

Innovations Radio Show

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Guests: **Andrew Gardner**, University of Oklahoma Health Sciences Center

[Music]

>> From the OCAST Radio Network, this is Oklahoma Innovations, a weekly science and technology radio magazine brought to you as a service of OCAST, the Oklahoma Center for the Advancement of Science and Technology. OCAST is the state's only agency whose sole focus is technology, its development, transfer, and commercialization. OCAST mission is to identify and fund promising research in technologies that allow Oklahoma to compete in a global market economy from our own backyard. This program features some of the state's most gifted and talented scientists, inventors, entrepreneurs, manufacturers, and business leaders who all have one common goal, developing technology-based economic growth for all Oklahomans. Now here are your hosts, Gary Owen and Steve Paris.

>> **Gary Owen:** Welcome to this week's edition of Oklahoma Innovations, Gary O and...

>> **Steve Paris:** Steve Paris.

>> **Gary Owen:** Yes sir.

>> **Steve Paris:** How are you doing Gary?

>> **Gary Owen:** I'm doing good sir. Did you have a good holiday weekend?

>> **Steve Paris:** Yes, I did.

>> **Gary Owen:** Oh, good.

>> **Steve Paris:** We have rain in places where we needed rain.

>> **Gary Owen:** Yeah.

>> **Steve Paris:** But not every place got rain.

>> **Gary Owen:** Yeah, well I know last weekend Fourth of July, and I hope that everybody had a great time and you got out even, you know in Oklahoma City anyway, I know some people got rained out a little bit.

>> **Steve Paris:** Yes they did. I just found out about that. I was in Eastern Oklahoma and we just had a great time.

>> **Gary Owen:** It was amazing that, which very rare, we get rained out on the Fourth of July.

>> **Steve Paris:** I know.

>> **Gary Owen:** Very unusual, but welcome the rain I'm telling you for sure.

>> **Steve Paris:** You bet.

>> **Gary Owen:** So, what's going on at OCAST?

>> **Steve Paris:** Well, there's a lot going on Gary. You know, we just approved four nanotechnology application award winners -- that's a mouthful in it. But we are really focused on nanotechnology right now in the State of Oklahoma and we have a program where people can

apply for funding to do work in the area of nanotechnology applications and there are four winners. I'm going to give you their names and you are going to have to forgive me because these names are -- some of them are a little....

>> **Gary Owen:** They are going to trip you up, aren't they?

>> **Steve Paris:** They are difficult for me, not for everybody else, okay.

>> **Gary Owen:** He didn't WD-40 his tongue this morning.

>> **Steve Paris:** There we go. We have Professor Jessie Mao from Oklahoma State University who is studying nanocoating surface treatments for the modification of regenerated fabrics and leather. Now, this has a lot of applications in many businesses, but one of those is in the hospital business and so...

>> **Gary Owen:** Hospital?

>> **Steve Paris:** Yeah, and this has a potential of making sure that some of the cloth materials that you see in hospitals may be in the form of chairs or other materials that it gives them a better chance of being germ-free.

>> **Gary Owen:** Wow!

>> **Steve Paris:** In using nanotechnology.

>> **Gary Owen:** That's going to be in that.

>> **Steve Paris:** She is getting \$90,000 for two-year research period. Then there are more. At Amethyst Research Inc., a private sector company. We have Khalid Hossain of Amethyst who is developing a compliant substrates using nanoengineering to improve -- this is a little difficult, lattice mismatch epitaxial thin film growth. Now, hey!

>> **Gary Owen:** Very nice. Good going, dude.

>> **Steve Paris:** I don't know exactly what that means, but it does involve defect-free...

>> **Gary Owen:** How you got through the word dude, that's something.

>> **Steve Paris:** Defect-free films and guess who's interested in that, the Office of Navy Research.

>> **Gary Owen:** Wow!

>> **Steve Paris:** And they are paying -- well, we're paying and they are paying also \$500,000 for a three-year research period. Back to Stillwater, Oklahoma State University, Professor Ranji Vaidyanathan of Oklahoma State will create composite material storage containers that are capable of storing or transporting alternative fuels with pressures up to 3600 -- 3,600 pounds per square inch. And that has a lot of impact on the future of how we move alternative fuels around this country and he received \$499,924 for a three-year research period. And a private sector company Wilco Machine and Fab Inc. are participating in this research project. Let's go to Tulsa for just a minute. Our friends up at the University of Tulsa, Professor Parameswar Hari of TU has discovered that zinc oxide nanorods can be selectively grown to produce open or closed nanostructures and this has an application. A company called Access Optics will work with TU on the project and these detectors will be in the form of sensors and medical monitors for anesthesia applications. And he received \$90,000 for a two-year period.

>> **Gary Owen:** Wow!

>> **Steve Paris:** So, we are kind of excited about what's going on in the area of nanotechnology in Oklahoma.

>> **Gary Owen:** And congratulations for getting through all that.

>> **Steve Paris:** Okay.

>> **Gary Owen:** I'm glad it was you and not me.

>> **Steve Paris:** Well, I had a good night's sleep.

>> **Gary Owen:** Yeah, guess what else is going on.

>> **Steve Paris:** Our friends with you know, with Dan Hoffman, who is a dear friend of ours. He is working with the inventors of the state, The State Inventors Congress.

>> **Gary Owen:** Yeah.

>> **Steve Paris:** The Oklahoma Inventors Congress and they have a meeting scheduled for July 14. The Tulsa Chapter will be meeting at the Golden Corral 71st and Mingo in Tulsa and their guest will be Leo Byford who is the chair of the Tulsa Chapter. They are going to be talking about all things that are involved in the inventing process and how to get through dealing with proprietary information and intellectual property, and dealing with attorneys and all those kinds of issues. So, if you want to go to that, that's on July 14. It will at 7 p.m. at the Golden Corral 71st and Mingo.

