00:00:12.560 --> 00:00:15.627
Hi, I'm James Barker, an
Associate Publisher from F1000

00:00:15.627 --> 00:00:17.080
and I'm joined today by Dr.

00:00:17.080 --> 00:00:20.521
Dr.Carl Laflamme, a Research Associate
from McGill University and Head

00:00:20.521 --> 00:00:22.640
of the Antibody Characterization
Group.

00:00:23.440 --> 00:00:25.880
Today we are talking about
antibodies.

00:00:25.880 --> 00:00:29.856
Antibodies are a vital component
of our immune system and also a

00:00:29.856 --> 00:00:31.570
vital component of research.

00:00:32.250 --> 00:00:35.391
Antibodies in our body will be
produced in response to

00:00:35.391 --> 00:00:38.361
infections and our body
engineers them to be highly

00:00:38.361 --> 00:00:41.846
specific through a process of
trial and error, creating more

00:00:41.846 --> 00:00:45.501
and more antibodies until they
find one that binds perfectly to

00:00:45.501 --> 00:00:46.130
the target.

00:00:46.850 --> 00:00:49.888
That specific binding to a
specific target is something

00:00:49.888 --> 00:00:51.570
that we now exploit in the lab.

00:00:52.080 --> 00:00:55.094
Most classically, this is done
through techniques such as

00:00:55.094 --> 00:00:58.317
Western Blots, where we will
produce commercial antibodies or

00:00:58.317 --> 00:01:01.384
might produce them in the lab
ourselves, and these will be

00:01:01.384 --> 00:01:02.839
raised to a specific target.

00:01:02.840 --> 00:01:06.240
And then we can use them to
identify those specific proteins

00:01:06.240 --> 00:01:09.529
in complex mixtures that we
might extract from things like

00:01:09.529 --> 00:01:11.480
cell lines or from tissue
samples.

00:01:17.370 --> 00:01:20.630
Now while there are thousands of
these antibodies available, not

00:01:20.630 --> 00:01:23.589
all of them work in the way that
we expect them to, either

00:01:23.589 --> 00:01:26.799
binding to incorrect targets or
just not binding to anything at

00:01:26.799 --> 00:01:27.000
all.

00:01:27.160 --> 00:01:30.961
And this is obviously a massive
issue when it comes to research

00:01:30.961 --> 00:01:34.524
in terms of resources and in
terms of wasted time, but it's

00:01:34.524 --> 00:01:36.960
something that is very rarely
addressed.

00:01:37.280 --> 00:01:41.206
So Carl, what would be great is
if you could explain a bit about

00:01:41.206 --> 00:01:44.528
this issue that we're having
with antibodies and their

00:01:44.528 --> 00:01:48.455
ability to actually work in the
experiments we're using them for

00:01:48.455 --> 00:01:52.080
and a bit about the work that
you're doing to address this.

00:01:53.720 --> 00:01:54.600
So thank you.

00:01:54.760 --> 00:01:55.280
Thank you, James.

00:01:55.280 --> 00:01:56.680
It's actually a pleasure to be
here today.

00:01:57.920 --> 00:02:01.220
There are various kinds of
antibodies and today we'll be

00:02:01.220 --> 00:02:04.580
discussing the research
antibodies, the ones that we use

00:02:04.580 --> 00:02:07.700
in the lab, as you said, in
contrast to therapeutic

00:02:07.700 --> 00:02:11.480
antibodies, when selective, as
you said, antibodies are great.

00:02:11.640 --> 00:02:16.113
They can detect one protein in a
complex cell mixture for

00:02:16.113 --> 00:02:16.730
diseases.

00:02:16.730 --> 00:02:20.399
For example, we can look at the
protein that will go up or down

00:02:20.399 --> 00:02:21.890
in a certain disease.

00:02:21.890 --> 00:02:25.002
And if it goes up and it needs
to be down, we can develop a drug that

00:02:25.002 --> 00:02:26.930
targets against the protein and
so on.

00:02:27.610 --> 00:02:30.410
And when selective antibodies
can give us this information.

00:02:30.410 --> 00:02:35.190
But unfortunately they don't
necessarily behave as advertised

1
00:02:35.190 --> 00:02:36.810
by the manufacturers.

