WEBVTT

NOTE duration:”00:05:26”

NOTE recognizability:0.807

NOTE language:en-us

NOTE Confidence: 0.71142818

00:00:02.320 --> 00:00:03.502 So, hi everyone.

NOTE Confidence: 0.71142818

00:00:03.502 --> 00:00:05.472 Yeah, I'm an associate research

NOTE Confidence: 0.71142818

00:00:05.472 --> 00:00:07.124 scientist in Dan Weinberger's lab,

NOTE Confidence: 0.71142818

00:00:07.124 --> 00:00:09.540 and I'm going to give you a very

NOTE Confidence: 0.71142818

00:00:09.606 --> 00:00:11.580 brief overview on what I do broadly.

NOTE Confidence: 0.71142818

00:00:11.580 --> 00:00:14.830 So I work on a bacteria called

NOTE Confidence: 0.71142818

00:00:14.830 --> 00:00:15.800 Streptococcus pneumoniae.

NOTE Confidence: 0.71142818

00:00:15.800 --> 00:00:17.080 Is that better? Yeah.

NOTE Confidence: 0.8542878

00:00:17.240 --> 00:00:18.040 OK. Sorry.

NOTE Confidence: 0.8542878

00:00:18.040 --> 00:00:20.040 I work on Streptococcus pneumoniae,

NOTE Confidence: 0.8542878

00:00:20.040 --> 00:00:24.684 which is a a bacteria that resides

NOTE Confidence: 0.8542878

00:00:24.684 --> 00:00:26.608 asymptomatically in the nasopharynx

NOTE Confidence: 0.8542878

00:00:26.608 --> 00:00:29.797 of many adults and children worldwide.

NOTE Confidence: 0.8542878

00:00:29.800 --> 00:00:33.045 But it is also a opportunistic

NOTE Confidence: 0.8542878

00:00:33.045 --> 00:00:36.720 pathogen and can cause a range of

NOTE Confidence: 0.8542878

00:00:36.720 --> 00:00:38.840 disease from milder diseases such

NOTE Confidence: 0.8542878

00:00:38.840 --> 00:00:40.960 as sinusitis and otitis media,

NOTE Confidence: 0.8542878

00:00:40.960 --> 00:00:44.180 up to more severe disease known as

NOTE Confidence: 0.8542878

00:00:44.180 --> 00:00:45.920 invasive pneumococcal disease IPD,

NOTE Confidence: 0.8542878

00:00:45.920 --> 00:00:48.416 which includes pneumonia,

NOTE Confidence: 0.8542878

00:00:48.416 --> 00:00:50.680 meningitis, bacteremia, sepsis.

NOTE Confidence: 0.750537871666667

00:00:52.920 --> 00:00:55.326 There are over 100 different stereotypes

NOTE Confidence: 0.750537871666667

00:00:55.326 --> 00:00:57.840 of pneumococcus and a stereotype is

NOTE Confidence: 0.750537871666667

00:00:57.840 --> 00:01:00.472 basically defined by the the capture the

NOTE Confidence: 0.750537871666667

00:01:00.472 --> 00:01:02.678 polysaccharide that is on the outermost,

NOTE Confidence: 0.750537871666667

00:01:02.680 --> 00:01:05.518 the outermost layer of the bacterium.

NOTE Confidence: 0.750537871666667

00:01:05.520 --> 00:01:08.698 And the vaccines that we have currently

NOTE Confidence: 0.750537871666667

00:01:08.698 --> 00:01:11.239 are targeting this sugar coating,

NOTE Confidence: 0.750537871666667

00:01:11.240 --> 00:01:13.600 this capture the polysaccharide

NOTE Confidence: 0.750537871666667

00:01:13.600 --> 00:01:15.400 and the introduction of vaccines.

NOTE Confidence: 0.750537871666667

00:01:15.400 --> 00:01:18.376 We saw a dramatic decrease in

NOTE Confidence: 0.750537871666667

00:01:18.376 --> 00:01:21.360 disease caused by vaccine serotypes.

NOTE Confidence: 0.750537871666667

00:01:21.360 --> 00:01:23.537 So those that were included in the

NOTE Confidence: 0.750537871666667

00:01:23.537 --> 00:01:24.844 vaccine but somewhat unexpectedly

NOTE Confidence: 0.750537871666667

00:01:24.844 --> 00:01:26.896 there was a very rapid emergence

NOTE Confidence: 0.750537871666667

00:01:26.896 --> 00:01:28.760 of non vaccine stereotypes.

