Metabolomics-2013
OMICS Group Conferences
Accelerating Scientific Discovery
2nd International Conference and Exhibition on
Metabolomics & Systems Biology
April 8-10, 2013 Hilton Chicago/Northbrook, USA

Gene transcription and metabolic effects of trace elements on productivity and product quality of mammalian cho cells

Seongkyu Yoon

University of Massachusetts Lowell, USA

Abstract

Biopharmaceuticals (defined as recombinant proteins, monoclonal antibody and nucleic acid-based products) is the fastest growing sector within the pharmaceutical industry. About 900 to 1,200 clinical candidate proteins and/or peptides are currently being investigated. Approximately one in every four drugs introduced to the market is a biopharmaceutical. The global biopharmaceutical market was estimated at $80 billion in 2007 with antibodies representing around $28 billion sales and protein products generating almost $52 billion. It is estimated that sales of biopharmaceutical products will exceed $150 billion by 2012. Despite all of the progress and commercial success, the development of production cell lines and fermentation processes with mammalian cells is, to a large extent, still based on empirical knowledge and historical experience. This is mainly because of missing qualitative and especially quantitative data and a lack of understanding of the intracellular mechanisms under bioprocess conditions. The challenges of selectivity, reproducibility and accurately quantitating these products, have seriously handicapped biopharmaceuticals from being commercialized.

The research aims at developing an innovative raw material handling strategy for monoclonal antibody product in suspension cultured mammalian cells. It is investigated how trace elements influence on mammalian cell-culture product and quality. The mechanistic explanation will be searched for with transcriptomics and metabolomics.

Biography

Seongkyu Yoon is the co-director of the Massachusetts BioManufacturing Center (MBMC) and an assistant professor in the department of chemical engineering. Yoon's research focus is on systems biology. Research covers Biopharmaceutical development, Multivariate Data Analysis, Supply Chain Management in biologics, and Chemometrics in life sciences. Research aims at developing innovative systems technology with which one can improve drug development efficiency and manufacturing productivity, and developing innovative diagnostic systems and tools for selected diseases with chemometrics framework. He is currently developing systems tool using genomics and metabolic flux analysis approach to explain variability to productivity and quality of CHO (Chinese Hamster Ovary) mammalian cell-culture product. Integration of medical devices with multivariate statistical method is also being explored to develop practical diagnostic tools.