00:02:37.530 --> 00:02:42.483
So there are articles in the
literature that used

00:02:42.483 --> 00:02:48.347
underperforming antibodies
leading to bad hypotheses, bad

00:02:48.347 --> 00:02:50.470
conclusions etcetera.

00:02:55.000 --> 00:02:57.315
When I was in the lab, we were
looking at cancer cells and

00:02:57.315 --> 00:03:02.646

extracting the proteins there to
look at up regulation of certain areas

00:03:02.646 --> 00:03:07.170
where it might be binding sites
or messenger proteins.

00:03:07.370 --> 00:03:10.612
So what are some of the examples
of diseases where you know this,

00:03:10.612 --> 00:03:13.609
these antibodies are used to
characterize those proteins and

00:03:13.609 --> 00:03:16.802
what essential issues where they,
when they don't work, what that

00:03:16.802 --> 00:03:17.490
might lead to?

00:03:19.090 --> 00:03:19.410
Sure.

00:03:19.850 --> 00:03:23.464
So we are at the Montreal
Neurological Institute at The

00:03:23.464 --> 00:03:26.950
Neuro and we do focus on
proteins involved in neuro

00:03:26.950 --> 00:03:28.370
degenerative diseases.

00:03:29.010 --> 00:03:33.577
And what's quite tremendous or
really fun is that we've been

00:03:33.577 --> 00:03:38.070
able to characterize antibodies
and identify key successful

00:03:38.070 --> 00:03:42.563
antibodies for all 25 proteins
linked to amyotrophic lateral

00:03:42.563 --> 00:03:47.281

sclerosis or ALS and for many
proteins involved in Parkinson's

00:03:47.281 --> 00:03:51.100
disease and many actually for
Alzheimer's disease.

00:03:52.340 --> 00:03:54.660
So first, that was a big, a
great breakthrough.

00:03:54.660 --> 00:03:56.220
Yeah.

00:03:56.220 --> 00:03:58.784
And I guess the key problem
there is where you might have

00:03:58.784 --> 00:04:01.392
that unspecific binding to those
proteins, particularly on

00:04:01.392 --> 00:04:03.780
something like a Western blot
when you're looking at

00:04:03.780 --> 00:04:06.820
the relative expression so,
I should maybe explain it.

00:04:07.020 --> 00:04:11.148
When you do a Western blot, you
usually use some sort of what we call

00:04:11.148 --> 00:04:15.214
housekeeping protein, so usually
gap DPH or something more

00:04:15.214 --> 00:04:19.279
Like actin or something like
that where you can know what the

00:04:19.279 --> 00:04:22.710
expression should be in a cell
of what that would be.

00:04:22.710 --> 00:04:26.556
So then you can compare that to
say a disease protein, so TP53

00:04:26.556 --> 00:04:30.342
for example in cancer cells
where you see the up regulation

00:04:30.342 --> 00:04:34.128
or down regulation of that, you
can look at that difference in

00:04:34.128 --> 00:04:34.790
expression.

00:04:35.030 --> 00:04:37.890
But if you have, for example,
unspecific binding to proteins

00:04:37.890 --> 00:04:40.562
that particularly if one might
be on a similar molecular

00:04:40.562 --> 00:04:43.423
weight, so that's what you're
using is that comparison, that

00:04:43.423 --> 00:04:46.236
inappropriate binding could mean

that when you look at that

00:04:46.236 --> 00:04:48.768
block, you know you're seeing
more expression or less

00:04:48.768 --> 00:04:51.300
expression or expression in
other areas, which is not

00:04:51.300 --> 00:04:54.020
telling you the true picture of
what's happening in vivo.

00:04:54.060 --> 00:04:56.748
But on the, you know on the page
that you're seeing that and

00:04:56.748 --> 00:04:59.152
that obviously could be a
massive issue down the line

00:04:59.152 --> 00:05:01.474
because you could be making
assumptions on this protein,

00:05:01.474 --> 00:05:02.900
does this, this protein does
that.

00:05:03.140 --> 00:05:04.460
And actually it's completely
unfounded.

00:05:04.460 --> 00:05:07.890
And while you've done everything
perfectly for yourself, and I'm

00:05:07.890 --> 00:05:11.267
sure you of course do all your
processes perfectly, when you're

00:05:11.267 --> 00:05:14.275
in the lab, then it's actually
the antibody which is the

00:05:14.275 --> 00:05:15.119
crucial problem.

