Vaccitech Oncology Limited's ChAdOx1/MVA prime-boost immunotherapeutic shows preclinical potential as a novel cancer treatment

September 3, 2021

This story was adapted from the joint press release issued by the University of Oxford and the Ludwig Institute for Cancer Research

- Research from the University of Oxford and the Ludwig Institute for Cancer Research shows the cancer immunotherapeutic generates effective anti-tumor immune responses and, in combination with immunotherapy, decreases tumor size and increases survival rates in mouse models.
- The technology is comprised of the ChAdOx vector, which underpins the Oxford-AstraZeneca COVID vaccine.
- The prime-boost viral vector product is licensed to Vaccitech Oncology Limited (VOLT), a strategic initiative between the Ludwig Institute for Cancer Research and Vaccitech plc.
- A first-in-human clinical trial of the immunotherapeutic (VTP-600) in patients with non-small cell lung cancer will commence later this year.

Scientists from the University of Oxford and the Ludwig Institute for Cancer Research are building on the success of the Oxford-AstraZeneca vaccine against SARS-CoV-2 to develop a therapeutic vaccine to treat cancer.

The study, which was done by Professor Benoit Van den Eynde's group at the Ludwig Institute for Cancer Research, University of Oxford in collaboration with co-authors Professor Adrian Hill and Dr Irina Redchenko at the University's Jenner Institute, has today been published in the Journal for ImmunoTherapy of Cancer.

The new therapeutic cancer vaccine (VTP-600) in the study is being developed by Vaccitech Oncology Limited (VOLT), a strategic collaboration between the Ludwig Institute for Cancer Research and Vaccitech plc.

A Phase 1/2a clinical trial in 80 patients with non-small cell lung cancer will be launched later this year in collaboration with Cancer Research UK's Centre for Drug Development. VTP-600 will be administered in combination with standard of care NSCLC treatment; anti-PD-1 immunotherapy and chemotherapy.

Cancer immunotherapy - turning a patient's own immune system against a tumor – has resulted in remarkable improvements in outcomes for some cancer patients. Anti-PD-1 immunotherapy works by taking the brakes off anti-tumor T cells to enable them to kill cancer cells. However, despite this success, anti-PD-1 therapy is ineffective in the majority of cancer patients.

One reason for the poor efficacy of anti-PD-1 cancer therapy is that some patients have low levels of anti-tumor T cells. VOLT's immunotherapy technology generates strong CD8+ T cell responses, which are required for good anti-tumor effects.

In order to create a therapeutic vaccine that specifically targets cancer cells, the vaccine was designed to target two MAGE-type proteins that are present on the surface of many types of cancer cells. Called MAGE-A3 and NY-ESO-1, these two targets were previously validated by the Ludwig Institute.

The preclinical experiments in mouse tumour models demonstrated that the therapeutic cancer vaccine increased the levels of tumour-infiltrating CD8+ T cells and enhanced the response to anti-PD-1 immunotherapy. The combined therapeutic vaccine and anti-PD-1 treatment resulted in a greater reduction in tumour size and improved the survival of the mice compared to anti-PD-1 therapy alone.

Benoit Van den Eynde, Professor of Tumour Immunology at the University of Oxford, Member of the Ludwig Institute for Cancer Research and Director of the de Duve Institute, Belgium, says: 'We knew from our previous research that MAGE-type proteins act like red flags on the surface of cancer cells to attract immune cells that destroy tumours.

'MAGE proteins have an advantage over other cancer antigens as vaccine targets since they are present on a wide range of tumour types. This broadens the potential benefit of this approach to people with many different types of cancer.

'Importantly for target specificity, MAGE-type antigens are not present on the surface of normal tissues, which reduces the risk of side-effects caused by the immune system attacking healthy cells.'

Adrian Hill, Lakshmi Mittal and Family Professorship of Vaccinology and Director of the Jenner Institute, University of Oxford, says: 'This new vaccine platform has the potential to revolutionise cancer treatment. The forthcoming trial in non-small cell lung cancer follows a Phase 2a trial of a similar cancer vaccine in prostate cancer undertaken by the University of Oxford that is showing promising results.

'Our cancer vaccines elicit strong CD8+ T cell responses that infiltrate tumours and show great potential in enhancing the efficacy of immune checkpoint blockade therapy and improving outcomes for patients with cancer.'

Bill Enright, CEO of Vaccitech said:

“This research builds on the data supporting the clinical trial of our cancer immunotherapeutic, VTP-600, sponsored by CRUK’s Centre for Drug Development (CDD). We are honoured to be working with world leading institutions such as the Ludwig Institute for Cancer Research and Oxford University.”