>> **Gary Owen:** By the way, their annual meeting will be coming up in August and that will be Saturday, August 8 in Stillwater at the ATRC on the OSU Stillwater campus. And that will be almost a full day. It starts at 8:15 goes to 2:15, so a little extra calendar note there for the Oklahoma Inventors Congress. And if you are an inventor, we encourage you to check that organization.

>> **Steve Paris:** Oh, yes. You would be welcome we promise you.

>> **Gary Owen:** Yes we would. In science and technology news from around the globe this week -- well first of all, scientists are saying that El Nino may have a split personality. Now a few weeks ago I had talked about El Nino and the water is warming up in the tropics of the Pacific Ocean that may affect some hurricane activity on the West Coast. Well now, they are saying that the El Nino may have two personalities. Now, the traditional El Nino tends to reduce the number of Atlantic hurricanes. But a form Georgia Tech scientists call El Nino Modoki can lead to more hurricanes than usual in the Atlantic Ocean. Modoki, comes from Japanese and it refers to something that is "similar but different." The traditional El Nino involves a periodic warming of the water in the eastern part of the tropical Pacific, but they are saying it's not clear why this new form is occurring. A sophisticated new weather satellite rocketed into orbit recently giving forecasters another powerful tool for tracking hurricanes and tornadoes. An unmanned rocket carrying the nation's latest Geostationary Operational Environmental Satellite GOES blasted off heading toward a 22,000 mile high orbit where it will undergo 6 months of testing that will circle the earth as a spare and be called in to service as needed. The GOES for short, G-O-E-S, the GOES satellite network provides continuous weather monitoring for 60% of the planet including the U.S. The newer one also monitors solar flares that can disrupt communications on earth and it also tracks climate change. This is the second of the more

advanced GOES satellites to be launched containing sensors capable of providing better location data and higher resolution pictures of storms. While this may have cropped up in your news this past week, nothing to be alarmed about in Oklahoma, but on the East Coast, not good news. Tomato plants have been removed from stores in half a dozen states as a destructive and infectious plant disease makes it its earliest and most widespread appearance ever in the Eastern U.S., late blight the same disease that caused the Irish potato famine in the 1840's that occurs sporadically in the Northeast, but this year's outbreak is more severe for two reasons. Infected plants have been widely distributed by big box retail stores and rainy weather has hastened the spores' airborne spread. The disease which is not harmful to humans is extremely contagious to plants and experts say it's most likely spread on garden center shelves to plants not involved in the initial infection. Isn't that something?

>> **Steve Paris:** You can run, but you can't hide, I'm telling you.

>> **Gary Owen:** Well, the U.S. government has finally released new rules on governing federally funded research on human embryonic stem cells loosening some ethical requirements that scientists said could have cost them a decade of work. The rules now in effect keep many existing restrictions on the research. These federal funds may still not be used to actually make the cells using human embryos, only to work with the cells after someone else has made them. If you are one of those individuals that you have trouble sleeping at night, you might be one of those who watches television, or more likely you are one of those who gets up, turns on the computer and gets on the Internet just to kind of help you go through the night. Well now a small study shows promise for insomniacs with nine weeks of Internet-based therapy. No human therapist is involved. The Internet software gives advice even specific bedtimes based on users sleep diaries. Patients learn better sleep habits like avoiding daytime naps, through stories, quizzes and games. Sleep Healthy Using the Internet or -- are you ready for this, SHUTi, spelled S-H-U-T-I. The software could one day be a low cost alternative for some patients and it could be the only non-drug option for people who live in areas without trained specialists. Isn't that cool?

>> **Steve Paris:** That's interesting.

>> **Gary Owen:** Steve's got our Innovations in History this week. We got a couple of good ones.

>> **Steve Paris:** We sure do Gary. Thank you. It was July 5, 1954 that the BBC broadcasted its first daily television news program. French scientist Louis Pasteur successfully tested an anti-rabies vaccine on July 6, 1885. It was tested on a young boy who had been bitten by an infected dog. A patent was granted for the traveler's check on July 6, 1891.

>> **Gary Owen:** Eighteen ninety one, wow.

>> **Steve Paris:** Eighteen ninety one, you bet. It was July 6, 1928 when the first all-talking movie premiered in New York. The name of the movie was the "Lights of New York" and it was July 6, 1997 Sojourner, a robot on board the Mars Pathfinder was released from the probe to explore the red planet.

>> **Gary Owen:** Where were you?

>> **Steve Paris:** Oh, yeah. It hadn't been that long ago. July 10, 1962 the launch of Telstar. Remember Telstar?

>> **Gary Owen:** I do.

>> **Steve Paris:** The world's first television communications satellite designed to bring live pictures from America to Europe. After breaking up in the atmosphere the American space station Skylab comes crashing down in Australia and into the Indian Ocean on July 11, 1979, that was five years after its last manned mission ended. No one was injured. There was no one on board. Launched in 1973 Skylab was the world's first successful space station, safely able to house three separate three-man crews for extended periods of time. The crews of Skylab spent more than 700 hours observing the sun and also provided important information about the biological effects of living in space for prolonged periods of time. That Gary is our Innovations in History for this week.

>> **Gary Owen:** That's very interesting. Well, we have a medical show for you this week.

>> **Steve Paris:** We do. I am so excited.

>> **Gary Owen:** And a very interesting guy.

