Huffines Sports Medicine Podcast

Dr. Molly Bray – 10/3/2014

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S1 00:11 Welcome to the Sports Medicine Podcast, brought to you by the Sydney & J.L. Huffines Institute for Sports Medicine & Human Performance in 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.

S2 00:40 Hello and welcome to the weekly edition of the Huffines Institute's podcast. We're so glad you took the time to download us today. As always, we have another interesting person from the world of sports medicine/human performance with us, and actually a repeat visitor from several years ago. We've done 155 of these podcasts, and I think our guest today was back in the early 20s for us. We're so glad to have Dr. Molly Bray with us back today. Welcome back to the podcast, Molly.

S3 01:09 Thank you. Thanks, Tim.

S2 01:11 Let me tell the audience - refresh their memories a little bit - about why you're here, and then we'll just jump on off in the conversation.

S2 01:19 Dr. Bray has a Bachelor's Degree in Kinesiology and a Master's Degree in Exercise Physiology from the University of Houston. She also has a PhD in Human and Molecular Genetics from the University of Texas. Dr. Bray is a nationally recognized expert on the genetics of obesity, energy balance, and exercise response. She has approximately 165 articles out in the scientific literature. She has been the director of several different large-scale projects, both at Baylor College of Medicine in Houston and at the University of Alabama at Birmingham.

S2 01:50 She's currently the Department Chair of the Department of Nutrition at University of Texas, and she has been leading, for actually the last 11 years, one of the largest genetic studies of exercise adherence, called the Training, Interventions, and Genetics of Exercise Response study, with about 3,500 individuals so far - which is a huge study - which is funded by the federal government. So we're really pleased to have you back, Molly. Welcome back again.

S3 02:13 Thank you so much. It's great to be here.

S2 02:15 It's great to have you. Let's just start off with an easy question. How'd you get interested in all this? This in an amalgamation of genetics, exercise, nutrition, and you successfully brought all this together. Tell the audience a little bit about your background, and why you get up every morning excited about this stuff.

S3 02:33 Do you want me to talk about being an aerobics instructor [laughter]?

S2 02:37 That's completely up to you [chuckles].

S3 02:39 I've had an ongoing interest in exercise pretty much my whole life. I played competitive tennis when I was younger, and when I did my bachelor's and master's degrees, my goal at that time was to work with obese children and to create aerobics

exercise programs for obese children.

S2 03:01 A great Idea.

S3 03:01 It is a great idea, even back then, and even now certainly still very much needed. When I was doing my master's degree, my mentor at the time encouraged me to keep going, and I actually really fell in love with research at that time. So I went to the Texas Medical Center looking for a new mentor and a new place to learn, and fell in love with the genetics, because I had had a really good training in statistical analysis. So, I became a Geneticist but, during the whole time I was in grad school, I kept dreaming about how I could marry the two areas of my experience in exercise and genetics, and that's how our large exercise steady came to fruition.

S2 03:43 Cool. Now, your research falls out in a lot of different categories, and if we were just to talk about that, we'd be here for about a week or so, but I wanted to highlight a couple of different things and one of which you've done-- actually did a presentation here that we have up online. I want to touch on that, and then I'm going to come back to the genetics thing. People listening probably heard me say the G-word, genetics, and they're all freaked out. It's okay, everybody. Everybody can calm down. Genetics is good.

S2 04:11 But I want to first talk about your timing of feeding studies that you were doing, when you were looking at what you eat, and when, and how that effects how much fat you store.

S3 04:23 The general focus of our laboratory is response to obesity treatments, and so we started reading and focusing a lot on the literature that showed that people who had disrupted circadian rhythms - either through shift work, or through sleep deprivation, or other means of altering your rhythms - had increased risk for obesity and all kinds of metabolic disease. So we wanted to understand more clearly why disrupting circadian rhythms could be associated with obesity, and at the time, the researchers working on molecular circadian mechanisms really only focused on the genes and the gene expression, and how they became rhythmic. They weren't very metabolic in their focus.

