Countries, including Singapore, in race to develop vaccine

TO PREVENT

No vaccines for coronaviruses have been developed, although Singapore has joined the race to develop one for the Covid-19 disease.

It recently announced its partnership with American firm Arcturus Therapeutics to develop a vaccine for Singapore.

A vaccine helps a person’s immune system to recognize a specific threat like Sars-CoV-2, the virus that causes the coronavirus disease. You can then produce antibodies without having to suffer a real infection.

Now that Singapore is conducting its own trials, some healthy participants will be recruited to test the experimental vaccine as soon as in the third quarter of the year, when human trials start.

That is when the safety or phase 1 clinical trial—when the vaccine is tested on a small group to see if it is safe—will start.

“We hope to complete phase 1 trials by the end of this year or beginning of next year, so that we can proceed to larger clinical trials,” said Professor Ooi Eng Ying, the deputy director of the emerging infectious diseases programme at Duke-NUS Medical School.

Before moving on to the larger phase 2 trial to look at the vaccine’s efficacy and the even larger phase 3 trial, researchers need to know the right amount of the vaccine.

“You need to know how much of the vaccine you can give before they start to dislike it,” said Prof Ooi.

That is when people may suffer undesirable side effects like losing their appetite or having a headache, for instance.

Phase 2 studies involve the vaccine being tested on more people, possibly a few hundred, to see if it generates an immune response.

Phase 3 will see researchers test the vaccine on an even larger group of people to see if it can generate an immune response that is strong enough to protect people from the disease.

“Let’s say you want to build a Rolls-Royce, but at this stage, if you can build a car that works, it will help protect a lot of people,” said Prof Ooi.

“Once we can start to vaccinate the vulnerable, even if it does not totally prevent the disease, if it can make it milder, it would already make a big difference.”

Scientists have been working at breakneck speed. Two phase 1 trials for a Covid-19 vaccine—one in the US and one in China—started about two months after the genetic sequence of the virus was shared by China.

The US is testing an experimental vaccine on four people in the phase 1 trial, while China is testing another type of Covid-19 vaccine on 108 volunteers from Wuhan.

More trials are expected to start soon. There are at least 42 other potential coronavirus vaccines in the pre-clinical trial stage around the world.

Seth Berkley, the chief executive of GAVI, a non-profit organization that supplies vaccines to developing countries, said there is talk of up to 80 vaccine trials going on.

“The challenge in this particular case is obviously, there is worldwide demand, so what we have to do is plan for large-scale production from the beginning,” he added.

“The challenge of doing that is we have no idea which particular technology is going to succeed.”

Therefore, what is needed is a worldwide effort to get lots of different ideas started and tested scientifically, he said.

“And then, the most promising candidates... can move into large-scale testing, which obviously needs to be an incredibly accelerated process.”

And even if everything goes smoothly, many experts have said that it would be at least 18 months before a coronavirus vaccine will be available.

Vaccine development is a complicated, lengthy and risky process—it can take 10 to 15 years, though scientists are now looking at ways to quicken the process in this crisis.

Prof Ooi said they will employ new molecular methods, instead of relying on just clinical observations, to accelerate the process.

“For instance, we have been able to now understand the types of genes that need to be switched on or off for the immune system to function optimally and generate high levels of antibodies,” he said.

Prof Ooi added that Arcturus was chosen for its unique vaccine technology.

For instance, “instead of using either weakened or inactivated virus, or even a sub-unit of the virus, Arcturus’ technology uses the genetic code of the virus to deliver the important parts of the virus to educate our immune system to recognise and remember Sars-CoV-2,” said Prof Ooi, referring to the virus that causes Covid-19.

“The best vaccines are live vaccines. They will cause a mild infection that is not enough to make you sick, but enough to stimulate a reaction,” he said.

However, it will take time to weaken it to the point that the researchers can be sure it will not make people sick, he said.

Singapore will own the rights to the vaccine in this country, while Arcturus will be free to market it around the world.

Associate Professor Hsu Li Yang, infectious diseases programme leader at the National University of Singapore’s Saw Swee Hock School of Public Health, said: “While the cost of bringing a vaccine to market is beyond Singapore institutions, we can conduct the vaccine trials here, given our excellent research facilities.”

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