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# CORONAVIRUS UPDATE EPISODE 55

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A special edition of the weekly show on coronavirus is a bit of a surprise, but it's a good one. Today we have a virologist who has been working on the ground in Kerala, India, and who has made a lot of video, documentary and podcast work on the virus. Meet Dr Christina Dixithe, virologist and epidemiologist at Charity Health. Hi Christina! Thanks for the invitation. Hi everyone, I'm Kamina Sharma, I'm a science editor at New Info, and I'm joined by Christina Dixithe. Christina, you've been in Kerala since the beginning of the pandemic, and you've been working on a project – a documentary, a podcast, a blog – that has been very popular. Tell us what it has been like to work in Kerala, and what you've been doing.

Christina Dixithe

Thanks for having me, it's great to be here. I'm based in Kerala, but I'm originally from Tamil Nadu, and I'm a virologist by training. I've been working in Kerala since the beginning of the pandemic, and I've been doing a lot of work on the ground, talking to people, documenting what we're doing and what we're learning. We've been very lucky in Kerala, we've had a very low number of cases and deaths, and we've been able to learn a lot from our experience. We've been able to test and trace and isolate and treat, and we've been able to do it on a large scale. We've been able to do it because we've had a very strong public health system, and because we've had the support of the government. We've been able to do it because we've had a very strong sense of community, and we've been able to do it because we've had a very strong sense of trust between the people and the government. We've been able to do it because we've had a very strong sense of solidarity, and we've been able to do it because we've had a very strong sense of hope. We've been able to do it because we've had a very strong sense of love for our fellow human beings. We've been able to do it because we've had a very strong sense of faith in the power of science and medicine. We've been able to do it because we've had a very strong sense of gratitude for the people who have worked so hard to make it happen. We've been able to do it because we've had a very strong sense of humility, because we've had to learn from our mistakes, and we've had to be willing to change our minds and our ways of thinking and our ways of doing things. We've been able to do it because we've had a very strong sense of responsibility, because we've had to take care of our neighbours and our fellow citizens. We've been able to do it because we've had a very strong sense of gratitude for the people who have worked so hard to make it happen. We've been able to do it because we've had a very strong sense of love for our fellow human beings. We've been able to do it because we've had a very strong sense of faith in the power of science and medicine

system reacts, it immediately goes into fighting stance.
Is that actually a disadvantage?
so this unspecific reaction of T-memory
cells?

Christian Drosten
Yes, so what was done here in the study,
after it was noticed that it was too
this incomplete, unclean way of reacting
There are T cells and that they can be measured well here
can with these laboratory tests, one also has to
looked at how it is actually with patients who
have had this disease, the SARS-2
Infection, and then either harmless or
had a severe course. You can do that in this one
Divide into two groups. And there you can see
another interesting additional finding.
I can from this whole department of this investigation
only briefly mention individual findings.
For example, what you can see is that the patients
that had a difficult course, actually like that
react improperly. So also those
when exposed to the protein fragments
from the SARS-2 virus, they don't react so nicely
clean with the signal on these structural proteins,
but they need a relatively large number of fragments, protein
fragments from other pieces of the virus to still
respond cleanly to make a good signal
although they are already reacting strongly overall, so
after the infection, these memory cells are already there
available. There are many, there are many cells
measure up. So there is quite a signal, but that
Pattern of this reaction is not as clean as at
those who had mild courses.
And that can now be done with further laboratory tests
underpin. For example one can look at
like the diversity of T cells in theirs
Transcription pattern is. So this is a character
the general metabolic activity
RNA level. And on this basis you can create patterns
recognize the specific functional units of
T cells that are descended from each other, we speak
of clones, make them identifiable. And there you can
tell the patients with a severe course that
have a relatively colorful one after an infection
Image. So they have, they say a polyclonal one
Situation, i.e. a high diversification of existing
those T cell cloning, while the patients who are mild
such characteristics of an aged immune system
to have. Logically, that happens more often
old people, in patients who are older. But
the real determinant is precisely this measure of the
Immune age in the laboratory test, which one actually
correlated. So if you, in other words, very
has a lot of memory T-cells, so if you have a
has a broad T-cell memory and less
naive T cells, then you may not be in that
Able to have new immunoreactivity and new ones too
Build up immune memory compared to someone
the one who still has many naive T cells, a young one
Immune system. It is rather targeted against this
Virus build up a new immune memory while
an older person may fall back on old experiences,
which are not always correct, based on old immune
gen, and then generates a scattered response.

Korinna Hennig
But that fits in with the observation that younger
People, if they belong to the risk group,
are more at risk. So when I'm younger, but one
Got over cancer or another
If you have chronic illness then the condition could be
my T cells are at risk of severe disease
represent, right?