Tim Elliott, Kidani Professor of Immuno-oncology at the University of Oxford and co-Director of Oxford Cancer, says: ‘In Oxford, we are combining our fundamental scientific expertise in immunology and antigen discovery with translational research on vaccine platforms.

‘By bringing these teams together we can continue to address the significant challenge of broadening the positive impact of immunotherapy to benefit more patients.’

- End -

Editors Notes

This new paper, ‘Heterologous prime-boost vaccination targeting MAGE-type antigens promotes tumor T-cell infiltration and improves checkpoint blockade therapy’ is published in the Journal for ImmunoTherapy of Cancer at http://dx.doi.org/10.1136/jitc-2021-003218

This study was co-led by Professor Benoit Van den Eynde and Dr Carol Leung at the Ludwig Institute for Cancer Research, University of Oxford. It was funded by the Ludwig Institute for Cancer Research, and the Cancer Research UK Oxford Centre.

About the University of Oxford

Oxford University has been placed number 1 in the Times Higher Education World University Rankings for the fifth year running, and at the heart of this success is our ground-breaking research and innovation. Oxford is world-famous for research excellence and home to some of the most talented people from across the globe. Our work helps the lives of millions, solving real-world problems through a huge network of partnerships and collaborations. The breadth and interdisciplinary nature of our research sparks imaginative and inventive insights and solutions.

Oxford University’s cancer research is managed through Oxford Cancer: a city-wide network and partnership between Oxford University and Oxford University Hospitals NHS Trust based on the University’s Translational Biomedical Research Campus.

With over 900 cancer research scientists spread across the city and beyond, Oxford is ideally placed to enable and combine the best research and clinical resources in order to innovate cancer treatment and care world-wide.

About the Ludwig Institute for Cancer Research

Ludwig Cancer Research is an international collaborative network of acclaimed scientists that has pioneered cancer research and landmark discovery for 50 years. Ludwig combines basic science with the ability to translate its discoveries and conduct clinical trials to accelerate the development of new cancer diagnostics and therapies. Since 1971, Ludwig has invested nearly $3 billion in life-changing science through the not-for-profit Ludwig Institute for Cancer Research and the six U.S.-based Ludwig Centers. To learn more, visit www.ludwigcancerresearch.org.

About Vaccitech

Vaccitech is a clinical-stage biopharmaceutical company engaged in the discovery and development of novel immunotherapeutics and vaccines for the treatment and prevention of infectious diseases and cancer. The Company’s proprietary platform comprises proprietary modified simian adenoviral vectors, known as ChAdOx1 and ChAdOx2, as well as the well-validated Modified Vaccinia Ankara, or MVA, boost vector, both with demonstrable tolerability profiles and without the ability to replicate in humans. The combination of a ChAdOx prime treatment with subsequent MVA boost has consistently generated significantly higher magnitudes of CD8+ T cells compared with other technologies and approaches. The company has a broad pipeline of both clinical and preclinical stage therapeutic programs in solid tumors and viral infections and prophylactic viral vaccine programs. Vaccitech co-invented a COVID-19 vaccine with the University of Oxford, now approved for use in many territories and exclusively licensed worldwide to AstraZeneca plc through Oxford University Innovation, or OUI. Vaccitech is entitled to receive a share of the milestones and royalty income received by OUI from AstraZeneca plc.

Vaccitech plc Forward-Looking Statement

This press release contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, as amended, including, without limitation, statements regarding risks and uncertainties related to Vaccitech’s expectations regarding the benefits of this collaboration, including the potential benefits of using VTP-300 in triple combination with AB-729 and an NrtI, the timing and expected trial design of the Phase 2a clinical trial to be initiated by the parties pursuant to the agreement and Vaccitech’s expectations that, if the clinical trial is successful, VTP-300 together with AB-729, could be a foundation for CHB combination therapy. The words “may,” “will,” “could,” “would,” “should,” “expect,” “plan,” “anticipate,” “intend,” “believe,” “estimate,” “predict,” “project,” “potential,” “continue” and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. Any forward-looking statements in this press release are based on management’s current expectations and beliefs and are subject to numerous risks, uncertainties and important factors that may cause actual events or results to differ materially from those expressed or implied by any forward-looking statements contained in this press release, including, without limitation, risks and uncertainties related to timing and advancement of the planned clinical trial and other risks identified in Vaccitech’s SEC filings, including its Quarterly Report on Form 10-Q for the first quarter of 2021 and subsequent filings with the SEC. Existing and prospective investors are cautioned not to place undue reliance on any forward-looking statements, which speak only as of the date they are made. Vaccitech expressly disclaims any obligation to publicly update or revise any such statements to reflect any change in expectations or in events, conditions or circumstances on which any such statements may be based, or that may affect the likelihood that actual results will differ from those set forth in the forward-looking statements.