>> **Steve Paris:** You bet. Dr. Andrew Gardner. I'm going to let him tell about himself because he is involved and I'm going to talk a little bit about some of the things he is involved in real quickly. Diabetes, if you're interested in diabetes and metabolic research you need to listen to the show. If you are interested in age related influences on inflammatory markers, he is going to explain what that's all about that. Exercise for elderly who are suffering from peripheral or revascularized patients or rather who have peripheral artery disease he will talk a little bit about that. And diabetes I think is probably the -- we are all interested in a lot of those things, but diabetes is one that just keeps coming.

>> **Gary Owen:** And so, we got about a minute.

>> **Steve Paris:** Well, let's just introduce him.

>> **Gary Owen:** Sure.

>> **Steve Paris:** Dr. Andrew Gardner. Welcome to Oklahoma Innovations.

>> **Dr. Andrew Gardner:** Oh, thank you. It's a pleasure to be here.

>> **Steve Paris:** We are going to let you explain all those things I messed up as I was introducing you.

>> **Dr. Andrew Gardner:** Okay.

>> **Steve Paris:** But before we do, let's talk just about 45 seconds on who you are. You haven't been in Oklahoma of about 7 years, right?

>> **Dr. Andrew Gardner:** That's right. My wife and I moved here in 2002, but I originally born and raised in Southern California.

>> **Steve Paris:** Okay.

>> **Dr. Andrew Gardner:** And ended up getting my Ph.D. in Exercise Physiology from Arizona State in way back in 1990.

>> **Steve Paris:** Wow.

>> **Dr. Andrew Gardner:** And went to Vermont for post doc research fellowship for a few years, then I went to Baltimore and was at the University of Maryland in Baltimore for about 9 years before coming here to Oklahoma.

>> **Gary Owen:** Well, it's probably don't have time to ask this, but I want to ask you the question, I want you to be thinking about it, what prompted you to get in to this area, and here again, not right now.

>> **Steve Paris:** We'll ask him that when we come back on your Science Radio Magazine, Oklahoma Innovations.

[Music]

>> **Male Speaker:** Imagine not being able to see your daughter on her wedding day or experiencing your grandchild's first smile. An estimated one in three quarter million Americans over age 50 have developed a loss of vision or blindness due to age related macular degeneration. And of more than 200,000 Oklahomans living with diabetes, 90% will develop eye disease. With the support of the Oklahoma Center for the Advancement of Science and Technology, an Oklahoma company is developing innovative treatments for blinding eye disease. The research will improve the lives of people across the nation, create new treatments that are more comfortable for patients and prevent vision loss. OCAST is looking for Oklahoma researchers serious about investigating new treatments and products that improve the quality of life and the economy for Oklahomans. For more information, call OCAST toll free at 866-265-2215 or visit their Website at ocast.ok.gov. Investing in science and technology, it's good for your health.

>> **Female Host:** Now in its 14th year, this is Oklahoma Innovations on the OCAST Radio Network.

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>> **Gary Owen:** Thank you for joining us on this week's edition of Oklahoma Innovations. If you are interested and fascinated with research in medicine, this is the program for you this week, right Steve?

>> **Steve Paris:** That's exactly right, Gary. We have with us Dr. Andrew Gardner. He is the Hobbs-Rechnagel professor, the CMRI Metabolic Research Center. He is also Exercise Physiology Lab Director for the General Clinical Research Center and he is at the University of Oklahoma Health Sciences Center, which is a tremendous, tremendous place where good medicine is done for lack of a better term.

>> **Dr. Andrew Gardner:** That's right.

>> **Gary Owen:** I mean, the Oklahoma Health Sciences Center, I've forgotten how many people work there, but I understand it's something like 16,000 or 17,000 at least in the major complex there and that includes, I think that might include students and professors in different fields that are over there and different organizations that are involved and affiliated with the University of Oklahoma Health Sciences Center. But before we went into break, I asked you a question and you kind of touched into it, but you know, you always wonder, why does somebody go into, looking into exercise and the benefits. Of course now, you delve into at a much deeper than most folks do.

>> **Dr. Andrew Gardner:** Yes.

>> **Gary Owen:** And you've got your Ph.D. based on this information.

>> **Dr. Andrew Gardner:** I do.

>> **Gary Owen:** And what prompted you to go into this field.

>> **Dr. Andrew Gardner:** Well, I think when I was an undergraduate student, you know, you are always searching for what interests you and health related issues were always on the top of the list for me. So, then it was really more of an issue, do I go into you know physical education or epidemiology or what have you. I was also very interested in sports, so I chose physical education and with the background you know, you work with athletes, but you also have a chance to work with older adults, cardiac rehabilitation, corporate fitness, that type of thing. And I would say probably you know most of my colleagues were very interested in working with the athletes and so forth and very few really wanted to go more into the middle age, elderly group and that was the area that I liked.

>> **Gary Owen:** Yes.

>> **Dr. Andrew Gardner:** So, I originally kind of got involved with more corporate fitness, and just healthy aging, and it kind of gradually grew into working with patients who had heart disease and cardiovascular disease and so forth. So, that was really kind of my early years of kind of getting interested in it.

>> **Gary Owen:** I see, I am developing an understanding just from the little time we have spent together and I'm sure our listeners are too, you know, you talk about physical fitness, you talk about the things that you just discussed and many of us I think, just like, well okay, physical fitness, the President's Council on physical fitness that we had back under President Kennedy on and on and on, we think of that and don't go any further...

>> **Dr. Andrew Gardner:** Yeah.

>> **Gary Owen:** You've delved into it.

>> **Dr. Andrew Gardner:** Yes.

>> **Gary Owen:** You've gotten into areas where you can actually help people improve their lives or at least understand what's happening to them.

>> **Dr. Andrew Gardner:** That's right.

>> **Gary Owen:** And will you talk about that.

>> **Dr. Andrew Gardner:** I think there's a kind of a misconception out in the general public of fitness and health and you don't necessarily have to be fit to be healthy.