S3 05:13 We were very metabolic in our focus, but we didn't know a lot about circadian genes at the time. So we started to collaborate with folks who had a really deep understanding of how those circadian clocks in the cells worked, and we combined that with our interest in why would clocks influence whether or not we got fat. That led to a series of experiments in which we manipulated the timing of macronutrient intake - whether animals ate fat early or late in the day - and we did a pretty extensive series of experiments with all kinds of conditions, where animals were given food only in the light food, only in the dark, meal feeding, but what we showed very robustly is that early waking meals that have high fat in them, followed by later-in-the-day meals that are lower in fat, seem to produce much healthier animals than the reverse.

S2 06:14 So if you're going to eat fat, eat it in the morning after you wake up, and eat less of it as you go through the day. I think you used the phrase metabolically plastic in your studies, which means your system is able to handle those different substrates as you go through the day.

S3 06:29 It seems like - at least from our work - that if you begin your day with a high-fat meal and end it with a lower-fat meal, your body is more responsive to appropriately metabolizing what you're eating than if you being the day with a high-carbohydrate meal.

S2 06:45 Which may lead to storing more fats that way.

S3 06:48 At least in animals, it seems to be the case. Those observations haven't been robustly tested in humans, but given the similarity between mouse and human physiology and metabolism, it's likely that the same kinds of observations will be true. The old saying - eat breakfast like a king, lunch like a prince, and dinner like a pauper - is very consistent with that observation in animals.

S2 07:16 This whole concept of circadian rhythms in humans is becoming more and more accepted throughout the body in all different kinds of functions, so this really falls right in line with that whole circadian idea.

S3 07:25 Absolutely, that our rhythms and our synchrony with our natural light/dark rhythms in the natural day seem to be just very, very important for good health.

S2 07:38 How did genetics come into play with this? Again, we're not going to scare anybody off here, but why should we be concerned about genetics with all this?

S3 07:49 With--

S2 07:49 With any of this.

S3 07:50 --with obesity, or exercise?

S2 07:50 Yeah, sure.

S3 07:52 I think, more and more, we've shown that genetics have a strong role in determining both obesity and metabolic outcomes, and that seems kind of a no-brainer, but also in influencing behaviors like physical activity and eating behavior. There's very good evidence to show that gene variation can influence those behaviors, and ultimately, those behaviors then can influence our ability to maintain or lose weight, and that can ultimately affect our metabolism.

S2 08:25 A question you got asked earlier this morning was, "So do we blame it all on our genes?" Is that an excuse? This is a question I get asked often. Is your research giving us an excuse not to be active or not to eat healthy? Well, If I have these set of genes, then I'm just going to get obese anyway.

S3 08:42 Right. I feel like people who say, "Oh, I've just got the fat gene", that's a misnomer actually, because we all have all the same genes. Some of us have different sequences than others, but many times when people say, "Oh, I'm just doomed", or, "It's my genes, and I'm meant to be fat", I think that comes from a lot of frustration with inability to lose weight, or difficulty with maintaining exercise or health programs, and some of that has a biologic basis. I think that when people say, "I've just got the fat gene. I'm never going to be skinny", that's not really an excuse. I think it's really a voicing of genuine frustration with difficulty in responding to things that are supposed to work. My doctor puts me on a diet - I'm supposed to lose weight. Why don't I lose weight? And I think some people have a harder time than others, and as your own work I know is focused, the hope is that we can identify the biologic basis of some of these behaviors and responses, and give better prescriptions for people so that they aren't feeling frustrated. They are getting a more appropriate exercise or diet prescription.

S2 10:07 So it just may be harder for some people, but that doesn't mean that they can't lost weight. They can be active.

S3 10:11 Absolutely. For complex traits, it's very seldom that genes are completely

deterministic. But it's also very seldom that behaviors and environments are completely deterministic, too. So it's the combination of both.

