WEBVTT

NOTE duration:”00:05:52”

NOTE recognizability:0.897

NOTE language:en-us

NOTE Confidence: 0.854448368571428

00:00:00.000 --> 00:00:03.800 All right. So thank you seminar committee for

NOTE Confidence: 0.854448368571428

00:00:03.800 --> 00:00:07.355 giving me this opportunity to talk, right.

NOTE Confidence: 0.854448368571428

00:00:07.355 --> 00:00:08.775 I'm a senior research

NOTE Confidence: 0.854448368571428

00:00:08.775 --> 00:00:10.195 scientist in the department.

NOTE Confidence: 0.854448368571428

00:00:10.200 --> 00:00:13.063 I also Co teach the vector biology

NOTE Confidence: 0.854448368571428

00:00:13.063 --> 00:00:14.760 course with Doctor Axoy.

NOTE Confidence: 0.854448368571428

00:00:14.760 --> 00:00:17.115 My interests are arthropod disease

NOTE Confidence: 0.854448368571428

00:00:17.115 --> 00:00:19.470 vectors and they're microorganisms and

NOTE Confidence: 0.854448368571428

00:00:19.539 --> 00:00:21.795 I work specifically with TETSI fly.

NOTE Confidence: 0.854448368571428

00:00:21.800 --> 00:00:25.440 So this is a TETSI fly down here.

NOTE Confidence: 0.854448368571428

00:00:25.440 --> 00:00:27.474 Many of you may not have seen one before.

NOTE Confidence: 0.854448368571428

00:00:27.480 --> 00:00:28.680 From from a size perspective,

NOTE Confidence: 0.854448368571428

00:00:28.680 --> 00:00:31.008 they're about the size of a large house

NOTE Confidence: 0.854448368571428

00:00:31.008 --> 00:00:33.394 fly and they're found exclusively in

NOTE Confidence: 0.854448368571428

00:00:33.394 --> 00:00:35.998 tropical and parts of subtropical Africa.

NOTE Confidence: 0.854448368571428

00:00:36.000 --> 00:00:36.819 In the wild,

NOTE Confidence: 0.854448368571428

00:00:36.819 --> 00:00:39.120 I should point out now we have a

NOTE Confidence: 0.854448368571428

00:00:39.120 --> 00:00:41.388 colony of these flies right in this

NOTE Confidence: 0.854448368571428

00:00:41.388 --> 00:00:43.680 building on the 6th floor here.

NOTE Confidence: 0.854448368571428

00:00:43.680 --> 00:00:46.060 It's the only self-sustaining taxi

NOTE Confidence: 0.854448368571428

00:00:46.060 --> 00:00:48.440 colony in the Western Hemisphere.

NOTE Confidence: 0.854448368571428

00:00:48.440 --> 00:00:50.554 You're a vector biology nerd like myself,

NOTE Confidence: 0.854448368571428

00:00:50.560 --> 00:00:52.678 that's pretty cool.

NOTE Confidence: 0.854448368571428

00:00:52.680 --> 00:00:54.176 So this is what we used to do

NOTE Confidence: 0.854448368571428

00:00:54.176 --> 00:00:55.080 all of our work.

NOTE Confidence: 0.854448368571428

00:00:55.080 --> 00:00:57.321 And then we also go into the field in

NOTE Confidence: 0.854448368571428

00:00:57.321 --> 00:00:59.557 Africa and work with these flies as well.

NOTE Confidence: 0.854448368571428

00:00:59.560 --> 00:01:01.448 All right,

NOTE Confidence: 0.854448368571428

00:01:01.448 --> 00:01:04.400 so Tetsi flies are most well known as the

NOTE Confidence: 0.854448368571428

00:01:04.475 --> 00:01:06.702 vectors of pathogenic African turpanosomes.

NOTE Confidence: 0.854448368571428

00:01:06.702 --> 00:01:09.140 These are some here circulating

NOTE Confidence: 0.854448368571428

00:01:09.140 --> 00:01:11.040 with some red blood cells,

NOTE Confidence: 0.854448368571428

00:01:11.040 --> 00:01:13.345 and these parasites are the

NOTE Confidence: 0.854448368571428

00:01:13.345 --> 00:01:15.650 causative agents of human and

NOTE Confidence: 0.854448368571428

00:01:15.733 --> 00:01:18.160 animal African Turpanosomyces.

NOTE Confidence: 0.854448368571428

00:01:18.160 --> 00:01:21.070 Some of the more epidemiologically

NOTE Confidence: 0.854448368571428

00:01:21.070 --> 00:01:23.398 important species are here.

NOTE Confidence: 0.854448368571428

00:01:23.400 --> 00:01:24.328 They're very interesting creatures.

