

Evolution Briefing: UK COVID -19 Vaccine activity

Imperial to begin first human trials of new COVID-19 vaccine

Professor Shattock's team is developing a unique vaccine approach that has significant potential to end the pandemic, in the UK and globally. This novel vaccine is similar to others under development by different countries in terms of targeting the Spike protein.

However, it differs in one crucial aspect: the anticipated human dose is very small, meaning that it will be possible to scale this to millions of doses.

It will be the first test of a new self-amplifying RNA technology, which has the potential to revolutionise vaccine development and enable scientists to respond more quickly to emerging diseases.

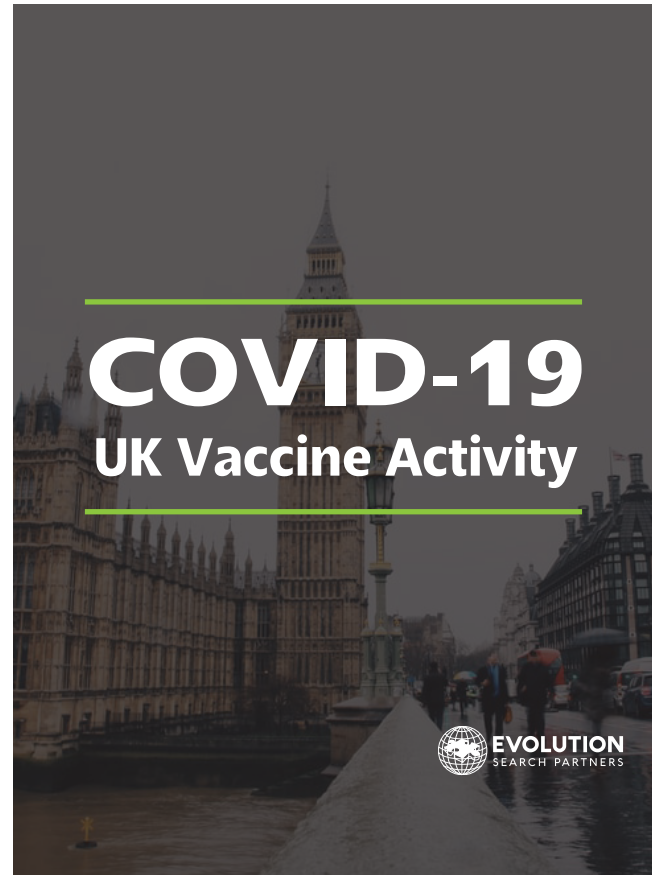
The vaccine in question would harness new technology, which would mean it could be manufactured in large quantities and be relatively cheap to produce at just £3 per dose.

Funding

- Government - £22.5M
- Citadel and Citadel Securities - £2M
- Sir Joseph Hotung Charitable Settlement - £1M
- Jon Moulton Charity Trust - £440K
- Restore Our Planet - £25K

The UK government has given £22.5 million in funding toward research and trials of the vaccine, with £5 million more being donated from private sources.

Scientists at Imperial College in London said the new vaccine works by injecting a dose approximately a thousandth of a thousandth of a gram of genetic material, called RNA, into the body, allowing it to begin multiplying.



Timeline

- February: Received Genetic Sequence from China.
- February: Animal Studies.
- June: Combined Ph I/II Studies (300 people.)
- October: Further Efficacy Trial (6000 people.)
- Availability: Spring 2021.

The Approach: a self-amplifying RNA vaccine

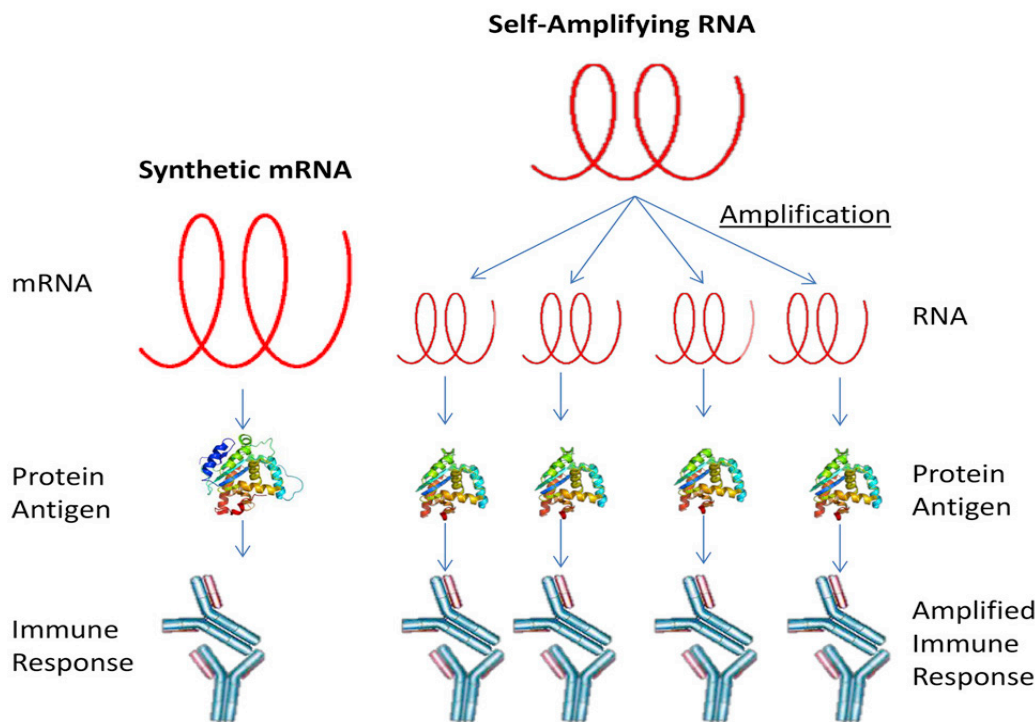
The team's work focuses on the development of a self-amplifying RNA vaccine. RNA vaccines are made with strands of genetic material known as messenger RNA, which can be designed to code for any viral, bacterial or parasitic protein. They can be quickly customised to protect against emerging pathogens and can be made and deployed faster than conventional vaccines.

