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- S1 00:00 Hi, this is Tim Lightfoot, the director of the Huffines Institute. To start the podcast, I'd like to take the chance to tell you about this year's rendition of the award-winning Huffines discussion. HD6 will take place on Friday, November 11th, from 1:00 to 4:00 PM in the Annenberg Presidential Conference Center here at Texas A&M. We're thrilled to have eight world leaders in sports medicine and human performance give their big ideas all in a language you can understand and use in your daily life. Dr. William Dexter, Dr. Russell Pate, and Texas A&M legend Mr. Dat Nguyen are just three of the eight exciting speakers here to share their thoughts on what's next in the field. We'll see you at Annenberg on November 11th. And if you can't make it here, all of these talks will be up on the podcast starting in January. Now, on to the podcast.
- S2 00:44 [music] Welcome to the sports medicine podcast brought to you by the Sydney and JL Huffines Institute for Sports Medicine & Human Performance, and the Department of Health and Kinesiology at Texas A&M University. At the Huffines Institute, we're always working to facilitate, apply, and bring you the most up-to-date coverage of the wide world that is sports medicine, and human performance all in a language you can understand and share with your friends. And now, here's our host, the director of the Huffines Institute, Dr. Tim Lightfoot.
- S1 01:16 Hello, and welcome to the weekly addition of the podcast from the Huffines Institute for Sports Medicine & Human Performance. I'm your host, Tim Lightfoot, and thank you so much for taking the time to join us today. Every week we strive to bring you an interesting person in the world of sports medicine and human performance. And once again, as I always say, this week is no exception. We have a great guest with us today. From the National Institutes of Health, we have Dr. Amanda Boyce with us on the line. Welcome to the podcast, Amanda.
- S3 01:45 Thank you so much, Tim.
- S1 01:46 Well, we're so glad to have you on the podcast. I'm going to take a minute, and tell the audience a little bit about you, and then we're just going to jump into the conversation. Dr. Boyce has a bachelor's degree in biology from the University of Texas at Austin. She and I have had that conversation many times. She has a PhD in cell biology from the University of Alabama in Birmingham. She did post-doctoral fellowships at University of Alabama in Birmingham and also at NIH, where she decided to stay, and work on the other side of the aisle in the funding aspect. She's currently the program director for the Division of Musculoskeletal Diseases. And again, we're pleased to have her on, because we're going to talk today with Amanda about something that I think a lot of people don't know about in the science world, and that is-- or actually in the general public, and that is funding. How does science get funded here in the United States? So Amanda, if we could just start-- let's just start with a broad overview. What is NIH? Why is it important for people to know what NIH is?
- S3 02:48 The NIH is the National Institutes of Health, and we are 27 institutes, and centers that cover the entire landscape of human health. We fund both science here on campus in Bethesda, Maryland, as well as labs all across the country, and to some extent, across the world. We have about \$30 billion of funding. About 85% of that actually leaves the NIH and goes out into the world to fund that science. That's the general overview.
- S1 03:19 And this is a governmental agency. So when people wonder what their tax dollars are going to, this is one of the things that their tax dollars go to.
- S3 03:27 Correct. We're housed within the Health and Human Services Department.
- S1 03:31 Right, and again, there's so much argument sometimes about how our tax dollars don't do any good. Well, in this case they really do do good.
- S3 03:40 You know we have a lot of bipartisan support which is a really nice thing. I think it's pretty easy to get behind health and disease in this country.
- S1 03:48 Yeah. To give some folks, I guess, a scope of how big NIH is, it's not the only science funding entity within the government in the United States. But I think the stats I've seen that it has more external funding than, I think, the next five entities together?
- S3 04:06 Yeah, it's about compliance. You probably have the same data as I have. As far as the-- when we think about federal R&D, we're talking really about the R side, the research side. The development side, there's a huge amount of money that goes into development through the Department of Defense. But the Department of Defense does have a small research component as well. But yeah, we account for about 50% of the federal research funding.