00:05:15.240 --> 00:05:17.765

And I guess another thing that should be talked about is that

00:05:17.765 --> 00:05:19.640
these antibodies aren't always cheap as well.

00:05:21.000 --> 00:05:24.146
Some of them are very reasonable, but if you're in

00:05:24.146 --> 00:05:27.848
research limited settings that can be a large issue as well

00:05:27.848 --> 00:05:31.365
so to jump on your point about having great

00:05:31.365 --> 00:05:34.080
antibodies to evaluate protein expression.

00:05:34.840 --> 00:05:38.138
So we're working at The Neuro

but in close collaboration with

00:05:38.138 --> 00:05:40.480
the Structural Genomic
Consortium, the SGC.

00:05:41.000 --> 00:05:44.612
And one goal of the SGC is to
explore the unknowns, to explore

00:05:44.612 --> 00:05:47.480
these proteins that we don't
know anything about.

00:05:47.720 --> 00:05:51.372
And to be honest 90% of human
proteins, we don't know much

00:05:51.372 --> 00:05:55.211
about them, but most of these
proteins are involved in neuro-

00:05:55.211 --> 00:05:57.440
degenerative diseases or in
cancer.

00:05:57.680 --> 00:06:01.586
So with our good collection of
high quality antibodies, we're

00:06:01.586 --> 00:06:05.618
now able to say for example in
the ALS, in the Amyotrophic Lateral

00:06:05.618 --> 00:06:08.390
Sclerosis, where are these
protein express.

00:06:08.870 --> 00:06:13.008
And what we found is even though
in ALS motor neuron dies, not

00:06:13.008 --> 00:06:16.764
all ALS disease genes are
expressed in motor neurons, some

00:06:16.764 --> 00:06:20.392
are in other types of brain
cells and that really guides

00:06:20.392 --> 00:06:24.085

therapeutic roots and that is
actually very important and

00:06:24.085 --> 00:06:26.950
that's something we're really
excited about.

00:06:36.410 --> 00:06:40.639
So the community needs one or
two potent selective renewable

00:06:40.639 --> 00:06:43.690
antibodies for every single
human proteins.

00:06:44.970 --> 00:06:49.735
We know without doing any work
that at the moment there's 1

00:06:49.735 --> 00:06:54.183
million or so commercial
available antibody for roughly

00:06:54.183 --> 00:06:56.090
70% of the human proteome.

00:06:57.450 --> 00:07:00.970
So what we decided to do, we
created YCharOS.

00:07:01.010 --> 00:07:05.670
YCharOS is a program to
characterize the available

00:07:05.670 --> 00:07:11.193
antibodies in collaboration with
leading antibody manufacturers,

00:07:11.193 --> 00:07:16.803
granting agencies, participating
academics, to characterize side by

00:07:16.803 --> 00:07:22.068
side each of these antibodies
for three research application

00:07:22.068 --> 00:07:27.160
and release quickly and openly
all the data to benefit the

00:07:27.160 --> 00:07:28.800
research community.

00:07:30.560 --> 00:07:36.610
At the moment, we characterized
more than 700 antibodies against

00:07:36.610 --> 00:07:39.030
roughly 70 human proteins.

00:07:39.950 --> 00:07:44.373
And what's really exciting is
that for most of these proteins

00:07:44.373 --> 00:07:48.511
we could find at least one
renewable antibody for each of

00:07:48.511 --> 00:07:49.510
these protein.

00:07:50.630 --> 00:07:52.150
And this is spectacular.

00:07:52.150 --> 00:07:55.110
Yes, there's some antibodies
that failed and that's correct.

00:07:55.110 --> 00:07:59.338
We report all negative data, but
in these reports, they can be

00:07:59.338 --> 00:08:00.430
used as a guide.

00:08:00.670 --> 00:08:03.992
You can see that there's one
potentially one key renewable

00:08:03.992 --> 00:08:07.033
antibody for all three
applications for most of these

00:08:07.033 --> 00:08:07.540
proteins.

00:08:13.130 --> 00:08:15.971
So as part of this and as we've
mentioned several times, these

00:08:15.971 --> 00:08:18.721
antibodies that are being used
in mainly commercial antibodies

00:08:18.721 --> 00:08:21.427
and one of the large parts of
working on YCharOS is the fact

00:08:21.427 --> 00:08:24.313
you're working directly with the
people who are producing these

00:08:24.313 --> 00:08:24.810
antibodies.