>> **Gary Owen:** Right.

>> **Dr. Andrew Gardner:** And a lot of folks get a little discouraged when they exercise or when they are thinking about exercising because they think that they have to be very fit.

>> **Gary Owen:** Yes.

>> **Dr. Andrew Gardner:** And increase their fitness, but that's not the case.

>> **Gary Owen:** Although, I would like to compliment, a lot of our seniors today getting more active is simple as going to the mall or...

>> **Dr. Andrew Gardner:** Absolutely.

>> **Gary Owen:** This time of the year in the park walking.

>> **Dr. Andrew Gardner:** Absolutely.

>> **Gary Owen:** I mean that's the best exercise they could possibly do for their cardiovascular, for their mobility.

>> **Dr. Andrew Gardner:** Yeah.

>> **Gary Owen:** All of that. I totally admire the generation of seniors today that really gotten more into -- even aerobics. They are getting into some of the aerobic programs.

>> **Dr. Andrew Gardner:** Well, you've just touched on a lot of the issues about improving health and you might improve fitness, but those are very healthy activities.

>> **Gary Owen:** Sure. Let's talk about the physiology lab that you're serving as director of the Exercise Physiology lab and then we will get into some of the other things that we have already touched on, but talk to us about that. What's the purpose of that lab?

>> **Dr. Andrew Gardner:** Yeah, the lab at the General Clinical Research Center is really a service related lab and so what that means is I direct the lab and have personnel in the lab who basically are working with patients or subjects who are participating in research studies. And our contribution might be if there are specific exercise tasks or activity measurements that we need to collect on these patients for other investigators and also for exercise programs. There are some, including my studies, there are some other investigators who are actually looking at the benefits of physical exercise in various populations.

>> **Gary Owen:** Well, and the work that you are doing there will have some impact on vascular and metabolic functions and obese and diabetic children. I mean, what better purpose could we have there than trying to help children out and help them live a long healthy life.

>> **Dr. Andrew Gardner:** That's right. That's exactly right.

>> **Gary Owen:** Notice that you have a \$625,000 grant from the National Institute on Aging. Congratulations.

>> **Dr. Andrew Gardner:** Thank you.

>> **Gary Owen:** And along with that you got a \$134,000 grant from OCAST and we are very proud of that. That's a very good example of what can happen when you take a little bit of state money and you can attract the much bigger awards from like this organization, the National Institute on Aging.

>> **Dr. Andrew Gardner:** That's exactly right.

>> **Gary Owen:** People wonder at OCAST how we get our \$18 to 1 you know return on investment or whatever you want to call that. Well, that's how we do it and we would like our expert researchers like yourself to go after those much bigger dollars and hopefully, those state dollars will help you do that. The CMRI Diabetes and Metabolic Research Center, talk to us a little bit about that facility.

>> **Dr. Andrew Gardner:** That is the CMRI stands for Children's Medical Research Institute and I am a faculty member and pediatric endocrinology. And the institute is set up basically to study the various aspects of health in children, but so far our focus has been primarily I think in the exercise and physical activity in normal way to an overweight children and how activity and exercise interacts with their vascular function and in diabetics and non-diabetics. And so we are

really gearing up in getting a lot of techniques involved where we can assess their physical activity very well, their metabolic function and their vascular function.

>> **Gary Owen:** We're visiting with Dr. Andrew Gardner and we are talking about some health research going on at the University of Oklahoma Health Sciences Center. More to come on Oklahoma Innovations.

[Music]

>> **Female Host:** This is Oklahoma Innovations on the OCAST Radio Network.

>> **Female Announcer:** When people think about science and technology, they imagine the future. Although, researchers are developing the technology and treatments of tomorrow, results can be seen today. An investment in OCAST yields immediate return to our state through increased salaries, higher productivity, and a diversified economy. Oklahoma is an emerging global leader in science, technology, research and development with a workforce that continues to improve within incomes and education levels. Oklahoma can achieve a dynamic economy with a culture of innovation and new opportunities that attract and retain bright creative people. Creating opportunities, improving the economy and investing in our future, that's what OCAST is all about. For more information, call OCAST toll free at 866-265-2215 or visit our Website at OCAST.ok.gov. An investment in OCAST is an investment in Oklahoma for today and tomorrow.

>> **Male Speaker:** As you drive across Oklahoma, you can see thousands of gas wells sprinkled throughout the countryside. Many of these wells don't produce enough natural gas to justify pipelines, but without these access thousands of well sites are abandoned. With the support of the Oklahoma Center for the Advancement of Science and Technology, one company is creating a portable device transported on a flat bed truck to process natural gas at well sites. This technology optimizes the amount of gas that can be captured and releases no byproducts into the atmosphere. This idea provides new opportunities for small oil and gas producers while bringing us one step closer to energy independence. Supporting innovation, that's what OCAST is all about. OCAST is looking for small business owners serious about investigating new products, services, and processes. For more information, call OCAST toll free at 866-265-2215 or visit their Website at OCAST.ok.gov. Investing in research and development, it pumps new life into Oklahoma's economy.

>> **Female Host:** Research and development, technology transfer and commercialization, creating high paying jobs in Oklahoma, it's what OCAST is all about. This is Oklahoma Innovations on the OCAST Radio Network.

[Music]

>> **Gary Owen:** Hope you like medical research, that's what we are talking about on this week's edition of Oklahoma Innovations with Dr. Andrew Gardner. He is with the University of Oklahoma Health Sciences Center and learning quite a bit of interesting stuff here Steve.

>> **Steve Paris:** Oh, it's fascinating. We have got a lot more to talk about Gary, thank you. I want to talk about endowed chairs.

>> **Dr. Andrew Gardner:** Yes.