NOTE Confidence: 0.750537871666667

00:01:28.760 --> 00:01:30.587 So those that were not included that

NOTE Confidence: 0.750537871666667

00:01:30.587 --> 00:01:32.398 were previously not causing much disease.

NOTE Confidence: 0.750537871666667

00:01:32.400 --> 00:01:34.740 And so now you know you have this problem

NOTE Confidence: 0.750537871666667

00:01:34.740 --> 00:01:36.624 where you're kind of chasing a tail

NOTE Confidence: 0.750537871666667

00:01:36.624 --> 00:01:39.060 trying to adapt a vaccine and building

NOTE Confidence: 0.750537871666667

00:01:39.060 --> 00:01:41.280 this the currently problematic stereotypes.

NOTE Confidence: 0.750537871666667

00:01:41.280 --> 00:01:43.544 But the major limitation is that we have

NOTE Confidence: 0.750537871666667

00:01:43.544 --> 00:01:46.038 a kind of a limitation to the valency,

NOTE Confidence: 0.750537871666667

00:01:46.040 --> 00:01:48.446 so the number of different stereotypes

NOTE Confidence: 0.750537871666667

00:01:48.446 --> 00:01:51.066 that we could include in anyone vaccine.

NOTE Confidence: 0.750537871666667

00:01:51.066 --> 00:01:53.488 So the this kind of reemergence or

NOTE Confidence: 0.750537871666667

00:01:53.488 --> 00:01:55.296 emergence of different serotypes

NOTE Confidence: 0.750537871666667

00:01:55.296 --> 00:01:57.396 is termed serotype replacement.

NOTE Confidence: 0.750537871666667

00:01:57.400 --> 00:01:59.080 And there are kind of two mechanisms

NOTE Confidence: 0.750537871666667

00:01:59.080 --> 00:01:59.800 to this happening.

NOTE Confidence: 0.750537871666667

00:01:59.800 --> 00:02:01.900 One is unmasking which is where the

NOTE Confidence: 0.750537871666667

00:02:01.900 --> 00:02:04.207 niche is just kind of cleared of

NOTE Confidence: 0.750537871666667

00:02:04.207 --> 00:02:06.145 that serotype that was present making

NOTE Confidence: 0.750537871666667

00:02:06.145 --> 00:02:08.265 room for a new serotype there to just

NOTE Confidence: 0.750537871666667

00:02:08.265 --> 00:02:10.315 kind of move in and and do its thing.

NOTE Confidence: 0.750537871666667

00:02:10.320 --> 00:02:12.462 And then the other one is serotype

NOTE Confidence: 0.750537871666667

00:02:12.462 --> 00:02:14.688 switching and this is where a vaccine

NOTE Confidence: 0.750537871666667

00:02:14.688 --> 00:02:16.560 type lineage acquires a non vaccine

NOTE Confidence: 0.750537871666667

00:02:16.618 --> 00:02:18.904 type capsule and kind of is able to hide

NOTE Confidence: 0.750537871666667

00:02:18.904 --> 00:02:21.316 you know and now unaffected from the vaccine.

NOTE Confidence: 0.750537871666667

00:02:21.320 --> 00:02:22.928 And so this is just a

NOTE Confidence: 0.750537871666667

00:02:22.928 --> 00:02:24.000 little image showing you.

NOTE Confidence: 0.750537871666667

00:02:24.000 --> 00:02:26.208 So this serotype 4 for instance

NOTE Confidence: 0.750537871666667

00:02:26.208 --> 00:02:27.680 has its blue backbone,

NOTE Confidence: 0.750537871666667

00:02:27.680 --> 00:02:29.906 the genetic backbone and the 19

NOTE Confidence: 0.750537871666667

00:02:29.906 --> 00:02:31.840 A capsule is switching onto it.

NOTE Confidence: 0.750537871666667

00:02:31.840 --> 00:02:34.054 And so you kind of end up with this

NOTE Confidence: 0.750537871666667

00:02:34.054 --> 00:02:36.440 capsule switch variant on the the end

NOTE Confidence: 0.750537871666667

00:02:36.440 --> 00:02:39.720 where it's now switched to a different thing.

NOTE Confidence: 0.750537871666667

00:02:39.720 --> 00:02:41.520 And if if the 19 A wasn't included in

NOTE Confidence: 0.750537871666667

00:02:41.520 --> 00:02:43.385 the vaccine you would be able to this

NOTE Confidence: 0.750537871666667

00:02:43.385 --> 00:02:45.275 would be able to evade that mechanisms.