00:08:24.810 --> 00:08:27.354
So maybe you could talk a bit
about that commercial

00:08:27.354 --> 00:08:30.289
partnership that you have and
how that is helping with this

00:08:30.289 --> 00:08:33.176
process of characterizing and
validating these antibodies,

00:08:33.176 --> 00:08:33.470
right.

00:08:34.390 --> 00:08:36.470
So these partnerships are very
important.

00:08:37.230 --> 00:08:41.721
The very first step and that was
key was to develop trusted

00:08:41.721 --> 00:08:45.764
protocols because as you say,
there's no standardized

00:08:45.764 --> 00:08:48.310
protocols for testing
antibodies.

00:08:49.870 --> 00:08:54.017
So that was a gradual process,
but we decided to use strictly

00:08:54.017 --> 00:08:57.630
knockout cell lines to
characterize these antibodies.

00:08:58.310 --> 00:09:02.714
A knockout cell line is a cell
line where we removed only one

00:09:02.714 --> 00:09:06.480
gene and that gene produces the
protein of interest.

00:09:06.960 --> 00:09:11.116
So briefly we have the parental
line and then the knockout cell

00:09:11.116 --> 00:09:14.882
line which there's only one
protein missing and that's a

00:09:14.882 --> 00:09:17.480
protein to be targeted by the
antibody.

00:09:18.040 --> 00:09:22.805
So in theory, if the antibody is
specific, we will have signal in

00:09:22.805 --> 00:09:27.571
the parental cell and absence of
signal in the knockout cell line

00:09:27.571 --> 00:09:32.117
and that would be our general
process for all application for

00:09:32.117 --> 00:09:34.390
which we're testing antibodies.

00:09:39.770 --> 00:09:43.935
So this is a great example of
commercial and research groups

00:09:43.935 --> 00:09:46.530
coming together to address a
problem.

00:09:46.770 --> 00:09:49.386
But considering that these

commercial bodies are producing

00:09:49.386 --> 00:09:52.135
these antibodies and potentially
you're saying you're finding

00:09:52.135 --> 00:09:54.574
that they might not be working
in the way that they're

00:09:54.574 --> 00:09:57.101
advertising, I guess the
question is what is the benefit

00:09:57.101 --> 00:09:59.673
here for your commercial
partners that are helping you on

00:09:59.673 --> 00:10:00.250
YCharOS? Right.

00:10:00.450 --> 00:10:01.370
That's a great question.

00:10:01.370 --> 00:10:04.660
So we work in complete open
science setup.

00:10:04.660 --> 00:10:09.017
We're completely transparent in
our antibody characterization

00:10:09.017 --> 00:10:09.580
reports.

00:10:09.660 --> 00:10:13.833
We show both the positive
results, the great antibodies as

00:10:13.833 --> 00:10:16.380
well as the nonspecific
antibodies.

00:10:16.380 --> 00:10:17.900
We do not remove any data.

00:10:19.500 --> 00:10:23.984
Companies do like it and our
partnerships involves companies

00:10:23.984 --> 00:10:27.660
that are really, that really care
about the issue.

00:10:28.540 --> 00:10:32.452
So for example, 20% of all
antibodies that we tested that

00:10:32.452 --> 00:10:35.960
are nonspecific have been
removed from the catalog.

00:10:36.000 --> 00:10:39.040
So no one will ever use these
non selective antibodies.

00:10:45.340 --> 00:10:48.984
And James, we do see for some
diseases and I'll take the

00:10:48.984 --> 00:10:52.948
example of Parkin which is a
protein involved in Parkinson's

00:10:52.948 --> 00:10:53.460
disease.

00:10:54.860 --> 00:10:59.555
Most of the antibodies that were
used previously to our report

00:10:59.555 --> 00:11:04.325
have been used, antibodies that
were specific but not perfectly

00:11:04.325 --> 00:11:05.220
outstanding.

00:11:06.640 --> 00:11:10.687
And one company saw that
opportunity and developed brand

00:11:10.687 --> 00:11:14.735
new recombinant antibodies,
perfectly renewable that are

00:11:14.735 --> 00:11:18.925
performing spectacularly both
for Western Blot and Immuno-

00:11:18.925 --> 00:11:19.919
precipitation.