NOTE Confidence: 0.854448368571428

00:01:24.328 --> 00:01:26.199 I'm not going to talk about them at all,

NOTE Confidence: 0.854448368571428

00:01:26.200 --> 00:01:28.756 but if you're interested in parasites,

NOTE Confidence: 0.854448368571428

00:01:28.760 --> 00:01:29.912 they're they're the most

NOTE Confidence: 0.854448368571428

00:01:29.912 --> 00:01:31.352 interesting ones in my opinion,

NOTE Confidence: 0.899959875

00:01:33.480 --> 00:01:34.677 right? So if you go out into

NOTE Confidence: 0.899959875

00:01:34.677 --> 00:01:35.680 the field and you sample,

NOTE Confidence: 0.899959875

00:01:35.680 --> 00:01:38.560 let's say in Africa, you sample 100 flies,

NOTE Confidence: 0.899959875

00:01:38.560 --> 00:01:41.280 you might find a couple,

NOTE Confidence: 0.899959875

00:01:41.280 --> 00:01:43.835 you know, maybe 20 at the most,

NOTE Confidence: 0.899959875

00:01:43.840 --> 00:01:46.400 that are infected with trepanosomes.

NOTE Confidence: 0.899959875

00:01:46.400 --> 00:01:48.997 But every single Tetsi fly that you

NOTE Confidence: 0.899959875

00:01:48.997 --> 00:01:51.900 collect and that you find houses a

NOTE Confidence: 0.899959875

00:01:51.900 --> 00:01:54.180 consortium of endosymbiotic bacteria

NOTE Confidence: 0.899959875

00:01:54.180 --> 00:01:56.760 that reside exclusively within it.

NOTE Confidence: 0.899959875

00:01:56.760 --> 00:01:57.930 And there's four of them

NOTE Confidence: 0.899959875

00:01:57.930 --> 00:01:59.360 that we know about so far.

NOTE Confidence: 0.899959875

00:01:59.360 --> 00:02:03.160 There could be more, and they're listed here.

NOTE Confidence: 0.899959875

00:02:03.160 --> 00:02:05.400 So every single Tetsi fly has the

NOTE Confidence: 0.899959875

00:02:05.400 --> 00:02:07.720 bacterium from the genus Wigglesworthia,

NOTE Confidence: 0.899959875

00:02:07.720 --> 00:02:09.920 and that's an obligate symbiosis.

NOTE Confidence: 0.899959875

00:02:09.920 --> 00:02:11.390 So neither Organism can live

NOTE Confidence: 0.899959875

00:02:11.390 --> 00:02:13.280 in the absence of the other.

NOTE Confidence: 0.899959875

00:02:13.280 --> 00:02:17.116 And then depending on environmental cues and,

NOTE Confidence: 0.899959875

00:02:17.120 --> 00:02:18.932 you know, temperature, humidity,

NOTE Confidence: 0.899959875

00:02:18.932 --> 00:02:21.980 so on, there might be some combination

NOTE Confidence: 0.899959875

00:02:21.980 --> 00:02:24.120 of the other three endosymbiotes.

NOTE Confidence: 0.899959875

00:02:24.120 --> 00:02:25.365 And these organisms,

NOTE Confidence: 0.899959875

00:02:25.365 --> 00:02:27.855 this fly and these microbes are

NOTE Confidence: 0.899959875

00:02:27.855 --> 00:02:29.913 very intimately associated with

NOTE Confidence: 0.899959875

00:02:29.913 --> 00:02:32.696 one another from a physiological

NOTE Confidence: 0.899959875

00:02:32.696 --> 00:02:34.520 and biological perspective.

NOTE Confidence: 0.899959875

00:02:34.520 --> 00:02:36.752 So touchy flies are also very

NOTE Confidence: 0.899959875

00:02:36.752 --> 00:02:38.240 unique because unlike basically

NOTE Confidence: 0.899959875

00:02:38.308 --> 00:02:40.078 every other insect they give,

NOTE Confidence: 0.899959875

00:02:40.080 --> 00:02:43.228 they give birth to live young and these,

NOTE Confidence: 0.899959875

00:02:43.228 --> 00:02:44.890 these endosymbiotic bacteria

NOTE Confidence: 0.899959875

00:02:44.890 --> 00:02:47.106 are maternally transmitted from

NOTE Confidence: 0.899959875

00:02:47.106 --> 00:02:49.439 the mom to these offspring.

NOTE Confidence: 0.899959875

00:02:49.440 --> 00:02:50.625 That's a larval,

NOTE Confidence: 0.899959875

00:02:50.625 --> 00:02:53.306 A larval tessie fly right there while

NOTE Confidence: 0.899959875

00:02:53.306 --> 00:02:54.836 it's developing within the mom.

