Professor SARAH GILBERT

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Professor SARAH GILBERT, Vaccinologist at Oxford University

(Rough transcript, check against delivery)

AM: I spoke to her this morning and I asked her first of all if it’s guaranteed that a workable vaccine can actually be produced.
SG: No, nobody can be absolutely sure it’s possible. That’s why we have to do trials. We have to find out. I think the prospects are very good, but it’s clearly not completely certain.

AM: And to get the vaccine to a stage where it is absolutely safe you have to do a lot of trials, and that can take some time. Where on that process have we got to?
SG: We haven’t immunised anybody yet. We are about to start clinical trials, we hope, towards the end of next week. We are waiting for the final safety tests to be done on the vaccine and the final approvals to be given. But in the meantime we’ve been given permission to start recruiting volunteers and explaining the process of the vaccine trial to them, to take blood samples from them, to check their health status before we recruit them. And so by the time we have all the approvals for the vaccine read we should have a good pool of volunteers to draw from and we’ll be able to get going quite quickly.

AM: And so if all that goes well – fingers crossed – when might it be ready?
SG: Well, it depends what you mean by ready. There are a lot of complex stages in vaccine development. First of all we have to immunise healthy people between the ages of 18 and 55. We’re looking at the safety of the vaccine as we go. We have used this type of vaccine many times before so we’re not expecting any surprises with this, it has a very well-characterised profile of what happens to people after vaccination. They may have the usual
things that you have after vaccination: a slightly sore arm, maybe a slight fever for a day or two, but that’s all expected. And we will then increasingly immunise more people. We’ll go into older people, we’ll start to look at the safety and the immune response to the vaccine in older people as well as younger people. And that’s important because it’s the older population that we really need to protect with a vaccine, but with vaccines in general you get not so good immune responses as the immune system ages. So we need to find out with this vaccine how good it’s looking in old people compared to younger people, just by measuring the immune response of the vaccination. And we’re also going to be looking to see if the vaccine works to protect people and stop them getting infected, and the way we do that is that half the people in the trial will receive the coronavirus vaccine and half of them get something else. It’s another vaccine that’s licensed to protect against meningitis. And people don’t know which vaccine they’re having. And then over time, as people become infected, they will come to us to get tested and we’ll arrange to have them tested very quickly, and when enough people have become positive for the coronavirus the statisticians will look at which groups those people were in, to find out were they in the group that had the coronavirus vaccine or are they all in the group that had the meningitis vaccine? And obviously we’re hoping for the infections only to happen in the meningitis vaccine group. And if that’s the case we will then be able to say that this vaccine works, at least in the age range that we’ve vaccinated, and we can start expanding the studies and we can start to apply for emergency use licensure so that the vaccine can be used more widely.

AM: It does sound to me from what you’re saying that it’s very unlikely that this vaccine will be ready for the wider population till the end of the year or thereabouts.

SG: It’s very difficult to predict. And there are two parts to that. One is demonstrating the vaccine works. That’s going to affected by how much virus transmission there is at the time that we’re
doing the testing. So obviously we’re seeing a drop in hospital admissions now, probably a drop in virus transmission in the community – and that’s great for the population as a whole. It makes vaccine testing more difficult, though, because we need a small number of people to become infected – and it is really a very small number – in order to know that the vaccine’s actually working. We need a situation in which some people could have been infected but they weren’t, and other people who had the other vaccine were infected. And so that might take a long time if there’s not very much virus transmission. The other part is having enough vaccine ready to use. So in parallel with the clinical trials what we need to do is start preparing to manufacture large amounts of the vaccine.

AM: So people are talking about millions of doses being available by this autumn, potentially. What do you need from the government to ensure that happens?

SG: What we need from government is support to help us accelerate the manufacturing. There aren’t any manufacturing facilities in this country that at the moment can make very large amounts of the vaccine. We have a pilot plant in the University that can make small numbers of doses, and that’s what we’re using for the first clinical trials. But we need to go to a much bigger scale. So those companies need to have new equipment, they need to have their staff trained in using new protocols and new quality control assessments, and all of that can happen, but the companies that we’re going to be working with are going to need to stop doing what they would normally do and make this vaccine instead. So we need support for them all to make sure that’s done in a fair way while they’re trying to do something that’s really very important.

AM: Now, if this vaccine works, then – fairly straightforward question – who owns it?
SG: That’s not really a very straightforward question. At the moment the intellectual property is owned by Oxford University Innovation and a spin-out company from the university, Vaccitech, under the terms of the founding agreement of Vaccitech. That’s now being consolidated into a single body. Discussions are under way at the moment. For the moment, though, what we’re concentrating on is having vaccine available for public health use. The university isn’t looking to make any money out of this. The university is looking to protect people’s health, and to do that as widely as possible across the world. It’s not just for this country. We need to make vaccine for the world. And there are discussions going on about mechanisms for ensuring fair access to all the vaccines that work at a global level, which we will need to engage with. So for the moment, what we’re concentrating on is getting lots of vaccine available, provided that it does actually work and will protect people. We also want to work to look at the assessment of other vaccines which are in development, because it’s my belief that quite a number of the vaccines in development will work and they’ll use different manufacturing facilities, and that’s another way of getting lots of vaccines available for lots of people. In the long term it may be a commercial product, it may be sold in future years, but that’s not something that we’re really thinking about at the moment.

