INDUSTRIALIZATION OF THE GMP MANUFACTURE OF EXOSOME THERAPEUTICS AND OPPORTUNITIES FOR FURTHER MULTIFOLD PROCESS PRODUCTIVITY INCREASE

Konstantin Konstantinov, Ph.D., Codiak BioSciences, USA
konstantin.konstantinov@codiakbio.com

Exosome therapeutics are rapidly evolving as a promising new modality in various clinical areas, such as oncology, immuno-oncology, neurology and metabolic diseases, among others. As some of these indications involve large patient populations, the success of exosome therapeutics depends on our ability to manufacture allogenic exosomes at a large scale, with high purity and quality, acceptable CoG, and under GMP conditions. Due to the complexity and natural heterogeneity of exosomes, the development of such an advanced production technology is not a trivial task. This presentation will discuss our ability to develop GMP processes to manufacture precisely engineered engEx exosomes from Codiak's pipeline. With two lead programs in clinical trials in cancer patients, and an IND approved for a third program in immuno-oncology this year, we have significantly scaled our GMP production capacity. Our large-scale process uses either 2,000L fed-batch or, more recently, 500L high-density perfusion bioreactors culturing HEK cells at high density in chemically defined media. The bioreactor harvest is processed through a sequence of purification steps yielding exosomes of high potency and purity, and with consistent quality attributes. Opportunities for a further multifold increase of process productivity and reduction of CoG through implementation of integrated continuous biomanufacturing technology will be outlined. This presentation will also review the applicability of the above technology to the manufacture of other ATMPs.