Transcript: Adipose Biology in the Cardiovascular System
September 7, 2022

**Stephanie Watts, PhD, FAHA:** My name is Stephanie Watts. I'm from Michigan State University in the Department of Pharmacology, and I'm joined by Dr. Andres Contreras, who is from the Large Animal Clinical Sciences Department, also of MSU. We just got done doing a session, *Recent Advances on Hypertension*, that was focused around adipose biology. So I was the one to organize the session and as I said in my introduction, I really organized this purposefully and deliberately.

So the group of people at Hypertension know a lot about high blood pressure regulation, and many of them have begun to touch more on how adipose tissue or adiposity changes cardiovascular systems. That said, though, they're not experts, right? They don't know the ways to study adipocytes and that there are different types of adipocytes, or different mouse lines that might be useful, or a big picture of how at adipose biology or adipose tissues might change the cardiovascular system.

 So we had three speakers this morning that epitomize those ideas that I just described. Dr. Christy Gliniak, who is in Philipp Scherer's group, speaking very much about the adipocyte. That there are different types of adipocytes. And how hypertension and obesity might change how those adipocytes work. She described a triad which include inflammation and fibrosis and metabolism as something that means that the quality of the fat you have is more important than quantity. So she educated us in regard to that.

And she was followed by Annabel Wang at the City of Hope, who has some fantastic tools to be able understand where fat cells come from. These things are called adipocyte progenitor cells. And she demonstrated convincingly that there are some cells that we may not have known existed, that as a body ages, they grow, or they expand or they are utilized in a way that makes an older person gain fat at the same time that they're losing muscle mass. So to a group of hypertension neurologists that's important to be able to know right.

The last speaker and I'll let him talk for himself is Dr. Andres Contreras. So Andres, do you want to tell us about what you did and then how that linked with the other two speakers?

**Andres Contreras, DVM, MS, PhD:** Yeah. Thank you. So I summarized the concept of adipose tissue in the context of cardiovascular disease and cardiovascular function. Three key things in my talk, first that adipose tissue is everywhere and that it's anatomical location matters. So there are specific adipose tissue depots that may influence or may increase the risk for cardiovascular disease because just their location. And I gave some examples, the fat in the kidney and the fat around the vasculature.

The second important thing that I show is that not all the parivascular adipose tissue, that's the one that surrounds the vessels and located almost everywhere, where there is a vessel of a large diameter and medium diameter, they are not created equal. They are different phenotypes. The PVAT, the acronym for perivascular adipose tissue, in the thoracic area is usually brown in rodent models of cardiovascular disease and obesity. In humans, there is some brown adipocytes in patches surrounding the thoracic aorta in the perivascular adipose tissue and the majority of abdominal perivascular adipose tissue is white. The second that, the third thing that I mentioned, that the perivascular adipose tissue has the capacity to sense mechanical stimuli. And that may influence the way new adipocytes are developed. When there is a lot of mechanical stimulation, there might be a reduction in the capacity of those preadipocytes, those type of fat progenitors to become adipocytes. That's basically a brief summary, a three-minute summary, of my 15, 17-minute talk.

**Stephanie Watts, PhD, FAHA:** So I thought the session was well attended and my hope is that people really stay, to listen to advances in adipose biology, that they really wouldn't receive everywhere. So I had the privilege of attending this meeting now for 30 years. And this was a different kind of hour intended to be educational. I think the three of you did a beautiful job in connecting with one another from the adipocyte, right? And some of the types of adipocytes, tools you used to study adipocytes, to different fat depots and how they changed with aging and blood pressure to a very special fat, that is the perivascular adipose tissue around the vasculature. So I was hugely encouraged, right, by how this hour went. What did you think, Andreas? And what were some of the thoughts you had?

**Andres Contreras, DVM, MS, PhD:** Oh, that was an excellent experience if you are in the cardiovascular theme or area because you often don't hear of these models to trace the adipocyte fate, in talks in the council of hypertension, for example, because you usually think about adipocyte as a diabetes, obesity type of topic, but these talks demonstrated really, matters and matters for hypertension, the way the adipose tissue develops. And even the localization of the adipose tissue depot. So I think it was excellent.

**Stephanie Watts, PhD, FAHA:** So today we held a Recent Advances in Hypertension session entitled, "Adipose Biology in the Cardiovascular System, Advances, Tools and Context of Hypertension." I was lucky enough to be in the room when this happened and can say that that session delivered on what the title promised and that is understanding adipose biology, understanding tools to be able to understand biology, and then how adipose biology impacts the cardiovascular system. Dr. Contreras, Dr. Gliniak and Dr. Wang were all an important piece of this. Also co-chaired by Dr. Clintoria Williams.