- S1 04:29 Now, in this case we're talking about federal funding, but in most cases people interact with universities and research scientists at universities, which are state entities. So how do scientists tap into this money?
- S3 04:43 Well, so hopefully, you'll have some state funds that are available to you, especially if you work for one of the state universities. But if you want to have access to federal funding, you apply through grant mechanisms. So for the most part, I

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think you can get it all through one site, which is grants.gov, but if you want to look specifically at the NIH, of course, we have a wonderful website, the nih.gov, as well. Yeah, but we all try to all use the same formats, and we try to all use the same language, and sort of the same concept. So you can generally, if you've got one idea, it may fit within one agency, it may fit with another, even though some of the things are very, very specific to certain agencies.

- S1 05:21 Yeah. And so, if a scientist decides they're going to apply for a grant, it's not that they just send it in, and then y'all automatically send the money, is it?
- S3 05:31 Not quite.
- S1 05:32 Unfortunately [laughter].
- S1 05:34 Yeah. So, I mean, it's a relatively involved process, right? So you want to talk to someone like me, a program officer at the agency, to try to figure out, first of all, which grant is appropriate for you. If you're a graduate student, it's going to be different than if you're a junior investigator, which is going to be different from a senior investigator. So you'll have to talk somebody about which mechanism. And then when you apply - we'll talk specifically about the NIH - you apply to the NIH, and the NIH will assign it to an institute, in which case I work for the National Institute of Arthritis and Musculoskeletal and Skin Diseases, and then it will have to go through peer review. So it's just what it sounds like. It's a committee composed of your scientific peers, and they will look at the whole-- three times a year, they look at a pool of applications, and they score them. They do not make funding recommendations; they score them. And then the programs that-- the institute will look at those reviews and scores, and ultimately, our directors will make the funding decisions about who will get funded. We do have one more step in there. And we have an advisory council too, so it goes through a lot of eyeballs before it gets to the funding stage.
- S1 06:43 Yeah, and this is a lot of effort, just the review process itself, and it's a lot of effort on the part of the investigators to write these grants because they certainly-- it's very clear what NIH wants in the grant proposals. But also, once it gets to the institute, that's not an easy process because of the volume of grants that you have. So can you give the audience, I guess, kind of an estimation of how many grants or funding proposals that y'all see in a year?
- S3 07:12 We are about a \$500 million institute. So we're either the biggest of the smalls, or the smallest of the bigs, so kind of in the center of the sizes of the institutes. So with that \$500 million, we saw about 800-- close to 900 R01s, which is the bread-and-butter award at the NIH. And in total, if you include all of the research grants that we saw, it was closer to 1,600.
- S1 07:42 Oh, wow.
- S3 07:43 If you look at the career development awards - those are people that are basically post-doctorate, but pre-independence - it's about 105. If you go a little bit more junior to that - that's graduate students and junior post-docs - it was 194. So it's quite a few applications.
- S1 07:59 So we're looking at 18 to 19 hundred applications on a yearly basis. They have to go through that process, where if they come in, they are vetted, and they are screened by the peer review process, and then they go through advisory council, and if they make it through all that, they get funded.
- S3 08:15 Yeah, so of that 1,600 of those, our awards, we fund about almost 300. So it's about 17% success rate.
- S1 08:24 Excellent. So that also gives folks an idea about how difficult it is to get funding.
- S3 08:28 It is. It's quite difficult. It's very competitive. And there are some grant mechanisms that are more competitive than others, which is why it's pretty important for you to talk to-- if you are interested in applying for funding, to talk to somebody because we can help guide you through to say how does your research fit in, what we recommend that you apply for, and give you some tips. Nothing too specific. We're not doing any grant mentoring. That's what we hoped your peers are for, but we can certainly help guide you through the systems.
- S1 08:56 Yeah, some people will look at the flip side and go, "While you fund 17%, that means 83% don't get funded. If I don't have that good a chance, they why do I even take the time to do it?"