00:11:20.440 --> 00:11:23.591
And now the field have been
using these two antibodies for,

00:11:23.591 --> 00:11:24.800
for a little while now.

00:11:32.580 --> 00:11:34.020
And so we're publishing these
data notes.

00:11:34.020 --> 00:11:38.600
So data notes are articles which
describe the methodology and how

00:11:38.600 --> 00:11:42.278
you've produced a set of data,
but don't provide any

00:11:42.278 --> 00:11:46.441

interpretation or effectively
any sort of results alongside

00:11:46.441 --> 00:11:46.650
it.

00:11:46.810 --> 00:11:49.575
It's literally the data how you
collected it and how you went

00:11:49.575 --> 00:11:50.690
about doing that process.

00:11:50.930 --> 00:11:53.625
What do you feel are the
advantages to presenting these

00:11:53.625 --> 00:11:56.418
characterization reports in that
format where it is quite

00:11:56.418 --> 00:11:59.114
agnostic without that level of
interpretation about the

00:11:59.114 --> 00:12:01.810
antibodies, just providing the
data about how they work.

00:12:04.610 --> 00:12:09.006
So we presented the YCharOS
initiative many times and the

00:12:09.006 --> 00:12:13.716
feedback we received was that,
oh, this is great work, it's

00:12:13.716 --> 00:12:15.130
easy to interpret.

00:12:18.010 --> 00:12:22.708
What we found is a researcher
that is looking for an antibody

00:12:22.708 --> 00:12:27.028
for Western Blot will be more
than able to interpret our

00:12:27.028 --> 00:12:31.348

characterization data for 10
different antibodies on the

00:12:31.348 --> 00:12:32.410
single figure.

00:12:33.850 --> 00:12:38.649
The problem with scoring an
antibody would be that that

00:12:38.649 --> 00:12:44.134
score would be accurate in the
experimental settings that we've

00:12:44.134 --> 00:12:46.620
been using for these reports.

00:12:47.500 --> 00:12:51.220
Outside these very precise
experimental conditions, the

00:12:51.220 --> 00:12:54.543
antibody might be sub
performing, might recognize

00:12:54.543 --> 00:12:55.539
other proteins.

00:12:55.740 --> 00:12:56.420
Hard to tell.

00:12:57.540 --> 00:13:00.926
So we provide a guide so that
scientists can select the most

00:13:00.926 --> 00:13:02.980
promising antibodies for their
need.

00:13:03.260 --> 00:13:07.241
And it would be important that
scientists be careful and

00:13:07.241 --> 00:13:11.291
acknowledge that the antibody
might behave differently in

00:13:11.291 --> 00:13:12.129
their setup.

00:13:13.890 --> 00:13:14.130
Great.

00:13:14.410 --> 00:13:18.558
And I think as well we were just
discussing earlier the fact that

00:13:18.558 --> 00:13:21.450
these are now being incorporated
into RRID.

00:13:21.450 --> 00:13:24.871
So research resource identifiers
and the fact that these reports

00:13:24.871 --> 00:13:27.872
are now attached to those
identifiers where people might

00:13:27.872 --> 00:13:30.819
then go away and use these
antibodies and and cite that

00:13:30.819 --> 00:13:34.083

identification that we at F1000
encouraged authors to do and

00:13:34.083 --> 00:13:35.610
other journals do it as well.

00:13:36.020 --> 00:13:39.280
The fact that these reports are
now being associated with those

00:13:39.280 --> 00:13:42.083
IDs and providing that
characterization alongside that

00:13:42.083 --> 00:13:45.394
I think is vitally important and
something that really should be

00:13:45.394 --> 00:13:48.451
becoming much more universal
across publications to provide

00:13:48.451 --> 00:13:49.420
that peer reviewed,

00:13:50.020 --> 00:13:52.900
But also that I really do think
that agnostic side of it where

00:13:52.900 --> 00:13:55.734
you were just presenting the
facts without any interpretation

00:13:55.734 --> 00:13:58.340
and just being like this is the
information we provided.

00:13:58.660 --> 00:14:01.611
You can go and interpret it as
you said, not every condition is

00:14:01.611 --> 00:14:04.609
going to be the same and a good
researcher should realize that's

00:14:04.609 --> 00:14:07.653
the case and realize just doing
an experiment following the same

00:14:07.653 --> 00:14:10.559
protocol doesn't mean you'll get

the same outcome every single

00:14:10.559 --> 00:14:10.790
time.