>> **Steve Paris:** In one that you occupies as a matter of fact the Hobbs-Rechnagel endowed chair, is that what it's called?

>> **Dr. Andrew Gardner:** That is correct.

>> **Steve Paris:** Okay. Just in case who is anybody out there who may not understand what an endowed chair is, give us a little background what that means and what it means for your research.

>> **Dr. Andrew Gardner:** Yeah. An endowed chair is really a very wonderful thing to receive for a faculty member because it essentially is guaranteeing you funding every year for you to pursue your research endeavors.

>> **Steve Paris:** Right.

>> **Dr. Andrew Gardner:** And so, of course even with an endowed chair you try to obtain research funding like through OCAST and National Institute of Health.

>> **Steve Paris:** Among others.

>> **Dr. Andrew Gardner:** Among others.

>> **Steve Paris:** You bet.

>> **Dr. Andrew Gardner:** But, you know it's always a wonderful thing to fall back on that you have guaranteed money coming to you every year.

>> **Steve Paris:** Yes.

>> **Dr. Andrew Gardner:** For helping you research and so it's really an honor you know there's not a lot of people who get offered these positions.

>> **Steve Paris:** Right.

>> **Dr. Andrew Gardner:** So, it's a very honorable thing to accept.

>> **Gary Owen:** Yes.

>> **Steve Paris:** In the state of Oklahoma, understands that we don't have enough endowed chairs and made some efforts to try to get some more funding to endowed chairs in working with in a matching program with private sectors.

>> **Dr. Andrew Gardner:** Yeah.

>> **Steve Paris:** And so, by the way, you mentioned that these are not easy to get.

>> **Dr. Andrew Gardner:** They are not.

>> **Steve Paris:** You have to kind of prove yourself before you get one and it helps you by spending all your time looking for funding, you get to focus on doing the actual research which is where we want you to be, right?

>> **Dr. Andrew Gardner:** Right. In fact, you know going back, it's a very wonderful thing and you know like you said, it takes probably years and years of developing a research track record.

>> **Steve Paris:** Right.

>> **Dr. Andrew Gardner:** For people to have the confidence in you, to offer you an endowed chair. They are not going to do that if you are just fresh out of your Ph.D.

>> **Gary Owen:** Exactly.

>> **Dr. Andrew Gardner:** Yeah.

>> **Gary Owen:** And I've heard a lot, I don't know what the numbers are, but I do know this that the more endowed chair inside of a state or inside of an institution, the better the economy is of that state. We have done some research on that and then...

>> **Dr. Andrew Gardner:** I'll take your word for that. I'll accept it.

>> **Gary Owen:** Well, endowed chairs are a good thing for the people of Oklahoma.

>> **Dr. Andrew Gardner:** I think so.

>> **Gary Owen:** You bet there.

>> **Dr. Andrew Gardner:** Yeah.

>> **Gary Owen:** Let's talk about some more of your research. The diabetes aspect of it, you know, we hear so much about the diabetes in any more the various kinds, the type I and the type II's and the things that we need to do to try to stay this off it seems to me a little bit of an epidemic in this country. Probably having to do with the way we eat and the way we don't exercise and things. Talk about this and where your research has taken you.

>> **Dr. Andrew Gardner:** Yeah. I think you're right. I think you know diabetes is becoming an epidemic. Oklahoma tends to be ranking poorly...

>> **Gary Owen:** Yes.

>> **Dr. Andrew Gardner:** Among states in terms of obesity rates and diabetes and like the other day I read we were dead last in fruits and vegetable consumption.

>> **Gary Owen:** Really?

>> **Dr. Andrew Gardner:** For all the states.

>> **Steve Paris:** Shame on us.

>> **Gary Owen:** And we grow it here.

>> **Dr. Andrew Gardner:** Yeah.

>> **Steve Paris:** Yeah, we do, we do.

>> **Gary Owen:** At times you know, we do.

>> **Steve Paris:** Sure.

>> **Gary Owen:** Yeah.

>> **Dr. Andrew Gardner:** Diabetes is definitely a type II diabetes obviously is adult onset diabetes and it develops many times from just excess body weight. So, the reason for that is unhealthy diets and lack of exercise over years and years and years.

>> **Gary Owen:** Yeah.

>> **Dr. Andrew Gardner:** Unfortunately, the complications of diabetes is great.

>> **Gary Owen:** Yeah.

>> **Dr. Andrew Gardner:** And from a vascular standpoint all sorts of negative health events.

>> **Steve Paris:** Pre-stages of heart failure.

>> **Dr. Andrew Gardner:** Occur. Yes.

>> **Steve Paris:** Blindness.

>> **Dr. Andrew Gardner:** You're absolutely right.

>> **Steve Paris:** On and on and on.

>> **Dr. Andrew Gardner:** Heart disease, peripheral heart disease, strokes, heart attacks.

>> **Gary Owen:** Yeah.

>> **Dr. Andrew Gardner:** All these things, hypertension. All these things start to develop when people get type II diabetes. So, managing type II diabetes is not only important for just the sake of better management of your blood glucose or blood sugar, but it's really altering your risk favorably for all these other potential hazards.

>> **Gary Owen:** I'll tell you what's alarming is the youth today.

>> **Dr. Andrew Gardner:** Yes.

>> **Gary Owen:** The alarming rate upon which our kids are becoming obese.

>> **Dr. Andrew Gardner:** Yes.

>> **Gary Owen:** What do you contribute that to, is that technology, where the kids aren't going out and playing these things. Sitting home watching the televisions sets. They're on the computers or their diet and all of that, is it all these occurs.

>> **Dr. Andrew Gardner:** I think you're on to that.

>> **Steve Paris:** All of the above.

>> **Dr. Andrew Gardner:** I think you're on to that.