- S3 09:07 I have to say, and we recognize within that 83% there's some really good science. The good news is, when your grant is reviewed, you get what's called a summary statement, which are the critiques from your reviewers that will give you suggestions about what you should do next. So you are free to reapply with those suggestions in mind, and at this point, you can basically do that as many times as you would like at the NIH.
- S1 09:31 Okay, but realistically, does that work? If just continue to throw something in ten times in a row, does that increase chances for funding?
- S3 09:40 I'm going to say no on that, and your program officer would tell you that too [laughter]. There is a point when you should call it quits, re-circle the wagons, and try to come up with a new idea, and try to figure out what went wrong. You can usually read those critiques, and say, "Something's not hitting here. What do I need to do differently?" And I will say the program staff at the NIH is really good at reading these summary statements. We also sit in and listen to these reviews, so we do have an insider perspective. Now, we're not allowed to say anything in the reviews. We're just there to listen.
- S1 10:10 You're right, and I will vouch for that. I mean, you and I have worked together on some of these grants in the past, and you have always been very helpful with those kinds of things and giving me insight as to how we should move forward and how we should-- I basically say this to encourage people that are listening to do talk to the folks at NIH. They are there to help you

get through the process.

- S3 10:33 If there are people that aren't interested in funding, we also have communications and public liaisons too, because I suspect you might have patients that are listening or just people that are interested in the science. So I'm just talking about the funding aspect, but we have staff that are also in charge of communicating with the public.
- S1 10:51 But you bring up, I think, a very important point - and it's one that I bring up in some of my classes with the doctoral students - is that don't think that you have to be a research scientist to work at NIH. Certainly, there are other avenues within which you can work within the research process of the government and of science in the United States.
- S3 11:11 Sure. Yeah, like I said, we have a large staff that does communications and outreach, and we also-- we're sort of broken up even within our institutes. The review staff, the people who run the review, are doctorates. People who are program officers are doctorates. And that's both MDs and PhDs. And then we have our non-doctoral, non-scientific staff too. So you don't even have to be part of the scientific staff. It takes a lot of people to run a \$30 billion entity [laughter].
- S1 11:40 It does take a lot of people. So that brings up the question. Your title is program director; some people, they'll use the term program officer. What do you do in your job?
- S3 11:53 I would say I am basically your liaison. So if you are a scientist looking to get funding at the NIH, and you're working in muscle, you contact me. I may not even be the right person, but I can certainly tell you that I know pretty much everybody across the NIH that could work with you. So we have friends at the Diabetes Institute, at the Aging Institute, at the Neurology Institute. So we have friends all across the NIH, and one of us is going to be the right person to talk to you. And that's important, because we have 27 institutes and centers, and each one, while we're all under the umbrella of the NIH, we have our own policies; we have our own priorities. And so we want to make sure that you get to the right person. So when you talk to me, you can talk to me before you put in an application. You can talk to me after you put in an application. You can talk to me about your reviews. And I can sort of act as the person that gets you to the right people. And sometimes it's not program staff. Sometimes you need to talk to somebody about some financial aspects of your grant, or the review of your grant, those sorts of things. So I'm the liaison. I'm the person you call.
- S1 12:57 And it's not that you just sit in Bethesda, Maryland, and wait for the phone calls. I think one thing people need to realize is that the NIH staff, like yourself, y'all are out at professional meetings. You're interacting with the scientists out there in the field as well.
- S3 13:10 Yeah, we have to make some scientific decisions, and we can't do that if we don't know the field, right? I go to meetings. Because I'm in muscle biology, there's lots of small meetings as opposed to one major meeting. Except for American College of Sports Medicine, which I try to get to every year. So we're out in the field looking at the exciting new science. We're also reading papers. We write things up for our director. But we do make funding recommendations to our director. So we definitely have to know the science, and we have to know what's going on out there.