00:14:11.750 --> 00:14:14.545
But providing that report
alongside it is not only great

00:14:14.545 --> 00:14:17.475
for you to get the views on it,
but I think also to provide that

00:14:17.475 --> 00:14:19.909
information where it's not
previously been available.

00:14:19.910 --> 00:14:23.667
I think is is a really good step
towards addressing this

00:14:23.667 --> 00:14:27.820
replication crisis and I think
YCharOS is a great contributor to

00:14:27.820 --> 00:14:28.150
that.

00:14:36.440 --> 00:14:39.120
And the RRID components is
important.

00:14:39.680 --> 00:14:44.880
You know we characterize 100 of
antibodies and what I've noticed

00:14:44.880 --> 00:14:49.600
is most of the antibodies are
called MAB1112 and MAB1112

00:14:49.600 --> 00:14:54.800
could correspond to an antibody
against protein X at company A,

00:14:54.800 --> 00:14:59.680
but could correspond to another
protein to another company.

00:15:00.000 --> 00:15:01.440
There's really a lot of

confusion.

00:15:01.560 --> 00:15:02.160
confusion.

00:15:02.600 --> 00:15:06.018
So I believe yes, it is very
important to use RRIDs in

00:15:06.018 --> 00:15:09.879
published papers and through the
RRID protocol, a scientist can

00:15:09.879 --> 00:15:13.043
identify available
characterization data directly

00:15:13.043 --> 00:15:14.120
through the RRIDs.

00:15:14.120 --> 00:15:17.720
So yes, RRIDs are a key component
in this adventure.

00:15:23.380 --> 00:15:26.862
So it's amazing having these
resources available in this open

00:15:26.862 --> 00:15:28.940
format where anyone can access
them.

00:15:29.640 --> 00:15:33.270
I think, I guess the question is
what do you see these resources

00:15:33.270 --> 00:15:36.621
that you're providing achieving
and what are the next steps

00:15:36.621 --> 00:15:39.917
after that with the
YCharOS program and providing

00:15:39.917 --> 00:15:42.040
these these characterization
reports?

00:15:44.240 --> 00:15:48.775

So what we've noticed in the
past year is that some

00:15:48.775 --> 00:15:54.183
antibodies that we characterized
2 to 3 years ago that we

00:15:54.183 --> 00:15:59.155
showed to be completely
nonspecific are still being used

00:15:59.155 --> 00:16:01.510
in research articles today.

00:16:04.190 --> 00:16:07.350
And this really annoys me.

00:16:10.550 --> 00:16:15.995
We hope that these reports can
really help researchers for

00:16:15.995 --> 00:16:21.717
their selection of antibodies,
and I'm happy to work with you

00:16:21.717 --> 00:16:27.070
with F1000 to have them better
exposed to the community.

00:16:28.630 --> 00:16:33.554
But we need potentially another
mechanism to ensure that only

00:16:33.554 --> 00:16:38.557
good antibodies are being used
right now in the literature, so

00:16:38.557 --> 00:16:43.243
that the ALS Society, the
Parkinson's Society, do generate

00:16:43.243 --> 00:16:45.070
only reproducible data.

00:16:46.310 --> 00:16:51.281
And we're having a collaboration
with Harvinder Virk at the

00:16:51.281 --> 00:16:56.749

University of Leicester who have
used antibodies on human samples

00:16:56.749 --> 00:17:02.052
and figure out a year after that
the antibody he was using were

00:17:02.052 --> 00:17:06.857
non specific and now he's
pushing addressing key antibody

00:17:06.857 --> 00:17:11.662
stakeholders so that we can try
to find the mechanisms to

00:17:11.662 --> 00:17:13.319
really, really help.

00:17:13.320 --> 00:17:16.440
The researchers to
use only good antibodies.

00:17:17.480 --> 00:17:19.845
No, yeah, I think that's it's
it's definitely the aim that we

00:17:19.845 --> 00:17:20.800
need to be going towards.

00:17:20.800 --> 00:17:23.938
And I think also a very
important part of these data

00:17:23.938 --> 00:17:27.787
notes and the way they're being
presented is that open side

00:17:27.787 --> 00:17:30.985
of them and obviously open
science is at the heart of

00:17:30.985 --> 00:17:31.400
YCharOS.