S3 10:25 I think understanding that your genes might make it harder for you to lose weight is not necessarily an excuse, and I actually think knowing that genes might be working against you is a bit empowering. It says, "I'm not just lazy. I actually do have a harder time. I don't respond to exercise the way others do," or, "I don't feel wonderful when I exercise the way some people do, and that may have biology behind it."

S2 10:52 Does that mean that maybe in the near future, as we work with people, whether it be in eating or exercise, that we're going to have to have different programs based on their genetic predispositions?

S3 11:05 I think the hope is that we could use genetic information to better prescribe programs. It's well known the efficacy of some drugs is much greater in people with certain types of genetic sequence than others, so pharmacogenetics is a well-established area of research. Why couldn't other types of treatment that are non-drug treatments be better enhanced by having that genetic knowledge?

S2 11:31 Right.

S3 11:31 I think we both hope that that's the case.

S2 11:34 Yeah. I think everybody thinks that sometimes if you have the genetic knowledge, you're looking to make a pill to make everybody better. And it may be as simple as using it for information to help guide people in the right direction, right?

S3 11:45 Right. To identify early on people at risk for sedentarism, especially children, and certainly, also to identify people who may be super-responsive and just not know it.

S2 11:56 As I mentioned earlier, you were the head of this big study called The TIGER Study. Can you tell people a little bit about the TIGER study and why so many people are excited about it?

S3 12:07 The TIGER study has-about 3,500 people who have gone through the TIGER protocol - and that is a 15-week aerobic exercise intervention where people exercise at a fairly high intensity for 30 minutes a day for 3 days a week - and it's a very well-controlled protocol that actually includes computerized monitoring using heart rate monitors. We've recorded duration, intensity, exercise mode, for more than 100,000 workouts to date.

S3 12:39 I guess the importance of that study is that in order to figure out how genes influence behaviors, you have to have a lot of data, because any single gene is probably not going to be very deterministic of the outcomes. Given that we've measured lots of people in a very controlled setting for how they respond to exercise, and whether they persist or adhere to exercise, we can now look for genes that influence those behaviors and outcomes.

S2 13:04 If any of you are listening going, "Well, that's not a big deal", I would challenge you to exercise/train 3,500 people for 15 weeks in a very repeatable manner. That's an incredibly difficult study, so my congratulations on that.

S3 13:20 Thank you.

S2 13:20 You all have found many interesting results, but in particular, some of your stuff about exercise adherence - why some people adhere to exercise, and some people don't. I think that is intriguing.

S3 13:31 It is intriguing, and I think the importance of that work is that I think we know that exercise and diet can produce weight loss. Obesity is one of the biggest public health problems in our country, and people are frustrated, and worried, and concerned, and working really hard to figure out ways to alleviate that problem. I don't think it's that we don't know that exercise and dietary intake is good for you and affects health, but often the programs that we develop, which are very efficacious, are not efficacious in the long run, because people won't stick to them.

S3 14:08 And I think a big part of what we don't know is why people do or do not persist in health behaviors. Some of that may be that they respond or don't respond. If I don't see my body changing, why should I continue in an exercise program? But some of that is by understanding how genes influence that persistence, we may actually improve the ability for people to stick with programs, if we understand what drives that.

S2 14:35 Any genes in particular that you're interested in?

S3 14:38 Our favorite gene right now is the FTO gene. It stands for fat mass and obesity related transcript, and that particular gene has been really robustly shown to be associated with obesity in large population studies with body mass index. In our study, certain forms of that gene are associated with increased risk for dropping out of exercise. And because that particular gene controls the regulation of other downstream genes, we're very interested in understanding more how the gene works and what the downstream pathways are. So that's our focus right now.

S2 15:16 That's neat. So we're looking at that for the FTO gene?

S3 15:20 Right. Hopefully.