>> **Steve Paris:** Yeah.

>> **Dr. Andrew Gardner:** My boss Dr. Ken Copeland, who is the chair of Pediatric Endocrinology, has told me that you know the whole phenomenon of type II diabetes in kids is sort of new.

>> **Gary Owen:** Yes.

>> **Steve Paris:** Yeah.

>> **Dr. Andrew Gardner:** I mean, I guess 10, 20 years ago here in Oklahoma and probably all over the country type II diabetes in kids was pretty rare.

>> **Gary Owen:** Yeah.

>> **Dr. Andrew Gardner:** And now, it's becoming more prevalent and even if they don't have full blown type II diabetes, you know, there are certainly a lot of obesity in our children and they are just waiting to develop type II diabetes.

>> **Gary Owen:** Right,

>> **Dr. Andrew Gardner:** When they are early adults.

>> **Gary Owen:** Plus, we also have a large population of American Indians in the State of Oklahoma and that there seems to be a connection between in this case ethnicity, and the

likelihood of developing diabetes. I know it really has a very heavy impact on the Native American population.

>> **Dr. Andrew Gardner:** I think you're exactly right on that. In fact, I have a little pilot study research program that is focusing on comparing Native American individuals with Caucasians on their vascular function and this is in children from about 8 to 18 years of age looking at their physical activity, looking at their body composition, looking at their vascular function and seeing the differences.

>> **Gary Owen:** This isn't a fair question, because it just pop in my brain, but I have wondered many times in the past, back in the old days before any of us were around, back in the 1800's and 1700's I wonder if diabetes because we didn't have it diagnosed then, but I wonder if it existed back then. Back before fast food, back before television, back before we had cars when we, you know people had to...

>> **Dr. Andrew Gardner:** Yeah.

>> **Gary Owen:** Live different lifestyle.

>> **Dr. Andrew Gardner:** Yeah, that's an interesting question kind of you know, and lifestyle was much more physically active and fast food was not around.

>> **Gary Owen:** Yeah.

>> **Dr. Andrew Gardner:** My guess is it probably did occur, but much later.

>> **Steve Paris:** I think so.

>> **Gary Owen:** Yeah.

>> **Dr. Andrew Gardner:** And maybe it didn't occur because maybe folks won't live long enough to actually have it developed.

>> **Gary Owen:** That's a good point, people in different times in our history life expectancy maybe was 45 years.

>> **Dr. Andrew Gardner:** That's right.

>> **Gary Owen:** That's all changed and so now we get older and have diseases that we didn't hear back then.

>> **Dr. Andrew Gardner:** That's right.

>> **Gary Owen:** Let's get back to some of your research, the diabetes part, I want to totally exhaust that because it is such an important part and so many people in Oklahoma who want to know about it. Is there anything we've missed about that? I mean, you've touched on it. I know there's a lot to it. Talk about exercise.

>> **Dr. Andrew Gardner:** Yeah.

>> **Gary Owen:** What do you recommend?

>> **Dr. Andrew Gardner:** Well, certainly, you know diabetes specially if we are looking on type II, but even on type I, you know the major, I guess the major message for patients with type II diabetes is to obviously be medically managed. So, you see your physician, be on appropriate medications to control your glucose and throughout the day and then to exercise and be as physically active as you can. That's important and a lot of the issues as I was mentioning earlier,

with exercise, you don't really have to exercise super strenuously so that you're really increasing your fitness and so forth, but...

>> **Gary Owen:** Yeah.

>> **Dr. Andrew Gardner:** Exercising enough such as walking in the mall or wherever, maybe going to the health club and you're just bicycling or swimming. Something that just gets you moving, increases the activity, you are burning calories, which is decreasing the excess calories that you normally store and preventing weight gain. That's the big component.

>> **Steve Paris:** You bet. You don't have to be built like a Dallas cowboy receiver.

>> **Dr. Andrew Gardner:** That's right.

>> **Steve Paris:** Those slender guys who have a lot of muscles and go after that ball. You don't have to be built like that to be healthy, right.

>> **Gary Owen:** You know, I think the biggest contributing factor in motivating people to exercise. You have two of which we've talked about the elderly and we've talked about those who have weight problems and the problem with both of those is that people have difficulty finding the energy...

>> **Dr. Andrew Gardner:** Yeah.

>> **Gary Owen:** To find the motivation, but once you get started -- just like anything else, once you get into the routine.

>> **Dr. Andrew Gardner:** Yeah.

>> **Gary Owen:** Two things happen. One is you enjoy it. Two, you feel better and then it becomes automatic. And the more you do something like that it's just amazing how much better you feel just taking a walk somewhere.

>> **Steve Paris:** Oh, yeah.

>> **Gary Owen:** Just going around the block. I mean, it's just amazing --

>> **Steve Paris:** Get your blood pumping.

>> **Gary Owen:** Yeah. It's amazing what it does for your psyche, for your body. I mean, you find energy you didn't know you had.

>> **Dr. Andrew Gardner:** Absolutely. In fact I think you had a key. It's kind of a routine. If you can just make a simple little routine of walking or some kind of physical activity that you enjoy for everyday that is a very important aspect of becoming healthier.

>> **Steve Paris:** Is it a mile a day or three miles a day, or does it matter.

>> **Dr. Andrew Gardner:** You know, I don't really think it matters.

>> **Gary Owen:** Baby step yourself.

>> **Dr. Andrew Gardner:** Yeah.

>> **Steve Paris:** Start out a mile and then work your way...

>> **Gary Owen:** Yeah, baby step yourself.

>> **Dr. Andrew Gardner:** Yeah, absolutely. It's all relative to what your ability is.

>> **Gary Owen:** You bet and even something simple as having an aerobics machine at home or a treadmill or something like that you can't get out. Any of those things that you can do to make your body more mobile and active will help your whole body feel better.

