‘Pick and mix’ technology promises future-proof universal vaccines against COVID and more

Submitted by: Baseimmune
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LONDON, UK - Imperial College-based biotech startup Baseimmune has secured USD4.8m funding to develop the next generation of future-proof universal vaccines against major human and animal diseases.

Around 1.5 million people die every year around the world due to a lack of effective vaccines.* There is an urgent need to develop better universal vaccines against existing diseases, including, COVID, flu and malaria, as well as future-proof vaccines that can cope with the emergence of new threats and variants.

It’s all about the antigen

Vaccines work by training the immune system to recognise and respond to infection with a specific pathogen, such as a virus, parasite or bacteria. At the heart of every vaccine is an antigen - a small, safe molecule based on part of the pathogen, which triggers the protective immune response.

Most vaccine antigens are based on a single pathogen component, such as the spike protein of the COVID SARS-CoV-2 coronavirus or the coat protein of the malaria parasite, which limits their effectiveness and ability to cope with new variants.

To solve this problem, Baseimmune’s vaccine design algorithm crunches genomic, epidemiological, immunological, clinical and evolutionary data together to create entirely new synthetic antigens containing all the parts of the pathogen that are most likely to evoke a strong protective immune response.

These ‘pick and mix’ antigens effectively present the immune system with a toolkit of everything it is likely to need to know about how to recognise and respond to a particular pathogen, both now and in the future. The antigen designs can then be fed into any vaccine technology platform, including mRNA, DNA and viral vectors, to create universal future-proof vaccines that should be effective against all current and likely variants.

For example, the company recently partnered with DNA vaccine pioneers Touchlight to develop a universal coronavirus vaccine aimed at tackling the emergence of new variants and preventing future pandemics.

Back in January 2020, the Baseimmune team fed the small amount of existing data about SARS-CoV-2 into their algorithm, which correctly predicted major variants such as Alpha and Delta that would not emerge for another year.

Co-founder Phillip Kemlo, the software engineer who built the company's AI prediction algorithm, says, “The major problem with current vaccines is that they aren’t designed to account for the evolutionary arms race that occurs between pathogens and the human immune system, and can’t protect against future variants or new mutations. Our prediction algorithm addresses all of these challenges, accelerating the creation of vaccines that are as good as they possibly can be and will stand up to whatever variants may come in the future.”

Universal vaccines for malaria, COVID and more

Baseimmune was founded in 2019 to design and develop universal future-proof vaccines for human and animal infections including malaria, COVID and African Swine Fever. The latest investment round, led by Hoxton Ventures and including early investors Creator Fund, will enable the company to grow, developing more vaccines in parallel and further expanding the number of diseases it is able to tackle.

The company grew out of research by Dr Josh Blight and Dr Ariane Gomes, who met while doing their PhDs at the prestigious Jenner Institute at Oxford University and teamed up with software engineer Phillip Kemlo to build the antigen design algorithm.

Co-founder Josh Blight says, “Vaccines are a powerful tool for eradicating infectious diseases, yet every year millions of lives are still lost or irreversibly changed worldwide due to preventable infections. We know vaccines work - we just need better ones against more diseases if we’re to truly make a difference to global health.”

Co-founder Ariane Gomes says, “I grew up in Brazil and saw first-hand the impact of infectious disease as my aunt lived her whole life with the devastating effects of polio, a vaccine-preventable disease. The COVID pandemic has reminded us that infectious diseases aren’t going anywhere, so we urgently need to develop the next generation of vaccines to help protect us all.”

Scientific advisor Jake Baum, Professor of Cell Biology and Infectious Diseases at Imperial College London, who is collaborating with the team to create an entirely new malaria vaccine, adds, “Vaccine research is often obsessed with developing new delivery methods, with little innovation in the underlying antigens that drive immunity. Innovations in antigen selection by computation have only just started, and companies like Baseimmune are blazing the trail.”

Notes

*Source: World Health Organization www.who.int/news-room/facts-in-pictures/detail/immunization

For further information about Baseimmune and their technology, read our Media Q&A (https://www.baseimmune.co.uk/q-a-oct21.html)

Photos of the team and their lab are available to download from Dropbox (https://www.dropbox.com/sh/khrplx8426d2238/AABqMlq3zUacDtnFDKpjTpy2a?dl=0) Please credit Brendan Foster

To request an interview with the co-founders, Josh Blight, Ariane Gomes or Phillip Kemlo, please contact Kat Arney, kat@firstcreatethemedia.com +44 (0)757 2379472

About BaseImmune
Founded in 2019, Baseimmune is creating the next generation of universal future-proof vaccines. Our unique AI design platform uses innovative and powerful technology to generate completely new vaccines to target diseases that have previously been hard to protect against, as well as emerging and evolving

pathogens. We are partnering with pharmaceutical companies and vaccine manufacturers through our antigen discovery services, and also developing our own broad-spectrum vaccines for humans and animals.

Find out more at Baseimmune.co.uk (https://www.baseimmune.co.uk/)