S2 15:21 Hopefully [chuckles]. As we said, running this kind of study is difficult. What are some interesting anecdotes that you've had? What have been the most difficult things about this, maybe what has surprised you the most as you've gone through this?

S3 15:36 Actually, I have to say, it's terrific. When I started the TIGER study, I had been in a lab for - during my PhD work - for five years, and I had missed a lot working with people. So you take 3,500 people through an exercise program, and it's just interesting. People are always super interesting. I've been inspired by how hard people work, how people come into the study and often feel frustrated or lack confidence that they'll be able to do such a hard workout, a workout that they perceive to be hard, and then watching them become fit, and watching them acquire some fitness and respond in various ways, is really exciting.

S3 16:23 The frustrating part has come from those who don't respond. Strongly believing that genes may be driving that, still trying to provide some motivation and some encouragement for those people who don't see their weight dropping or don't see their blood pressure changing. What I try to encourage everybody is I think everybody responds in some way, and those physiologic responses don't always come immediately, but we try to get people to focus on things like do you feel better? Do you wake up more energized?

S3 16:56 There's a strong component now in our research to look at depression, and how the propensity to be depressed and the persistence of depression seems to change with exercise training. And so--

S2 17:09 In a good way, or a bad way?

S3 17:10 In a good way. In a good way, generally. One of the hypotheses about that - that actually one of our collaborators came to us proposing - is that exercise is known to decrease low-level chronic inflammation, and that inflammation is itself associated with depression. And so one of the mechanisms for alleviating depression via exercise may be through the process of decreasing inflammation.

S3 17:38 The most gratifying response if for somebody who's trying to lose weight is weight loss, but they may not notice that, you know what? Every day I feel a little happier or I feel a little more energized, more motivated. And those things are important to pay attention to as well.

S2 17:56 Because you guys are measuring those things.

S3 17:57 We are.

S2 17:58 So exercise helps. Those are indices of quality of life, and so maybe weight loss doesn't happen immediately. We all remind people that you don't put weight on overnight, so why do you expect to drop it overnight? But you have all these other indices of quality of life that really start to increase when you exercise on a regular basis. And we're not talking about Olympic-intensity exercise. We're talking about 65%-85% of their max heart rate reserve.

S3 18:28 No, but I will say, I was at the CDC, and we were arguing about exercise intensity, the current recommendations are to do moderate to vigorous physical activity, and moderate activity is about 40% of your heart rate reserve. So that's exercise that gets you sweaty and makes you breathe a little bit hard. It may be difficult for some to get to that level, but surprisingly, if people are feeling uncomfortable in exercise, it's probably not moderate exercise. It's probably a little bit higher intensity exercise, and what we find for people of all ages-- TIGER focuses on young adults, but we still have people up to age 55 in the study, and what we find for people of all ages is that most people are able to tolerate a higher intensity of exercise than they think they can. And that if you give them a little bit of encouragement through those first few workouts, they acquire enough fitness in three or four workouts and enough confidence in themselves, that they really can maintain higher intensity exercise.

S3 19:31 Right now, the recommendation is moderate intensity exercise most days of the week, yet most people say that the biggest reason why they don't exercise is because they don't have enough time. So the recommendations keep increasing time and lowering intensity when time is the biggest issue. And what we find is high intensity short workouts seem to be associated with the best outcomes - at least, in our study.

S2 19:57 Now when you say short workouts, how long are you--?

S3 19:59 30 minutes.

S2 20:00 30 minutes.

S3 20:00 30 minutes.

S2 20:00 We're not talking about five minutes because I know there are some facilities out there that will advertise ten-minute workouts, and you're good to go, and it's like, "No." A little bit--

S3 20:08 No, I don't think the data are strong for super-short workouts. I think the message that something is better than nothing-- it makes sense, right? People resonate with that. "Well, you know, I put my sneakers on, and I got out and I walked at lunchtime."

