Biochemical superglue opens new approach to vaccine development

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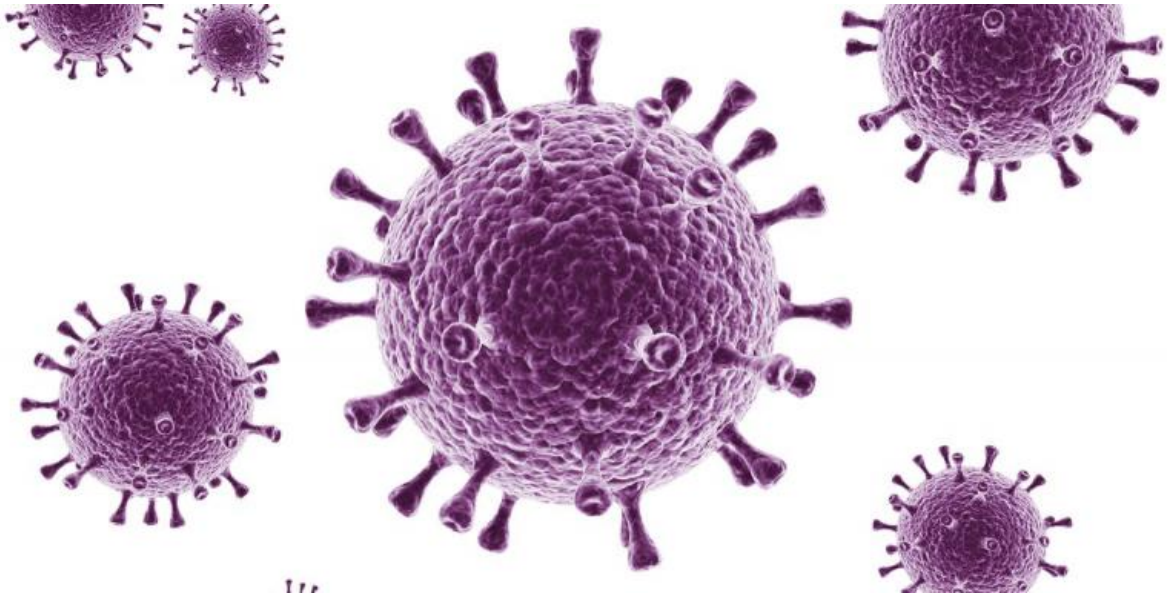

Credit: University of Oxford

An Oxford University spinout company is developing a molecular superglue for the rapid development of vaccines targeting a range of diseases.

SpyBiotech is using 'biochemical superglue' that can facilitate the rapid development of robust and novel vaccines. The company has raised £4m at launch in seed financing to develop the technology, led by Oxford Sciences Innovation with participation from GV.

The company gets its name from the bacterium Streptococcus pyogenes (Spy), the same organism behind a number of infections including strep throat and impetigo. The team behind SpyBiotech divided Spy into a peptide, SpyTag, and a protein partner, SpyCatcher. Naturally attracted to each other, the two form a covalent bond once combined.

SpyBiotech believes that this bond is the missing link to effective development and production of highly effective vaccines. The company will initially focus on virus-like particles (VLPs), a leading technology to induce immune responses by vaccination. Discovered in 1963, VLPs have become a cornerstone of a number of vaccines. Resembling viruses but without pathogenic material, VLPs can instead be coated with bug-busting antigens. However, the two most common ways in which a VLP can be paired with antigens – genetic fusion and chemical conjugation – are imprecise, expensive, prone to being misassembled, and consequently can result in the failure of a vaccine.

Conversely, SpyBiotech's SpyVLP can be easily and efficiently combined with a number of antigens, and used to produce stable vaccines that induce robust antibody responses. The company plans to target infectious diseases including major viral infections at first, with a view to developing SpyVLP into a universal platform that can be adapted to target a wide variety of conditions. In particular, owing to the versatile and easy-to-use nature of SpyVLP, the technology could underpin efforts to rapidly combat future outbreaks and pandemics.

SpyBiotech will use the seed funding to get its first candidates ready for Phase I trials. During that period, SpyBiotech's founders will receive support from its investors. The founders are aiming to start a further round of funding in the near future to catalyse the development of SpyVLP and expand into other disease areas. A leadership team, including the company's first CEO, will be announced in the coming months.

Sumi Biswas, Associate Professor at the Jenner Institute, Oxford University, said: 'Researchers in the vaccine field, including us, have struggled to make effective VLPs against many diseases for a long time. We view this superglue technology as a game changer to enable faster development of effective vaccines against major global diseases. We are excited to begin the journey of taking this versatile and innovative approach forward and moving our new vaccines from the laboratory to human clinical testing.'

Oxford Sciences Innovation (OSI), the patient capital investor for Oxford University, led the £4m investment, with GV (formerly Google Ventures), an independent venture capital arm of Alphabet, joining in participation.

Lachlan MacKinnon, Principal at OSI, said: 'We see the Spy technology as the missing link in rapid and robust VLP vaccine design and see GV as a natural co-investment partner to take this forward. We are privileged to be working with four founders who bring such an impressive combination of academic prowess and clinical stage experience to the company.'

Tom Hulme, General Partner at GV, added: 'SpyBiotech has established a novel approach using platform VLP vaccine technology that shows promise in a number of addressable markets. We're looking forward to working with a team of world class scientists with extensive experience in vaccine development – spanning from vaccine design through to Phase II clinical trials – to develop more effective vaccines for a wide range of global diseases.'

The research underpinning SpyBiotech was developed in conjunction between researchers at Oxford University's Department of Biochemistry and Jenner Institute, with four academics joining SpyBiotech at launch. The team includes: Mark Howarth, Professor of Protein

Nanotechnology; Sumi Biswas, Associate Professor of Vaccinology; Simon Draper, Professor of Vaccinology; and Dr. Jing Jin. Combined, the founding team has taken twelve products to Phase I and II trials; filed nine patents on vaccines and other technologies; and has extensive experience in biotech and industrial collaborations and partnerships. The commercialisation of SpyBiotech's technology and company formation is supported by Oxford University Innovation, the research commercialisation company of Oxford University.

Carolyn Porter, Deputy Head of Technology Transfer at Oxford University Innovation, said: 'SpyBiotech punctuates research that's been developing for some time here at Oxford, and is a testament to the benefits of collaboration between our departments and institutes. Oxford is playing a leading role in developing the next generation of vaccines, and SpyBiotech – and other spinouts working in this sector – showcases the potential impact the University can have on the wider world.'

Provided by University of Oxford

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