00:17:31.720 --> 00:17:34.440
Also the fact that it's not just
that they are available to

00:17:34.440 --> 00:17:37.160

everyone, it's also that the
data is available to everyone.

00:17:37.160 --> 00:17:40.086
And we mentioned before how
these antibodies can be very

00:17:40.086 --> 00:17:40.600
expensive.

00:17:40.600 --> 00:17:43.635
So in those resource limited
settings where they might be

00:17:43.635 --> 00:17:46.199
less likely to have the
subscriptions to paywall

00:17:46.199 --> 00:17:49.391
journals where that information
might be available by having

00:17:49.391 --> 00:17:52.741
these as an open resource that
anyone can access, it removes that

00:17:52.741 --> 00:17:53.159
barrier.

00:17:53.160 --> 00:17:56.699
So hopefully that research waste
isn't just designated to certain

00:17:56.699 --> 00:17:59.917
regions who can access this
information, it's available for

00:17:59.917 --> 00:18:00.400
everyone.

00:18:06.000 --> 00:18:07.143
I guess what we've been talking
about today is some of the sort

00:18:07.143 --> 00:18:11.260
of fundamental issues that
underlying biomedical research

00:18:11.260 --> 00:18:11.970
right now.

00:18:11.970 --> 00:18:15.462
And we've seen these with other
areas, things like Open Access,

00:18:15.462 --> 00:18:18.410
the sharing of open data,
reproducibility in general.

00:18:18.790 --> 00:18:21.879
And I think one of the issues
that we always see in these with

00:18:21.879 --> 00:18:24.870
these key fundamental problems
is that people sort of go off

00:18:24.870 --> 00:18:26.390
into their own little sections.

00:18:26.630 --> 00:18:28.550
Researchers, they're the ones
doing the work.

00:18:28.550 --> 00:18:30.670

So they're like there's
responsibility of funders or

00:18:30.670 --> 00:18:32.550
responsibility of publishers to
sort this out.

00:18:32.870 --> 00:18:35.279
Publishers will say researchers,
the ones doing the research,

00:18:35.279 --> 00:18:36.990
that's their responsibility to
sort it out.

00:18:36.990 --> 00:18:38.350
We're too late in the process.

00:18:38.670 --> 00:18:41.475
And that creates that stagnation
where nobody wants to take

00:18:41.475 --> 00:18:43.719
accountability, where
realistically everyone is

00:18:43.719 --> 00:18:45.870
accountable for the whole
process throughout.

00:18:45.870 --> 00:18:49.003
It's a symbiotic relationship
where it requires grant funders

00:18:49.003 --> 00:18:51.782
to mandate certain things,
whether that be taking open

00:18:51.782 --> 00:18:54.511
data, for example, a funder
mandates it, a publisher

00:18:54.511 --> 00:18:57.291
provides A venue that supports
that structure and then

00:18:57.291 --> 00:19:00.525
researchers will do it because
they're mandated to do it and it

00:19:00.525 --> 00:19:02.850
creates a nice little cycle
which it changes,

00:19:03.130 --> 00:19:06.961
And then as more people do that,
that changes the the research

00:19:06.961 --> 00:19:07.570
ecosystem.

00:19:07.930 --> 00:19:11.661
And I think that YCharOS provides
a great example of this, but

00:19:11.661 --> 00:19:14.490
with that commercial and
research partnership.

00:19:14.490 --> 00:19:17.882
So maybe you could discuss how
you think that process

00:19:17.882 --> 00:19:21.116
is addressing this fundamental
issue we're seeing with these

00:19:21.116 --> 00:19:21.700
antibodies?

00:19:23.580 --> 00:19:27.570
It's funny cuz when I present
YCharOS, I have this slide, it's a

00:19:27.570 --> 00:19:28.140
triangle.

00:19:28.420 --> 00:19:32.451
And at each side you have
publishers, scientists and

00:19:32.451 --> 00:19:36.634
antibody manufacturers and
everyone saying it's your

00:19:36.634 --> 00:19:38.459
responsibility to do it.

00:19:38.460 --> 00:19:39.060
No, it's you.

00:19:39.260 --> 00:19:41.500

But at the end of the day,
there's a stagnation.