And in theory, that's true, except that if you get up, and you put your sneakers on at lunchtime, and you walk around the block or you walk around your place of work, and you feel like you've done something, but you don't respond, then often the conclusion is: exercise doesn't work for me. Yet something wasn't enough, and so I don't know that that message about something's better than nothing is a good message. Something appropriate and sufficient to change your body is better than nothing.

S2 20:58 You need a little something more sometimes, yeah.

S2 21:03 As we start to wrap up here, I like to ask people to reflect on their career. Over your career, what is one thing that has changed from your undergraduate years when you first went to school? Something that's changed that has kind of shocked you, or changed the way you think about things?

S3 21:22 Our whole understanding of the human genome is hugely different, even from the time I was in grad school to now. And when I was in grad school, people assumed that much of the genome - because it was known even then that much of the genome is non-coding - much of the genome doesn't encode proteins or genes, that people called that sequence junk, and that there was just a lot of intervening sequence in between genes that didn't do anything. And now we know that whoever created our physiology certainly was too smart to put a lot of junk in our bodies, right? And so now we know that regulatory elements in intergenic sequence are really important. We know so much more about the genome than we did when I began. I think we're just learning a lot about the genome now, too, which makes this work super exciting.

S2 22:14 It seems to be increasing exponentially, on a daily basis, how much we know.

S3 22:17 That's so true.

S2 22:18 Yeah. So thank you for being with us today. We so appreciate having you here.

S3 22:23 You're so welcome. Thank you.

S2 22:24 We give all of our guests an opportunity at the end to give our audience a take-home message. If there's one thing you want the audience to remember from our conversation today, what would that be?

S3 22:34 I think it's interesting that you said, "Don't worry everybody. We're talking about genes, but it's not so hard." I would say that what we know about genes and complex outcomes like behaviors, and complex diseases like diabetes and obesity, is that it's probably not one single gene that influences those outcomes, that genes work together to influence outcomes, but that much of those outcomes is determined by our own behaviors and choices. Much of the risk associated with gene sequence can be offset by healthy behaviors, like low-fat diets and physical activity, and that is strongly been shown in the research literature. So my take-home message would be that even if you feel that genetic risk is making it harder for you to respond to exercise, or respond to treatments, or harder for you to lose weight, your own efforts have as much to do with those outcomes - in some cases, more - than your genetic risk.

S2 23:38 We do have control.

S3 23:39 We can offset that risk. We are not doomed by genes.

S2 23:44 Great take-home message. Thank you so much again for being here with us.

S3 23:47 You're welcome.

S2 23:48	Thank you all for taking the time to download and listen. As regular listeners know, this is the time of the podcast when we have our podcast question of the week. Here with the podcast question of the week is our producer, Ayland.
S4 24:00	What is the best time of the day to eat fats?
S2 24:03	Good podcast question. So be the first one to send us the correct answer to that via email to huffinespodcast@hlkn.tamu.edu, and you'll win one of those nifty podcast t-shirts. Again, the new third editions are now out, and so until you send us in your answer and until next week when you download another edition of this podcast, and we have another interesting person from the world of sports medicine/human performance, we hope that you will have an active and healthy week.
S1 24:32	The Sports Medicine Podcast is produced by Kelli Selman and Ayland Letsinger, and licensed by the Huffines Institute at Texas A&M under a Creative Commons 3.0 license. You can share it as much as you want, and you can talk or blog about it all you want, just don't change it or charge money for it.
S1 24:49	This podcast is made possible by support from the Omar Smith family, and the Sydney and J.L. Huffines family.
S1 24:55	Our music was composed, performed, and graciously provided by Dave Zeltner Productions, your source for quality music and music production since 1992. Find them at www.davidzeltner.com.
S1 25:09	Our opening and closing credits were provided by johnmilesproductions.com.
S1 25:13	If you have questions or comments, please send them to huffinespodcast@hlkn.tamu.edu.
S1 25:22	From all of us at the Huffines Institute, we hope you have an active and healthy week.