NOTE Confidence: 0.750537871666667

00:02:45.275 --> 00:02:48.880 So I'm super interested in capsule switching,

NOTE Confidence: 0.750537871666667

00:02:48.880 --> 00:02:50.212 both intra and interspecies

NOTE Confidence: 0.750537871666667

00:02:50.212 --> 00:02:50.878 capsule switching.

NOTE Confidence: 0.750537871666667

00:02:50.880 --> 00:02:53.100 There are streptococci that also

NOTE Confidence: 0.750537871666667

00:02:53.100 --> 00:02:55.261 reside in the nasopharynx and

NOTE Confidence: 0.750537871666667

00:02:55.261 --> 00:02:57.166 oropharynx that also possess capsules

NOTE Confidence: 0.750537871666667

00:02:57.166 --> 00:02:59.520 somewhat similar to the pneumococcus.

NOTE Confidence: 0.750537871666667

00:02:59.520 --> 00:03:01.440 And so yeah, I'm interested in the switching.

NOTE Confidence: 0.750537871666667

00:03:01.440 --> 00:03:03.400 We do switches in vitro.

NOTE Confidence: 0.750537871666667

00:03:03.400 --> 00:03:05.554 We look at genetic and metabolic

NOTE Confidence: 0.750537871666667

00:03:05.554 --> 00:03:07.446 restrictions on which of these

NOTE Confidence: 0.750537871666667

00:03:07.446 --> 00:03:09.396 stereotype pairs can and can't

NOTE Confidence: 0.750537871666667

00:03:09.396 --> 00:03:11.280 switch and which lineages can,

NOTE Confidence: 0.750537871666667

00:03:11.280 --> 00:03:12.981 and then with the aim of looking

NOTE Confidence: 0.750537871666667

00:03:12.981 --> 00:03:14.383 at the underlying mechanisms to

NOTE Confidence: 0.750537871666667

00:03:14.383 --> 00:03:15.938 this and establishing their fitness

NOTE Confidence: 0.750537871666667

00:03:15.938 --> 00:03:17.360 when they have switched.

NOTE Confidence: 0.750537871666667

00:03:17.360 --> 00:03:19.160 So we look at growth characteristics,

NOTE Confidence: 0.750537871666667

00:03:19.160 --> 00:03:21.200 the expression of the capsule,

NOTE Confidence: 0.750537871666667

00:03:21.200 --> 00:03:24.032 and then in vivo models looking

NOTE Confidence: 0.750537871666667

00:03:24.032 --> 00:03:25.920 at colonization and disease.

NOTE Confidence: 0.750537871666667

00:03:25.920 --> 00:03:28.128 And the idea of understanding this

NOTE Confidence: 0.750537871666667

00:03:28.128 --> 00:03:30.072 and having this detailed information

NOTE Confidence: 0.750537871666667

00:03:30.072 --> 00:03:32.907 would be that we can better predict

NOTE Confidence: 0.750537871666667

00:03:32.907 --> 00:03:34.598 which stereotypes are likely to

NOTE Confidence: 0.750537871666667

00:03:34.600 --> 00:03:37.333 become problems in the future and

NOTE Confidence: 0.750537871666667

00:03:37.333 --> 00:03:39.198 kind of use surveillance data,

NOTE Confidence: 0.750537871666667

00:03:39.200 --> 00:03:41.356 carriage data to kind of establish these,

NOTE Confidence: 0.750537871666667

00:03:41.360 --> 00:03:44.594 a set of rules that we can,

NOTE Confidence: 0.750537871666667

00:03:44.600 --> 00:03:44.998 yeah,

NOTE Confidence: 0.750537871666667

00:03:44.998 --> 00:03:46.988 understand which ones we should

NOTE Confidence: 0.750537871666667

00:03:46.988 --> 00:03:48.580 be focusing on and

NOTE Confidence: 0.918867480909091

00:03:48.659 --> 00:03:50.899 which ones should be considered

NOTE Confidence: 0.918867480909091

00:03:50.899 --> 00:03:52.691 or prioritized for inclusion

NOTE Confidence: 0.918867480909091

00:03:52.691 --> 00:03:54.640 in subsequent vaccines.

NOTE Confidence: 0.918867480909091

00:03:54.640 --> 00:03:57.375 We also do some assay development

NOTE Confidence: 0.918867480909091

00:03:57.375 --> 00:03:59.200 and we developed this assay

NOTE Confidence: 0.918867480909091

00:03:59.200 --> 00:04:01.816 which helps us extract or enrich

NOTE Confidence: 0.918867480909091

00:04:01.816 --> 00:04:04.163 samples of mixed stereotypes for

NOTE Confidence: 0.918867480909091

00:04:04.163 --> 00:04:06.279 a particular stereotype interest.

