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Christos Stamatis

Tania D. Pereira Chilima

Jose Castillo

Suzanne Fraid

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DECISIONAL TOOLS FOR SUCCESSFUL COMMERCIALISATION OF NOVEL VACCINE TECHNOLOGIES

Christos Stamatis, Dept. of Biochemical Engineering, University College London, UK
christos.stamatis.12@ucl.ac.uk
Tania D. Pereira Chilima, Univercells Technologies
Jose Castillo, Quantoom Biosciences
Suzanne Farid, Dept. of Biochemical Engineering, University College London, UK

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With the emergence of personalised cancer vaccines and more recently with the COVID-19 pandemic, the increasing need for novel and disruptive manufacturing and supply chain strategies to deliver affordable vaccines has been highlighted. Decision-support tools are essential to accelerate and enhance decision-making during the development, commercialisation and distribution of prophylactic or therapeutic vaccines across the globe. This presentation will share our most recent insights from UCL's Bioprocess Decisional Tools research on modelling the economics of integrated and intensified manufacturing technologies for viral vectors and mRNA vaccines.

On the mRNA front, UCL collaborated with Univercells Technologies and Quantoom Biosciences to explore novel identified, integrated and automated platforms for the production of personalised cancer vaccines, and we evaluated the benefits and limitations of the technology across a range of demands and dose sizes. Furthermore, we simulated the same manufacturing technology for the production of a prophylactic mRNA vaccine against an infectious disease at a pandemic pace, focusing on the adequate and rapid supply of vaccines in developing countries. The case study used the COVID-19 pandemic as a real-world example to determine the necessary infrastructure and manufacturing capacity in Africa to support a rapid response across the continent. In the analysis, we considered two vaccine technologies; an adenoviral vector and an mRNA vaccine, aiming to determine the required facility footprint, the capital investment and the cost of goods. Moreover, for each vaccine technology we compared an integrated with a conventional manufacturing platform for a centralised and a regional manufacturing and supply chain network.

These case studies have highlighted the importance of utilising decision-support tools in bioprocessing to gain an in-depth understanding of the necessary infrastructure and the associated cost to manufacture and supply affordable vaccines.