Continuous Processing for Pre-Clinical and Clinical Manufacturing: Balancing Speed, Cost, and Quality

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Continuous processing has been touted as a new paradigm in commercial manufacturing of biologics. Significant effort has been spent on achieving optimal commercial processes. These efforts have resulted in processes with ten-fold increases in productivity and lower costs than typical batch processes.

Early stage clinical manufacturing, however, has different needs than commercial manufacturing. Cost and productivity, in and of themselves, are not as important as the ability to manufacture multiple candidates quickly and robustly, yet with the assurance of scaleability for commercialization.

A launch capable, high productivity mammalian perfusion process appears to be easier to develop than fed batch systems with equivalent productivity. This facile development of perfusion bioreactors and a robust, effectively continuous platform downstream can allow the inexpensive production of regulatory toxicology material prior to candidate selection for multiple candidates, shortening the time to the IND by five to eight months. The product quality is acceptable for new biological entities. The productivity of such a perfusion process will be demonstrated with the production of 1kg of material in a 100L SUB in 15 days. The challenges associated with using continuous processing in early stage clinical supply will be discussed.