- S1 13:40 So one of the reasons that you and I are talking is because one of the things that your institute funds is research in the exercise world, especially when it deals with muscle, development of muscle, etc., and keeping the muscle healthy. And there are some exciting things happening at NIH, one of which you have been very much behind the scenes player in and developer of over the last several years. And it goes by the acronym of MoTrPAC. So let's take a minute, and describe to the audience what MoTrPAC is.
- S3 14:14 MoTrPAC is \$170 initiative by the Common Fund, which is actually Francis Collins's office. He's the director of the NIH.
- S1 14:22 Okay, stop. I'm sorry Amanda. Did you say \$170 or 170 million?
- S3 14:26 \$170 million [laughter]. Good amount of money. Yeah, so it was approved by the Office of the Director here at the NIH. They have a couple of programs that they fund every year, and they're really meant to be resources. In this case, it's the MoTrPAC, which is Molecular Transducers of Physical Activity.
- S1 14:45 Before we go on with that, that's really a big deal that this was selected as one of the two to be funded.
- S3 14:52 No, I agree. It was 10 years of work, so there was a lot of people doing a lot of work to make this happen. And it was 14, I think, of the institutes that the NIH are involved - don't quote me on that - but it's clearly a trans-NIH issue, and it had a lot of support, and has a large base. And what we found when we were looking at the kinds of grants the NIH was funding is that we had a lot of exercise grants, but what they were were health outcomes. But what we didn't know was, why does exercise lead to this health outcome? So the entire point of the MoTrPAC was to do, basically, a large clinical trial covering all ages to be able to pull tissues from those people, specifically in adults anyway - fat, muscle, and blood - run them through the chemical analysis center. So we're going to be looking at genes, proteins, etc., put them in a large database so the people are well-phenotyped. We have this large database of information as well as tissue banks. So now we have this huge exercise resource, and then people can start asking the question, hopefully answering it, what is it about exercise that leads to health outcomes? What is it about exercise that prevents disease, or treats disease [crosstalk]?
- S1 16:03 Right. And so, for the first time, this is going to provide a large database that other scientists can go in, and look at these findings, maybe look at these different molecular transducers, and really work towards understanding this.
- S3 16:15 Right. And so right now, we're about to fund these, the applications for the coordinating center, all the clinical sites. We also have a few animal sites that we're going to be using as well. It's essentially the same concept: you're going to exercise the

animals, pull the tissues, and do some chemical analysis on them. But the great thing about animals is that then you can pull the brain, you can pull the liver, you can pull the lung, and the heart [laughter]. But you're not--

- S1 16:39 We don't have any human volunteers for that, I don't think.
- S3 16:41 No, right. So we're going to use the animals too. So we have clinical with humans. We have animals. We have the chemical analysis sites. Of course, we're going to need a large bioinformatics center, and we have that coming too, and then an overarching coordinating center. So all of those grants will hopefully be out very soon. So while that money is basically tapped, there's hopefully going to be what we're calling opportunity funds, which will come later in the process as we start to unravel some of these signatures. And also, there's probably going to be a second call for animal work. So again, once we start unraveling some of these signatures, then people can do some mechanistic studies in animals. At this point, it's just discovery. There are no hypotheses. We're just saying what happens. Step one.
- S1 17:29 Yeah. We've said this is a very important program already. So give us a little bit of a timeline. You said that the awards are going to be made soon. When does NIH anticipate that the first results will become available?
- S3 17:42 That's a good question [laughter]. So the first year, which hopefully will start very soon, we're expecting to have a meeting in January. So hopefully, the money will be out December 1 for this meeting in January. The first year is going to be entirely planning. We did something really unique. What we did is we asked everybody to propose what they think would be the best design, and then we chose among those people, first of all, who could do the work, and who had the most interesting design. But all those designs are different, so they need to spend an entire year deciding which design is going to be the one that everybody uses. So it's a lot of really important people with their own strong ideas. So, hopefully, we'll get some really great team science going here to try to figure out what those protocols are. So that's the first year. This is unusual, we have six years instead of five. Most NIH grants are five years. This is basically up one planning year plus then five years. So then they'll have to start recruiting the patients. The chemical analysis site will have to figure out how to get their system set up. Hopefully, oh boy, depends on when it starts recruiting, the people, that's going to be a little bit of the lag, but the animals should start pretty quickly. So hopefully, within three, four years we'll start getting some early results, and then we can start thinking about opportunity funds, and the second animal.
