteins and antibodies on the market with sales exceeding USD100B (2013).

While the use of *E. Coli* and *S. Cerevisiae* as platform is very common due to their capability for fast growth in bioreactors using simple media, the vast majority (~40%) of biopharmaceuticals are currently still being produced by mammalian cells such as Chinese Hamster Ovarian cell lines (CHO cells). Despite the disadvantage of requiring complex media, the use of mammalian cells is still necessary for incorporating typical eukaryotic post-translational modifications like glycosylation. The application of our project outcome can greatly reduce the cost for culture media and potentially improve the yield of mammalian cells in large-scale production system in the future.

Partnership & Facilities

- **Department of Medicine** Imperial College London
- **Department of Life Science** Imperial College London
- **Imperial Enterprise Lab** Imperial College London
- **Synthetic Biology Society** Imperial College Union