00:19:41.500 --> 00:19:42.900
No one's doing anything.

00:19:43.660 --> 00:19:46.646
So yes, it's been three years
that we're actively

00:19:46.646 --> 00:19:50.229
characterizing antibodies and
what we're seeing is antibody

00:19:50.229 --> 00:19:52.380
manufacturers are really
proactive.

00:19:52.420 --> 00:19:54.940
They are removing antibodies
from their catalog.

00:19:55.020 --> 00:19:58.980
They are changing recommendation
for their different antibodies.

00:20:00.420 --> 00:20:04.242
But what we're seeing is
researchers are still using

00:20:04.242 --> 00:20:08.209
antibodies that are not
specific, even though there are

00:20:08.209 --> 00:20:09.580
great alternatives.

00:20:11.030 --> 00:20:17.174
So antibody stakeholders such as
publishers like F1000

00:20:17.174 --> 00:20:23.977
researchers, funders, needs to
develop a mechanism where they

00:20:23.977 --> 00:20:30.232
could see which antibodies are
available and are of high

00:20:30.232 --> 00:20:31.110

quality.

00:20:31.470 --> 00:20:34.066
And we need a way to make sure
that these nonspecific

00:20:34.066 --> 00:20:36.230
antibodies aren't being used in the
literature.

00:20:37.110 --> 00:20:40.810
I don't have the answer, but
we'll need to sort it out.

00:20:41.010 --> 00:20:44.003
Maybe we need to organize a
major symposium about this

00:20:44.003 --> 00:20:44.330
issue.

00:20:46.370 --> 00:20:49.061
Yeah, but it's really the issue
after the antibody

00:20:49.061 --> 00:20:52.175
characterization data, after
these studies have been done,

00:20:52.175 --> 00:20:55.500
what do we do with this data to
ensure that everyone is taking

00:20:55.500 --> 00:20:56.450
advantage of them.

00:20:57.770 --> 00:21:01.573
Well, I think just to round it
all off, I think this is a

00:21:01.573 --> 00:21:03.410
really important discussion.

00:21:03.490 --> 00:21:06.961
I think as someone who's
worked in the lab and as someone

00:21:06.961 --> 00:21:10.107
who's, you know, studied in
biomedical sciences, everyone

00:21:10.107 --> 00:21:13.253
has almost certainly done a
Western Blot at some point in

00:21:13.253 --> 00:21:13.850
their life.

00:21:13.850 --> 00:21:16.010
And while it's seeing, everyone
has their story, right?

00:21:16.010 --> 00:21:16.770
Yes, exactly.

00:21:16.770 --> 00:21:18.930
Everyone's tried to make a gel
when it's fell out through the

00:21:18.930 --> 00:21:19.170
bottom.

00:21:19.170 --> 00:21:21.861
Everyone's tried to use an
antibody and nothing's turned up

00:21:21.861 --> 00:21:23.970
on the film when they've spent
hours doing it.

00:21:24.170 --> 00:21:27.003
I think it's a point of
frustration when you're in the

00:21:27.003 --> 00:21:27.210
lab.

00:21:27.210 --> 00:21:30.045
But then when you look at it at
this higher level, when you're

00:21:30.045 --> 00:21:32.610
looking at the problem it's
having with the the academic

00:21:32.610 --> 00:21:35.400
record and the public and the
actual published articles, it's

00:21:35.400 --> 00:21:37.920
becomes less of a personal
frustration to a fundamental

00:21:37.920 --> 00:21:39.450
issue that needs to be
addressed.

00:21:39.450 --> 00:21:42.653
And the work that YCharOS is
doing in partnership with these

00:21:42.653 --> 00:21:45.696
commercial partners and then
publishing them through the

00:21:45.696 --> 00:21:48.846
gateway, I think is a great
first step and one of the many

00:21:48.846 --> 00:21:51.782
first steps I hope we'll see
with this to address that

00:21:51.782 --> 00:21:52.689

underlying issue.

00:21:54.090 --> 00:21:58.332
So thank you Carl for joining us
and thank you for providing your

00:21:58.332 --> 00:21:58.730
input.

00:21:59.590 --> 00:22:03.238
All of these reports are
available on the YCharOS Gateway,

00:22:03.238 --> 00:22:07.138
which is now available on the
website F1000Research.com

00:22:07.138 --> 00:22:07.830
/YCharOS.