>> **Dr. Andrew Gardner:** Absolutely.

>> **Gary Owen:** We are getting low on time here Steve. So, I want to tease that coming up, we've got a lot more to talk about. We just barely scratched the surface. We got one more segment, so we're going to come back. We'll talk once again with Dr. Andrew Gardner from the University of Oklahoma Health Sciences Center at Oklahoma Innovations.

[Music]

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>> **Gary Owen:** He is from the University of Oklahoma Health Sciences Center, Dr. Andrew Gardner and we have been talking a lot about exercise on this program because it is a key issue. It s a good way to keep our health going and now we are going to talk about PAD, Peripheral Arterial Disease.

>> **Steve Paris:** Peripheral arterially -- I can't even say that.

>> **Gary Owen:** Some people say peripheral artery disease, but I am sure that Dr. Gardner will set us straight on that.

>> **Steve Paris:** Peripheral arter -- no, I can't even say it.

>> Garry Owen: Let's have him say it.

>> **Steve Paris:** Forget it.

>> **Gary Owen:** Dr. Gardner has chosen this as one of his key areas of research and you probably know more about it. I don't expect you to respond to this. You probably know more about it than anybody else in Oklahoma. So, tell us about PAD and what it means to Oklahoma citizens or anybody and kind of what your approach is on how to deal with it.

>> **Dr. Andrew Gardner:** Well, yeah. PAD is much easier to say that peripheral arterial disease.

>> **Gary Owen:** Well, that's a comfort I'm telling you.

>> **Dr. Andrew Gardner:** PAD is basically a form of cardiovascular disease and so probably if you went up and interview a hundred people on the street and you ask them what is coronary or

cardiac disease or coronary heart disease, they probably would tell you, they probably know that that means. If you went up and said what is peripheral arterial disease, they probably would not know, but the two are very much interrelated. It's just basically developing atherosclerosis or arterial sclerosis or plaque in the arteries.

>> **Gary Owen:** These are called hardening of the arteries.

>> **Dr. Andrew Gardner:** Yeah, hardening of the arteries because of plaque build up and in some patients it builds up in the legs, The arteries in the legs more or faster than the arteries in the heart. There's also another form of vascular disease which is cerebral vascular disease, which is the arteries that feed the brain, so the carotid arteries in the neck that go up to the brain. All of these arteries are very much interrelated with each other, so if you are developing plaque in one area of your arterial tree, chances are you are developing plaque in other areas. So, one reason why peripheral arterial disease is important is because if we identify patients with PAD, there is a high likelihood that they may be developing risk for coronary artery disease and cerebral vascular disease.

>> **Steve Paris:** Yeah. When you take your annual physical and your physician puts the stethoscope up to your neck.

>> **Dr. Andrew Gardner:** Yes.

>> **Steve Paris:** He is checking to see if your coronary arteries...

>> **Dr. Andrew Gardner:** That's your cerebral.

>> **Steve Paris:** Cerebral.

>> **Dr. Andrew Gardner:** Yeah.

>> **Steve Paris:** Arteries are working properly and listening to see if the blood is flowing properly.

>> **Dr. Andrew Gardner:** That's right.

>> **Steve Paris:** And that's very important.

>> **Dr. Andrew Gardner:** Yes.

>> **Steve Paris:** People can die from that if it's a severe case.

>> **Dr. Andrew Gardner:** That's right and in fact, patients with carotid disease or cerebral vascular just like what you were saying here with checking on the stethoscope, obviously, the big risk factor there is stroke.

>> **Steve Paris:** Right.

>> **Dr. Andrew Gardner:** And so if patients have stroke that's either fatal or it's very...

>> **Steve Paris:** Debilitating.

>> **Dr. Andrew Gardner:** Debilitating.

>> **Steve Paris:** You bet.

>> **Dr. Andrew Gardner:** Arteries in your heart you develop, you may have a heart attack. Peripheral arterial disease you know and probably nothing fatal with it except potentially losing your limb, your leg.

>> **Steve Paris:** Yes.

>> **Dr. Andrew Gardner:** But also, you know those patients are very much limited in how much walking they can do, so this impacts their lifestyle. They are much more prone to becoming obese and diabetic because they can't move around.

>> **Gary Owen:** Yeah.

>> **Steve Paris:** Yeah, yeah

>> **Dr. Andrew Gardner:** And they carry the risk of potentially having a higher risk of heart attack and stroke.

>> **Gary Owen:** There's really a lot of bad things that come from peripheral arterial disease and from diabetes in those things.

>> **Dr. Andrew Gardner:** That's right.

>> **Gary Owen:** That's why it is so important to stay on top of it. One of those things to do is to make sure you exercise enough. That's one of several things. Make sure you see your physician.

>> **Dr. Andrew Gardner:** That's right.

>> **Gary Owen:** And give us some a nugget of some of the things you discovered. You talked about in general sense, but what kind of specific findings have you uncovered as you've done your research in area of working with different groups and exercise.

>> **Dr. Andrew Gardner:** Yes. Well, as I was mentioning patients with PAD have very limited in their walking ability and what they can do. It may sound odd that exercise brings on their symptoms, their leg pain, so they can't walk and they sound odd that one of the best treatments for that is to walk.

>> **Gary Owen:** Right.

>> **Dr. Andrew Gardner:** Simply to improve or promote the circulation of the legs and so they are experiencing some leg pain when they walk. But if they do that everyday over time, over a month or two or three it's amazing how much circulation has improved and how much they can walk. And so we are really breaking the downward spiral of these patients before they come to us, you know, they may have had these leg pains for a month or years. They're like I said, they are very inactive, developing lots of problems because of their inactivity and now we are making them more active, they can walk better and we hope that we are kind of ratcheting up their fitness or health level so that now they can experience a better healthy life.

