

## DEVELOPMENT AND SCALE-UP OF PERFUSION CELL CULTURE PROCESS FOR HIGHER PRODUCTIVITY

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In the biopharmaceutical industry, integrated continuous biomanufacturing (ICB) process has been investigated and implemented to downsize facilities, save manufacturing cost, and improve product quality. We have developed the ICB technology since 2017 to establish Next Generation Factory which can realize these expectations.

Our ICB process version 1.0 incorporates the key unit operations of monoclonal antibody production from perfusion culture to the end of polishing chromatography steps. In 2020, we developed new perfusion process and medium co-developed with Ajinomoto Co., Inc., and achieved world-class productivity (5-10 g/L/day) for a total of 42 days with multiple clones. During production phase, viable cell density was maintained constantly at high level ( $>1000 \times 10^5$  cells/mL). The product qualities such as size variants, charge variants and DNA impurities were less than or comparable to the level of fed batch mode. In early 2022, we introduced pilot scale equipment (50 L perfusion bioreactor and fully automated continuous purification system), and the first scale-up trial of perfusion for 30 days was successful.

In this poster, we will report a highlighted progress of perfusion process development, medium development and the scale-up trials of perfusion.