ESTABLISHMENT AND APPLICATION OF A MULTIOMICS SYSTEMS BIOLOGY APPROACH FOR CELL CULTURE PROCESS DEVELOPMENT AND OPTIMIZATION

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Development of robust and efficient cell culture manufacturing processes may be enhanced through the application of -omics approaches, in combination with conventional process data, to obtain a more in-depth understanding of the underlying biochemical pathways and cellular processes. Integration of -omics data using a systems biology approach can help to resolve process issues, improve process consistency and control, as well as lead to more cost-effective biomanufacturing and scale-up solutions [1,2, 3]. However, complex data sets derived from CHO -omics studies have created significant challenges for data analysis, integration and interpretation that have led to limited realization of the full potential of systems biology in cell culture process development. Overcoming this challenge is necessary for widespread meaningful application of systems biology in process development and optimization.

Here we demonstrate the utilization of a multi-omics data analysis workflow for successful application of systems biology approaches to mammalian biopharmaceutical production. We describe CHO cell-based case studies of various -omics tools applied for characterization of underlying mechanisms that trigger variability in process performance and product quality during a bioproduction process to potentially enable the development of a toolbox that allows us to directly modulate product quality and improve process control.

References:
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