NOTE Confidence: 0.899959875

00:02:54.840 --> 00:02:57.653 So that's how they're transmitted and

NOTE Confidence: 0.899959875

00:02:57.653 --> 00:03:00.718 if you interrupt that transmission,

NOTE Confidence: 0.899959875

00:03:00.720 --> 00:03:03.919 this offspring and it develops without them,

NOTE Confidence: 0.899959875

00:03:03.920 --> 00:03:06.866 it's biologically compromised

NOTE Confidence: 0.899959875

00:03:06.866 --> 00:03:09.008 in many ways and that's what we

NOTE Confidence: 0.899959875

00:03:09.008 --> 00:03:10.640 look at in in our group.

NOTE Confidence: 0.899959875

00:03:10.640 --> 00:03:12.509 So the ultimate goal of the research

NOTE Confidence: 0.899959875

00:03:12.509 --> 00:03:14.650 that we do in our in our group is

NOTE Confidence: 0.899959875

00:03:14.650 --> 00:03:17.265 to kind of decipher just the basic

NOTE Confidence: 0.899959875

00:03:17.265 --> 00:03:19.013 molecular mechanisms that underlie

NOTE Confidence: 0.899959875

00:03:19.013 --> 00:03:21.480 Tetsy fly endosymbiont interactions,

NOTE Confidence: 0.899959875

00:03:21.480 --> 00:03:23.320 because it's just very

NOTE Confidence: 0.899959875

00:03:23.320 --> 00:03:24.240 interesting biologically.

NOTE Confidence: 0.899959875

00:03:24.240 --> 00:03:26.584 And then also of course we want to

NOTE Confidence: 0.899959875

00:03:26.584 --> 00:03:29.104 try and use this knowledge that we

NOTE Confidence: 0.899959875

00:03:29.104 --> 00:03:32.342 learn to develop novel ways to control

NOTE Confidence: 0.899959875

00:03:32.342 --> 00:03:35.720 the spread of Tetsy borne diseases.

NOTE Confidence: 0.899959875

00:03:35.720 --> 00:03:36.772 All right.

NOTE Confidence: 0.899959875

00:03:36.772 --> 00:03:40.448 So over the years we have come up

NOTE Confidence: 0.899959875

00:03:40.448 --> 00:03:42.960 with ways to eliminate either all

NOTE Confidence: 0.899959875

00:03:42.960 --> 00:03:45.560 of these symbionts or you know,

NOTE Confidence: 0.899959875

00:03:45.560 --> 00:03:46.976 different ones, different combinations.

NOTE Confidence: 0.899959875

00:03:46.976 --> 00:03:49.440 And then we can by doing that,

NOTE Confidence: 0.899959875

00:03:49.440 --> 00:03:51.512 we can look at the phenotypes of

NOTE Confidence: 0.899959875

00:03:51.512 --> 00:03:54.560 these flies and determine, you know,

NOTE Confidence: 0.899959875

00:03:54.560 --> 00:03:56.716 you know, the nature of these interactions.

NOTE Confidence: 0.899959875

00:03:56.720 --> 00:03:59.600 And to make a very long story very short,

NOTE Confidence: 0.899959875

00:03:59.600 --> 00:04:01.877 these are some of the main things we found.

NOTE Confidence: 0.899959875

00:04:01.880 --> 00:04:04.680 We found that when flies are dysbiotic,

NOTE Confidence: 0.899959875

00:04:04.680 --> 00:04:08.120 so when they're symbiotes are,

NOTE Confidence: 0.899959875

00:04:08.120 --> 00:04:10.196 you know, altered by us experimentally,

NOTE Confidence: 0.899959875

00:04:10.200 --> 00:04:12.874 they can't find hosts and they they,

NOTE Confidence: 0.899959875

00:04:12.880 --> 00:04:14.638 they don't find mates as well.

NOTE Confidence: 0.899959875

00:04:14.640 --> 00:04:16.796 They become reproductively sterile

NOTE Confidence: 0.899959875

00:04:16.796 --> 00:04:18.952 because the symbiotes provide

NOTE Confidence: 0.899959875

00:04:18.952 --> 00:04:20.800 nutrients if they need.

NOTE Confidence: 0.899959875

00:04:20.800 --> 00:04:22.108 They're they're immunocompromised.

NOTE Confidence: 0.899959875

00:04:22.108 --> 00:04:25.160 And also depending on which one's missing,

NOTE Confidence: 0.899959875

00:04:25.160 --> 00:04:27.585 they're either more or less

NOTE Confidence: 0.899959875

00:04:27.585 --> 00:04:29.040 susceptible to trepanosomes.