NOTE Confidence: 0.918867480909091

00:04:06.280 --> 00:04:07.672 And so here you can see the orange

NOTE Confidence: 0.918867480909091

00:04:07.672 --> 00:04:09.039 stereotype is the one that's of interest.

NOTE Confidence: 0.918867480909091

00:04:09.040 --> 00:04:12.389 We use an antibody and a magnetic bead

NOTE Confidence: 0.918867480909091

00:04:12.389 --> 00:04:15.640 to kind of pull out that from a mixture.

NOTE Confidence: 0.918867480909091

00:04:15.640 --> 00:04:17.474 This can help us do our capture

NOTE Confidence: 0.918867480909091

00:04:17.474 --> 00:04:17.998 switching experiments,

NOTE Confidence: 0.918867480909091

00:04:18.000 --> 00:04:20.852 but it can also be used to take

NOTE Confidence: 0.918867480909091

00:04:20.852 --> 00:04:22.476 out stereotypes from complex

NOTE Confidence: 0.918867480909091

00:04:22.476 --> 00:04:24.600 polymicrobial samples such as saliva.

NOTE Confidence: 0.918867480909091

00:04:24.600 --> 00:04:26.021 So if you have a stereotype of

NOTE Confidence: 0.918867480909091

00:04:26.021 --> 00:04:27.357 interest that you want to look at,

NOTE Confidence: 0.918867480909091

00:04:27.360 --> 00:04:29.215 you can basically pull it out using

NOTE Confidence: 0.918867480909091

00:04:29.215 --> 00:04:32.000 this and it can also work on those non

NOTE Confidence: 0.918867480909091

00:04:32.000 --> 00:04:33.071 pneumococcal streptococci species.

NOTE Confidence: 0.918867480909091

00:04:33.071 --> 00:04:35.213 So if we're interested in looking

NOTE Confidence: 0.918867480909091

00:04:35.213 --> 00:04:37.236 at that those we can do it as well.

NOTE Confidence: 0.918867480909091

00:04:37.240 --> 00:04:39.072 So this is just super quick overview of

NOTE Confidence: 0.918867480909091

00:04:39.072 --> 00:04:40.838 the types of techniques that we have.

NOTE Confidence: 0.918867480909091

00:04:40.840 --> 00:04:43.710 We use micro a lot of microbiology

NOTE Confidence: 0.918867480909091

00:04:43.710 --> 00:04:44.120 techniques,

NOTE Confidence: 0.918867480909091

00:04:44.120 --> 00:04:45.725 molecular techniques and the current

NOTE Confidence: 0.918867480909091

00:04:45.725 --> 00:04:47.651 projects that I'm working on as

NOTE Confidence: 0.918867480909091

00:04:47.651 --> 00:04:49.277 I've kind of mentioned and hinted

NOTE Confidence: 0.918867480909091

00:04:49.277 --> 00:04:50.640 towards is capsule switching,

NOTE Confidence: 0.918867480909091

00:04:50.640 --> 00:04:53.298 looking at the genetics of the

NOTE Confidence: 0.918867480909091

00:04:53.298 --> 00:04:55.700 importance of non capsular genes

NOTE Confidence: 0.918867480909091

00:04:55.700 --> 00:04:57.880 in supporting these variants,

NOTE Confidence: 0.918867480909091

00:04:57.880 --> 00:04:59.380 how different adaptations may

NOTE Confidence: 0.918867480909091

00:04:59.380 --> 00:05:00.880 be in metabolic things.

NOTE Confidence: 0.918867480909091

00:05:00.880 --> 00:05:03.544 Certainly sugar metabolism might

NOTE Confidence: 0.918867480909091

00:05:03.544 --> 00:05:07.632 kind of limit or promote certain

NOTE Confidence: 0.918867480909091

00:05:07.632 --> 00:05:10.680 switching and the identification of

NOTE Confidence: 0.918867480909091

00:05:10.680 --> 00:05:13.040 these non pneumococcal stereotypes

NOTE Confidence: 0.918867480909091

00:05:13.040 --> 00:05:15.140 in for instance saliva samples and

NOTE Confidence: 0.918867480909091

00:05:15.140 --> 00:05:17.663 then also the role of unencapsulated

NOTE Confidence: 0.918867480909091

00:05:17.663 --> 00:05:19.520 pneumococci on receiving capsules

NOTE Confidence: 0.918867480909091

00:05:19.520 --> 00:05:21.520 in kind of this emergence.

NOTE Confidence: 0.918867480909091

00:05:21.520 --> 00:05:23.278 So, yeah, thank you very much.