>> **Gary Owen:** You know, one of the issues with patients in this regard too particularly dealing with elderly patients is the arthritis...

>> **Dr. Andrew Gardner:** Yes.

>> **Gary Owen:** Problems because that causes some lack of motivation to be mobile, but in the exercise program, that too helps the arthritis, right?

>> **Dr. Andrew Gardner:** It does. In fact, if they have very severe arthritis certainly they might be good candidates for more like water aerobic-type programs.

>> **Steve Paris:** Excellent.

>> **Gary Owen:** Yeah.

>> **Dr. Andrew Gardner:** Where they can still be active and not have quite so much stress...

>> **Gary Owen:** Impact.

>> **Dr. Andrew Gardner:** Impact placed on their legs. Without water, you know certainly there's more like non-weight bearing exercise like cycle ergometry and that type of thing, but even those patients with arthritis, you know easy walk on a treadmill or easy walking certainly is not something that is really injuring their joints.

>> **Gary Owen:** Right.

>> **Dr. Andrew Gardner:** But they are getting more benefits. It's kind of breakdown to the benefits risk ratio, you know what are you willing to do to get the benefits.

>> **Gary Owen:** Sure. Let me ask the question based on something you said just a short while ago. I was going to ask you these PAD, all these different things that have to do with poor circulation, that have to do with diabetes and have to do with some of these other diseases that we are talking about, is it reversible? You kind of indicated that there you can achieve some of that, but maybe...

>> **Dr. Andrew Gardner:** Yeah.

>> **Gary Owen:** Is it really truly reversal or we just or does our body just deal with it better with exercise.

>> **Dr. Andrew Gardner:** I think the body deals with it better with exercise. Reversibility essentially what has happened when patients develop peripheral arterial disease or any kind of arterial disease is that years and years and years...

>> **Gary Owen:** Trying to reverse that.

>> **Dr. Andrew Gardner:** Of poor healthy living choices, I guess have gone into developing this problem, maybe 50 years of smoking, you know, 50 years of bad eating, 50 years of inactivity, so you're not going to reverse that.

>> **Gary Owen:** Right

>> **Dr. Andrew Gardner:** With you know a three months of exercise. In fact, probably the only way that artery actually gets unclogged is actually to have some type of surgery.

>> **Gary Owen:** Right.

>> **Dr. Andrew Gardner:** Or stent or you know that type of thing put in. But what we are doing is we're developing, we may not be really changing the artery too much, but we are changing all the little collateral arteries around the main artery. So, patients, they get better circulation in their muscle maybe their leg muscles because all the little capillaries...

>> **Gary Owen:** Yeah.

>> **Dr. Andrew Gardner:** And all the little arteries are now starting to develop and so the blood kind of it's kind of like the freeway system you know in Los Angeles when everything is clogged up, you know you go on a different little route and that is what the blood is doing.

>> **Gary Owen:** Yeah. So, to reverse it, probably we have to find a way to get younger.

>> **Dr. Andrew Gardner:** Yeah.

>> **Gary Owen:** And nobody has ever been able to do that.

>> **Dr. Andrew Gardner:** Yeah, that's probably so.

>> **Gary Owen:** But you do get some benefit from it.

>> **Dr. Andrew Gardner:** Absolutely.

>> **Gary Owen:** By getting some of those capillaries to working that maybe were not there before and developed.

>> **Dr. Andrew Gardner:** That's right, actually.

>> **Gary Owen:** And so there's hope out there for people who suffer from these diseases.

>> **Dr. Andrew Gardner:** Absolutely.

>> **Gary Owen:** Some of your researches work about controlled home exercise and you talk about that real quick.

>> **Dr. Andrew Gardner:** Yes, you know, one of my current grants is focusing on whether home based exercise is beneficial for patients. We all know that if you are really motivated and dedicated and come up, come to our lab, work on the treadmill for three months and you know where we are monitoring you and we know that is effective. Patients really benefit from that.

>> **Gary Owen:** Yeah.

>> **Dr. Andrew Gardner:** The downside is not very many people can do that or want to do that. And so what we are trying to see is whether we can establish home based programs and we really monitor them well with little activity monitors so we can really see if they are walking and so forth.

>> **Gary Owen:** Yeah. That's right.

>> **Dr. Andrew Gardner:** But we are trying to see whether you know home based walking can be almost as good or as good as actually coming to the center. The implication for that is huge because you know 90% of the patients, this would be kind of applicable for as opposed to the select small group of people who are motivated to come in to our center.

>> **Gary Owen:** Very good, open up to a bigger audience.

>> **Dr. Andrew Gardner:** Open it up to a bigger audience and we are trying to see the efficacy or the ability of our research program if it really works or not.

>> **Steve Paris:** Gary, I don't know if we have time.

>> **Gary Owen:** Quick question. We always ask this of our guests. Look out five, ten years down the road, where do you see this area of study taking you.

>> **Steve Paris:** A real short answer.

>> **Dr. Andrew Gardner:** I think it all boils down to more the very specifics of the vascular and the muscle environments. So, it's really going to get very cellular and molecular of what the mechanism for the improvement that we see with exercise.

>> **Gary Owen:** Dr. Andrew Gardner, we thank you very much for being our guest this week and that we've learned a lot about exercise.

>> **Steve Paris:** We are going to have to have him back on.

>> **Gary Owen:** We are.

>> **Steve Paris:** Because we didn't exhaust this subject.

>> **Gary Owen:** Steve, we'll see you next week.

>> **Steve Paris:** Okay Gary.

>> **Gary Owen:** On Oklahoma Innovations. You have a good week.

[Music]

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