The self-amplifying RNA vaccine (saRNA) works by injecting new genetic code into a muscle, instructing it to make a protein found on the surface of coronavirus, which triggers a protective immune response. Once injected, the saRNA makes multiple

copies of itself, meaning that immunity can be induced with very low immunisation doses. While conventional vaccine technology requires reaction vessels and downstream processes able to deal with thousands of litres of material, the saRNA vaccine technology developed at Imperial can enable a million doses to be synthesised in a one litre reaction volume.

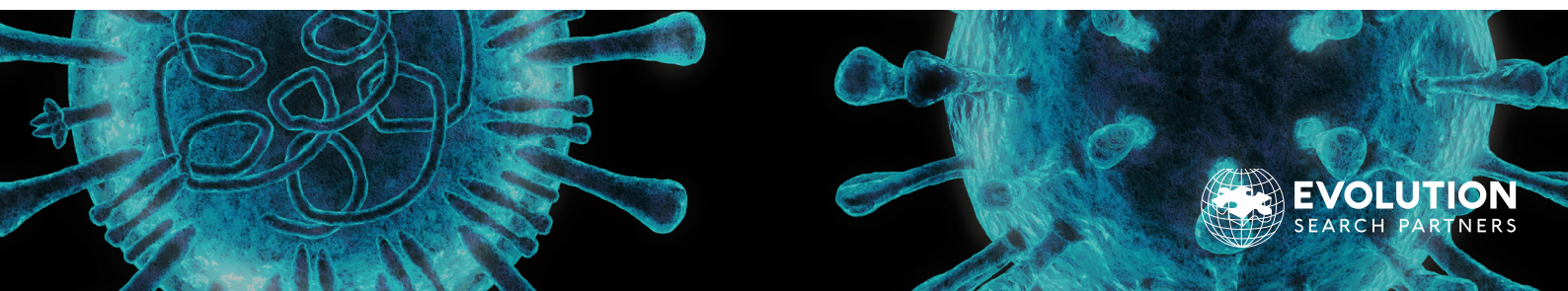
Initial studies on animals show this amplifying effect to be working and gives us confidence that a self-amplifying RNA vaccine for COVID-19 can indeed be a reality.

Figure 1:- Self amplifying RNA Vaccines



Datasource:- www.cell.com

mRNA-based vaccines are promising novel platforms that are; highly flexible, scalable, inexpensive and 'cold chain' free. Most importantly, mRNA-based vaccines can fill the gap between emerging 'pandemic-level', infectious diseases and a sufficient supply of effective vaccines. A variety of preclinical and clinical projects have made enormous strides toward the conceivable application of mRNA vaccines and have suggested that mRNA-based prophylaxis and therapy can be translated to human applications.



Imperial Partners

Imperial College appointed to manufacture self-amplifying RNA (saRNA) for COVID-19 vaccine development. The partnership will apply TriLink's ability to scale saRNA production from research to Phase II scale, allowing for efficient RNA production from a single source. According to TriLink, the significant dose sparing nature of saRNA provides capability to rapidly scale manufacturing to millions of doses.



The Centre for Process Innovation, on behalf of the BioIndustry Association (BIA) led vaccine manufacturing group, is leading the work stream to manufacture the Imperial College London mRNA vaccine.



Morningside and Imperial are also launching a separate startup company named "VaXEquity (VXT)", to develop the underlying self-amplifying RNA technology to treat other health conditions beyond the current pandemic.



Conclusion

Ultimately, Imperial's approach can be scaled to make large quantities of doses worldwide. Enough for the whole UK could be achieved within months and, through engagement of global manufacturers in low-to-middle income countries, hundreds of millions of doses could be quickly made available to vulnerable populations in these areas.

References

- <https://www.genengnews.com/covid-19-candidates/imperial-college-london/>
- www.cell.com
- <https://www.imperial.ac.uk/news/198314/imperial-begin-first-human-trials-covid19/><https://www.imperial.ac.uk/news/197017/imperial-covid-19-vaccine-team-secures-225/>
- <https://www.imperial.ac.uk/news/197573/covid-19-vaccine-secures-government-investment/>



Evolution Search Partners are a boutique search firm operating globally across USA, Europe and APAC, providing 'business critical' teams to the Biomanufacturing and Cell Gene Therapy sector.

With 25 years acclaimed international Biotechnology experience, we offer strong global networks, exceptional technical and business acumen, and operate as an experienced, competent, trustworthy search partner.

Online: www.evolutionexec.com

Email: info@evolutionexec.com