The Pioneering Tech Speeding Up Drug Development

IPT talks to Johannes Stanta at Celerion about how improvements in molecular and cellular capabilities are aiding Good Laboratory Practice/Good Clinical Practice (GLP/GCP) standards

***IPT*: How important are molecular and cellular capabilities for the support of drug development projects that need to comply with GLP/GCP standards?**

Johannes Stanta: With many drugs in development harnessing the power of the immune system as a therapy, there has been an increasing demand for an in-depth understanding of immunology and immunotoxicology during the drug development process. These key endpoints of new therapies require different bioanalytical platforms than more traditional drugs, such as synthesised small molecules. Many of these molecular and cellular methods have been used for many decades in research and diagnostic applications and have now entered the limelight of drug development. Delivering on these key endpoints requires a particular level of documentation, organisational, and quality structure not previously associated with these platforms. The availability of these molecular and cellular capabilities, alongside the more traditional platforms, is very important to fully support the development of innovative new drugs now and in the future.

In what ways can innovative tech used by Contract Research Organisations (CROs) be utilised to support the development of new modality therapies, such as cell and gene therapies (CGTs)?

The availability of innovative technology at CROs allows drug development companies to access these technologies for their studies, without the need to invest the time and money into their own laboratory space, staff, and compliance. Many of the analytical platforms only become viable if you have a constant stream of work that utilises them. At a CRO, we can use 'economies of scale' to make them available to many clients for when

they are needed for their projects. In particular, for the development of CGTs focusing on rare diseases with very few patients, there is a requirement for many different platforms to be used in parallel. This necessitates a multi-platform set-up that uses many different scientific skills. For CROs to understand this industry and the challenges of developing new modalities, making these platforms available is vital, and this will reduce the time to bring these therapies to the patients.

Can you explain how a pre-qualified interferon gamma ELISpot assay works, and how can this be used to accelerate the drug development process?

The enzyme-linked immune absorbent spot (ELISpot) is a technique related to ELISA that quantifies the frequency of cytokine secretion from as little as a single cell. ELISpot assays have been used in many research fields such as vaccine development, cancer research, and veterinary research. For example, measuring T cell responses through cytokine production makes it possible to study vaccine efficacy because an immune response is the desired outcome. The latest application of this technology is in gene therapy, where it is used as a key immunogenicity endpoint to study cytotoxic T cell responses against the therapy. The T cell mediated immune response against capsid and transgene-product antigens is an unwanted response and part of the FDA's recommended evaluations in early phase clinical trials of cellular and gene therapy products. In following this guidance, clients can be supported with validated ELISpot assays that are tailored to their therapies, providing them with the necessary information to progress their therapies to the next milestone.

In the wake of COVID-19, how important is offering fully automated ELISA assays in order to accelerate vaccine development?

The development of new vaccines against COVID-19 has been the focus for many companies in recent years. It has also highlighted to everyone the large volume of participants needed in these studies and the enormous volume of work required to support such endeavours. ELISA, and other more modern ligand binding assay platforms, such as Electrochemiluminescence Immunoassays, Gyrolab, and SIMOA, have been the cornerstone for providing quick and robust efficacy readouts during vaccine development. Many of the analytical workflows that use these platforms used to be manual and laborious. Automating these workflows enables the increase of throughput by several fold, which has been in line with the increase in demand for these services. It is now hard to imagine a time where this lab work and documentation were done completely manually.

Johannes Stanta, PhD, is Global Director of Molecular and Cell Biology at **Celerion** where he leads the Lincoln, US and Zürich, Switzerland MCB laboratories. He previously worked at Freeline Therapeutics as Director of Bioanalysis where he had overall bioanalytical responsibility for several gene therapy clinical trials, including the analytical and clinical development of Freeline's companion diagnostic. He previously worked in senior scientific leadership roles in bioanalysis and clinical laboratory at LabCorp and Hammersmith Medicines Research. He received his PhD from the University of Cambridge, focusing on the discovery of diagnostic biomarkers for neuropsychiatric disorders. He has hands-on industry experience in small and large molecule bioanalytical assay development, validation and sample analysis, supporting clinical and non-clinical programs. He also leads the European Bioanalysis Forum's Cell and Gene Therapy interest group where Bioanalytical labs across Europe share their bioanalytical challenges and best practices.