Christian Drosten
Yes, that's an interesting, good thought in principle.
But I definitely don't want to do this in any way
Break down diseases. Because the immune
diseases that fall into this and the other
Direction out. But if you basically have one
pre-aged T-cellular system would have where one
has fewer naive cells, more memory cells in the
Proportion, then that might also be predictive for
a more difficult course, so a not so targeted one
Opportunity to react, a not so good then too
later buiilding up memory.

Korinna Hennig
But as a rule an immunological one goes higher
Age often at least with the biological height
age of the person.

Christian Drosten
Right, that goes hand in hand, of course, that is very clear.
Only here was really the first time in this study
carefully looked at cause and effect. There is



it is so that the real cause is not
is the pure biological age of the patient, rather
a very strong component in the cause of one
severe course in the immune age.

## WHAT DO THE FINDINGS MEAN FOR THE VACCINE DEVELOPMENT?

Korinna Hennig
Can we use this finding about the T cells,
who react differently, derive insights,
possibly, or new questions for the
Development of vaccines and therapeutic
Medication?

Christian Drosten
Yes, sure, you can definitely do that. The
T cells are absolutely essential. And we want exactly
do that with such a vaccination, an immune
trigger memory, create so the immune system
then is prepared for it. That's exactly what we do
want. So we want memory cells there
are both CD8 and CD4 memory cells, and
Of course, memory cells in the B-cell area as well.
And then we want to get antibodies out of that
B-cell area, getting a cellular response out
the CD8 T cell area and then a helping one
Effect from the CD4 memory area. And this is
for example often a groundbreaking effect. So
there are CD4 cells that have an immune memory
and they then tell the CD8 cells: You have to go to them
Lungs, you don't have to be floating around somewhere
whole body, but this virus, you will
see in the lungs. That would of course also be
good if you put a vaccine like that in your lungs
so that this site-specific immune
memory also forms. And put one in the lungs
Vaccine not so easy, but in the nose it is. And
this is not the first vaccination in the future vaccination
generation, they won't do that yet. There is
usually intramuscular injections. But
it is already anticipated that one will go to
Example makes a vaccination so that you can
Putting the vaccine up your nose instead of injecting it. And
that the information can then also be sent there locally
suggests that this virus is found in the respiratory tract
and that there are certain memory lymphocytes
which then also directs the immune response towards the airways
conduct. So these are the things that really happen
also in vaccine development.
And with the vaccines that are now coming
men ... I think we need to get into vaccines
keep talking about the next podcast episodes,
because this vaccination issue is also luckily coming
comes. Fortunately there will be vaccines soon, hopefully
very soon. But 'very soon' in this case means
just still that it's been a few months.

Korinna Hennig
And not the first vaccine brings the
fracture.

Christian Drosten
Probably not in that sense. So not in
the sense of sterile immunity. So not how
in measles - a vaccination and immune and lifelong
you will never get infected again - it will be that easy
not be that. You will surely be against
the severe symptoms are protected, but not
against a somewhat superficial cold,
which you might get through the virus
can be imagined.
And there are vaccines that are stronger
against the induction of a cellular response
the virus designed. And others are much stronger
designed for a good neutralizing antibody response.
You will have to take another look at how
well then there is one at the level of the CD4 cells
applied immune memory is formed. The
will certainly not be the same with all of these vaccines
be strong.

Korinna Hennig
Finally, Mr Drosten, the question - because we are now
last about immunological age and biological
Alter spoke: How important is it that
elderly people in these vaccine studies
men? And to what extent is that possible? There is a
current study in "JAMA Internal Medicine", which says
they are underrepresented in many studies.

Christian Drosten
Yes, that was probably the case at the beginning, that
is actually quite natural. Vaccines will be
first of all evaluated in such a way that one is under the
Prerequisite works, they might not be able to do that well
that might have side effects.
So it is clear what kind of patient you are going to start with
times includes in the studies: as healthy as possible
young people, of course no children either, but just
Adults who do not have diseases. Only it is
yes, already clear to all vaccine manufacturers who do
that is not completely blind and without thinking about it-
think about who already all know that at the beginning of the
There is not enough vaccine availability at first
Vaccines will be there ... They also know exactly
because it probably isn't that the vaccines
will be absolutely perfect: in the first generation
the vaccines will try to identify groups of indications
preferred to vaccinate. That also includes
the older. That's why it is certainly the same without
that I now know this in detail, I would now
say in most or even all of the major now,
ongoing phase three studies will then gradually and
after including elderly patients.
Otherwise you can't actually do it for this one
older populations.



SOURCES

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GLOSSARY

You can find explanations of the technical terms here:
ndr.de/coronaplossar

ADDITIONAL INFORMATION
ndr.de/coronaupdate

PODCAST TIP
Synapses: Science in the new podcast
ndr.de/synapsen

eat.READ.sleep. - books for you
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Both podcasts are of course available in the ARD audio library.