- S1 18:58 Yeah, now this type of approach though, this is a big undertaking, because as you mentioned, not only do you have individual labs that are run by individuals that have very strong opinions about things, but now you're bringing 17 of these groups together, and saying, "Okay, y'all have to work together." I know that's something NIH is stressing very clearly on this one, is that everyone has to work together. Has that been an issue in the past with this kind of big grants?
- S3 19:27 It certain can be, and we actually have heard some people that gave us a warning up front that I think you have to set the stage early, set it smartly. And get the right person at the helm because I think it's like all things, if you have a great leader, I think everybody can then follow-- you know, just the spirit of it - trying to get everybody to want to fall in line. Though I will say this. Now, this is completely non-scientific. You'll just have to take me at my word. I feel like most people in exercise physiology come from a team sports background, and they know how to do this. So I have faith.
- S1 20:00 I would agree with you. I've always said that about academia, and how kinesiology departments in particular work well together because most people come from a team sports background. So they understand the team of working together to get stuff done.
- S3 20:12 I think it'll work. We also are hoping that the coordinating center has an innovative way to engage these people.
- S1 20:19 To keep everybody in line.
- S3 20:21 Yeah, that's right [chuckles]. Without being police, right? You don't want to be police. You want to--
- S1 20:25 That's true. That's true.
- S3 20:26 --facilitate, right?
- S1 20:27 Yeah. We're going to stay tuned to keep an eye out on this because I know that once this is funding, they'll start to hear a lot more about the MoTrPAC consortium, especially I know the different professional organizations that are in exercise science are paying attention to this and trying also to help their members figure out how they can fit in.
- S3 20:46 Right. And they can always contact us. We're happy to hear from people, and hopefully, everyone saw the Time magazine article with the exercise on the cover too, so we got a nice shout out there too.
- S1 20:57 Cool. Well, Amanda, thank you so much for your time today. And we're running a little bit short here on time. And as we always do at this point, we'd like for you to give us the big take home message. What take home message would you like people to remember if all they remember is this one thing from this podcast?
- S3 21:12 Oh, it's funny because I think I've already said it several times. I think it's the old joke, "We're here from the government-- I'm from the government and I'm here to help [chuckles]." That's actually true; we are. You can call us. You can email us. I encourage emailing. We're in and out of our offices and buildings in meetings and conferences. But, yeah, get in touch with us. We really are-- we're engaged, we're interested, and this matters to us. People are really here because they are committed to the mission of the health of the American people.
- S1 21:41 Yeah. Great take home message. And so thank you so much for being with us today.

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- S3 21:47 You are so welcome. Thank you for having me.
- S1 21:49 Well, you're more than welcome. Anytime, anytime. And I want to thank all of you for taking the time to download and listen to us. Our regular listeners know that this is the time of the podcast when we have our podcast question of the week. And here with our podcast question of the week is our producer Kenneth McIntyre.
- S4 22:05 About how many RO1 applications did Dr. Boyce's department receive in 2015?
- S1 22:11 Great podcast question, Kenneth. Be the first person to send us an email at huffines@tam.u.edu with the correct answer to that podcast question, and you will win one of our nifty podcast t-shirts. Again, that email has changed recently. So it's huffines@tam.u.edu. Be the first one. Don't think you're too late. Just go ahead and send us an email anyway. And again, Amanda, thank you so much for being with us, and I want to thank everybody for listening to us. We hope that you tune us in next week when we will have another interesting person from the world of sports medicine and human performance. And until then, we hope that you stay active and healthy. [music]
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