AM: There are two things, I think that come out of that. First of all, if this works it’s a British invention, does Britain get it first before anybody else? But second, if it works – and the whole world is watching what you’re doing, do you think it should be made freely available to the rest of the world?

SG: As I said, we’re working on this as a public health project, so we want to make it available across the world and we want to be able to make it available at a price everybody can afford. It’s not a particularly expensive vaccine to manufacture. We have to understand how we can cover the cost of manufacture, but then
we need to make it available in large numbers of doses across the world.

AM: And do you think it will be available in Britain first?
SG: At this moment I couldn’t say where it will be available. We’re still at a very early stage in the process. We haven’t vaccinated a single person yet. And we have to work very, very fast to go through many of the stages in vaccine development that would normally take about five years, and we’ve done them in four months. So thinking about how we’re going to use the doses when we actually have them, when we have a vaccine that we know the efficacy of, that’s something that’s really still to come. We’re concentrating on the clinical trials and accelerated the manufacturing at the moment.

AM: You’ve probably been studying this virus more closely than anybody else in the world. Can I ask you a few things about it? From what you know at the moment, is it possible, do you think, to be reinfected after you’ve been infected by coronavirus?
SG: Well, we can’t say for certain with this particular coronavirus, but from what we know about other coronaviruses that infect humans and infect animals, we know that immunity isn’t very long-lived. So I think it probably is likely that if somebody’s been infected they will be able to be reinfected in the future. We don’t know at what interval yet. Possibly a number of years. We’ll just have to wait and see.

AM: So this is a vaccine you’d have to use again, as it were, like a flu vaccine, you’d have to go every winter and get it again probably?
SG: Well, there’s a difference between immunity acquired after natural infection and immunity acquired after vaccination. They’re not necessarily the same thing. The coronavirus itself is very good at not leaving a very strong immune memory behind it. That’s why people get reinfected. But we’re not using the coronavirus
itself as a vaccine, we’re using a different virus to make a vaccine, and with the adenovirus that we use to make the vaccine you get strong immune responses and they stay at a high level for a long period of time. So we could be in a situation which would be very fortunate: we could find that the vaccine-induced immunity lasts a lot longer than the infection-induced immunity.

AM: How long do you think – maybe this is an impossible question – how long do you think the vaccine-induced immunity might last?

SG: Well, it is an impossible question. What we’ve done in clinical trials of our mers coronavirus vaccine, though, is looked at people’s immune responses a year after we vaccinated them, and they’re still very strong then. Now, we don’t know how strong they need to be to protect people from infection. So there’s a lot still to know but we do know that with vaccination we get immune responses that are there at a good strong level for at least a year.

AM: And are you of the view that this is a single strain of coronavirus, this one, or is it mutating around the world? Are there different strains?

SG: There are some mutations going on. But not at a level that will affect our ability to vaccinate against it. In our mers coronavirus trials we took the serum from people who’d been immunised from their blood and we tested it against lots of different coronaviruses – mers coronaviruses that is – isolated different years from humans and from camels and in different countries, and the serum antibodies worked against all of them, because the differences are really quite minor. So for some viruses, like flu, there’s a lot of change from year to year and between the avian viruses and the human viruses, but the coronaviruses, within one type, such as either mers or sars or novocoronavirus, although it changes a little bit as it passes through people it’s really not very much.
AM: And the World Health Organisation has suggested there might be five or six or even more waves of this still to come.
SG: Well, yes because that’s what happens when people get infected and then lose immunity and become susceptible again and can be reinfected. I think it’s going to go on for quite a long time. We need to work out which vaccines are going to work to stop that, and to really get this under control.

AM: Can you explain why some people – for instance, older people, men in particular, are more vulnerable than others?
SG: That seems to be largely to do with the level of expression of the receptor that the virus uses to get in cells. So it’s the Ace 2 protein that’s found on the surface of cells in the respiratory tract, and the virus catches onto that and then uses that to pull itself inside the cell. And we know in children who have mild infections, they’re getting infected but these infections are generally very mild in children, they have quite low levels of Ace 2 receptor expression in the respiratory tract. But it increases with age and it’s higher in men than in women. And that seems to be the main difference in why men are having infections worse than women and more fatalities. And the other thing is the immune system. As the immune system ages it’s less able to fight off viruses. So as we get older we don’t always have the capability to deal with viruses, particularly if there’s a very high viral load at the time of infection. So if we get a high exposure to the virus it can overwhelm the immune system and mean that we can’t fight it off. So there are lots and lots of variables to be taken into account. I’m sure genetics will come into play as well. It seems as though we’re seeing some differences in the outcomes in different races and that could be down to genetics which is affecting susceptibility to infection in a different way, or possibly affecting the immune response in a different way. And all of that is still to be worked out.
AM: Professor Gilbert, I know you’ve been working round the clock and working all the time – you’ve taken time out to talk to us, so thank you very much indeed for joining us this morning.

(ends)