Biology 2.0: Combining machine-learning, robotics and biology to deliver drug discovery of tomorrow

Intelligent OMICS, Arctoris and Medicines Discovery Catapult test *in silico* pipeline for identifying new molecules for cancer treatment

Medicines discovery innovators, Intelligent OMICS, supported by Arctoris and Medicines Discovery Catapult, are applying artificial intelligence to find new disease 'drivers' and candidate drugs for lung cancer. This collaboration, backed by Innovate UK, will de-risk future R&D projects and also demonstrate new cost and time-saving approaches to drug discovery.

Analysing a broad set of existing biological information, previously hidden components of disease biology can be identified which in turn lead to the identification of new drugs for development. This provides the catalyst for an AI-driven acceleration in drug discovery and the team has just won a significant Innovate UK grant in order to prove that it works.

Intelligent OMICS, the company leading the project, use *in silico* (computer-based) tools to find alternative druggable targets. They have already completed a successful analysis of cellular signalling pathways elsewhere in lung cancer pathways and are now selectively targeting the KRAS signalling pathway.

As Intelligent OMICS' technology identifies novel biological mechanisms, Medicines Discovery Catapult will explore the appropriate chemical tools and leads that can be used against these new targets, and Arctoris will use their automated drug discovery platform in Oxford to conduct the biological assays which will validate them experimentally.

Working together, the group will provide druggable chemistry against the entire *in silico* pipeline, offering new benchmarks of cost and time effectiveness over conventional methods of discovery.

"Much has been written about the wonders of artificial intelligence and its potential in healthcare," **says Dr Simon Haworth, CEO of Intelligent OMICS.** "Our newsflows are full of details of AI applications in process automation, image analysis and computational chemistry. The DeepMind protein folding breakthrough has also hit the headlines recently as a further AI application. But what does Intelligent OMICS do that is different?"

"By analysing transcriptomic and similar molecular data our neural networks algorithms re-model known pathways and identify new, important targets. This enables us to develop and own a broad stream of new drugs. Lung cancer is just the start – we have parallel programs running in many other areas of cancer, in infectious diseases, in auto-immune disease, in Alzheimer's and elsewhere."

"We have to thank Innovate UK for backing this important work. The independent validation of our methodology by the highly respected cheminformatics team at MDC coupled with the extraordinarily rapid, wet lab validation provided by Arctoris, will finally prove that, in drug discovery, the era of AI has arrived."

Dr Martin-Immanuel Bittner, Chief Executive Officer of Arctoris commented:

"We are thrilled to combine our strengths in robotics-powered drug discovery assay development and execution with the expertise in machine learning that Intelligent OMICS and Medicines Discovery Catapult possess. This unique setup demonstrates the next stage in drug discovery evolution, which is based on high quality datasets and machine intelligence. Together, we will be able to rapidly identify and validate novel targets, leading to promising new drug discovery programmes that will ultimately benefit patients worldwide."

Prof. John P. Overington, Chief Informatics Officer at Medicines Discovery Catapult:

"Computational based approaches allow us to explore a top-down approach to identifying novel biological mechanisms of disease, which critically can be validated by selecting the most appropriate chemical modulators and assessing their effects in cellular assay technologies."

"Working with Intelligent OMICS and with support from Arctoris we are delighted to play our part in laying the groundwork for computer-augmented, automated drug discovery. Should these methods indeed prove fruitful, it will be transformative for both our industry and patients alike."

If this validation is successful, the partners will have established a unique pipeline of promising new targets and compounds for a specific pathway in lung cancer. But more than that they will also have validated an entirely new drug discovery approach which can then be further scaled to other pathways and diseases.

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For further information or to arrange interviews please email simon.haworth@Intellomx.com or media@md.catapult.org.uk

Notes to Editors:

About Intelligent OMICS

Intelligent OMICS Ltd is based in Nottingham, UK and Wuhan, China. The company exploits the world-leading computation methods developed by Chief Scientific Office Professor Graham Ball at the J van Geest Cancer Centre, Nottingham Trent University, and the technology has now been Assigned to the company.

Intelligent OMICS undertakes in-house research to apply its own technology, but also offers some fee-for-service work to pharma for drug discovery and to the diagnostics industry to generate content for new diagnostics.

The company is privately funded and has discussions underway with a number of pharma companies that seek to secure an option for future out-licensing of the in-house drug discovery pipeline.

www.intellomx.com Contact: Dr Simon Haworth, CEO simon.haworth@intellomx.com

About Arctoris

Arctoris Ltd is an Oxford-based research company that is revolutionising drug discovery for virtual and traditional biotechnology companies, pharmaceutical corporations and academia. Arctoris has established the world's first fully automated drug discovery platform, offering pre-optimised and fully validated processes for its partners and customers globally. Accessible remotely, the platform provides on-demand access to a wide range of biochemical, cell biology and molecular biology assays conducted by robotics, enabling rapid, informed decision-making in basic biology, target validation, toxicology and phenotypic screening. These assay capabilities are accessed using a powerful online portal that streamlines experiment planning, ordering, tracking and data analysis. Thanks to the Arctoris platform, clients can rapidly, accurately and cost-effectively perform their research and advance their drug discovery programmes.

https://www.arctoris.com/   @Arctoris

About the Medicines Discovery Catapult

Medicines Discovery Catapult is a national facility connecting the UK community to accelerate innovative drug discovery.

We provide unique scientific capabilities and act as a gateway to UK resources and expertise, supporting UK SMEs to drive the development and industrialisation of new approaches for the discovery of new medicines.

By validating new ways of discovering medicines and driving key talent and expertise across the sector, we will support the UK life sciences industry, SMEs and innovators to deliver growth for the UK economy and maintain the UK's heritage position as a global leader in medicines R&D.

Ultimately, new industrialised technologies are vital for delivering new medicines to patients, faster.

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