NOTE Confidence: 0.899959875

00:04:29.040 --> 00:04:31.035 And the more we learn about this,

NOTE Confidence: 0.899959875

00:04:31.040 --> 00:04:31.680 you know, the more we,

NOTE Confidence: 0.899959875

00:04:31.680 --> 00:04:32.021 again,

NOTE Confidence: 0.899959875

00:04:32.021 --> 00:04:34.408 we can apply this information to developing

NOTE Confidence: 0.899959875

00:04:34.408 --> 00:04:36.640 these novel Disease Control strategies.

NOTE Confidence: 0.899959875

00:04:36.640 --> 00:04:38.176 So for example,

NOTE Confidence: 0.899959875

00:04:38.176 --> 00:04:39.200 you could,

NOTE Confidence: 0.899959875

00:04:39.200 --> 00:04:40.080 you know,

NOTE Confidence: 0.899959875

00:04:40.080 --> 00:04:42.740 you could figure out how to inhibit

NOTE Confidence: 0.899959875

00:04:42.740 --> 00:04:44.520 the the symbionts ability to

NOTE Confidence: 0.899959875

00:04:44.593 --> 00:04:46.849 produce vitamins and you would lower

NOTE Confidence: 0.899959875

00:04:46.849 --> 00:04:49.479 fecundity of the fly and fewer flies,

NOTE Confidence: 0.899959875

00:04:49.480 --> 00:04:50.746 less disease transmission.

NOTE Confidence: 0.899959875

00:04:50.746 --> 00:04:52.434 That's just one example.

NOTE Confidence: 0.899959875

00:04:52.440 --> 00:04:55.000 So I like to just conclude with this,

NOTE Confidence: 0.956484825714286

00:04:55.000 --> 00:04:58.012 this is just a really interesting

NOTE Confidence: 0.956484825714286

00:04:58.012 --> 00:05:00.155 diagram of physiological similarities

NOTE Confidence: 0.956484825714286

00:05:00.155 --> 00:05:02.880 between humans and fruit flies.

NOTE Confidence: 0.956484825714286

00:05:02.880 --> 00:05:04.728 And I cheated and added Tetsy

NOTE Confidence: 0.956484825714286

00:05:04.728 --> 00:05:06.640 fly because it's the same also,

NOTE Confidence: 0.956484825714286

00:05:06.640 --> 00:05:08.800 but they're very similar actually,

NOTE Confidence: 0.956484825714286

00:05:08.800 --> 00:05:10.834 you know, they they share similar

NOTE Confidence: 0.956484825714286

00:05:10.834 --> 00:05:12.880 organ systems and similar cell types.

NOTE Confidence: 0.956484825714286

00:05:12.880 --> 00:05:15.489 And what we can learn from these flies,

NOTE Confidence: 0.956484825714286

00:05:15.489 --> 00:05:17.925 you know, it's conspicuously

NOTE Confidence: 0.956484825714286

00:05:17.925 --> 00:05:20.361 applicable to developing hypothesis

NOTE Confidence: 0.956484825714286

00:05:20.361 --> 00:05:22.838 for more advanced systems.

NOTE Confidence: 0.956484825714286

00:05:22.840 --> 00:05:26.184 And case in point is the 2011 Nobel

NOTE Confidence: 0.956484825714286

00:05:26.184 --> 00:05:28.176 Prize in Physiology and Medicine was

NOTE Confidence: 0.956484825714286

00:05:28.176 --> 00:05:30.412 awarded to a group that deciphered the

NOTE Confidence: 0.956484825714286

00:05:30.412 --> 00:05:32.560 innate immune system of a fruit fly.

NOTE Confidence: 0.956484825714286

00:05:32.560 --> 00:05:33.840 And as it turns out,

NOTE Confidence: 0.956484825714286

00:05:33.840 --> 00:05:36.198 it's highly conserved in all animals.

NOTE Confidence: 0.956484825714286

00:05:36.200 --> 00:05:38.314 And what we know about human innate

NOTE Confidence: 0.956484825714286

00:05:38.314 --> 00:05:40.438 immunity kind of came from that work.

NOTE Confidence: 0.956484825714286

00:05:40.440 --> 00:05:42.000 All right. So I thank you for listening.

NOTE Confidence: 0.956484825714286

00:05:42.000 --> 00:05:44.555 This is my wonderful group of colleagues.

NOTE Confidence: 0.956484825714286

00:05:44.560 --> 00:05:46.810 That's how you can reach me if you want

NOTE Confidence: 0.956484825714286

00:05:46.810 --> 00:05:49.706 to talk or see the flies or anything.

NOTE Confidence: 0.956484825714286

00:05:49.706 --> 00:05:51.998 Thank you.