

EPISODE 237

[INTRODUCTION]

[00:00:10] AVH: Hey everybody, welcome to Paleo Magazine Radio, I'm your host Ashleigh VanHouten and the purpose of today's podcast and the book that we're going to talk about is really to get you aroused. And that's kind of a corny way to start things off but I don't know how else to do it because the book that we're talking about is called Aroused. The history of hormones and how they control just about everything and it's by Dr. Randi Hutter Epstein and I'd be lying if I said that the name wasn't part of the reason why I reached out to her because you know, it's a kind of a provocative title, right?

I read, reviewed the book in The New York Times and I was intrigued because it seemed like a super-informative, interesting research based, obviously, book. But one that wasn't super technical or formal and medical and high level and when I read the book, I realized, I think I was pretty spot on. The book is fascinating, it talks all about the history of discovering hormones and trying to find answers to hormonal issues and at times, the book is gross and kind of creepy and sometimes just super unethical by today's standards, the stuff that she talks about. But it's really incredibly informative, it gives a background on so much of the research and history and medical breakthroughs as well as just horrifying, practices that took place while people were trying to understand hormones.

It's also good to note here that this was not ancient history, this is really like the last hundred or so years that we really even started to scratch the surface in understanding what our hormones are and what they do. This book does a good job of outlining in a clear way what we know, how we came on know it and hinting at just how much we don't know yet about the complexity of our hormones. How interconnected and layered they are.

Anyway, it's just so fascinating, I really recommend you read the book, especially if you're into nonfiction but maybe want something a little more titillating than your typical scientific journal about hormonal research like maybe if you're tired of PubMed. You want to give this one a try. Today, I'm speaking with the author, Dr. Epstein, she is a medical writer, lecturer at Yale University, a writer and resident at Yale Medical School and an Adjunct Professor at Columbia

University Graduate School of Journalism. She's worked as a medical writer for the London Bureau of the Associated Press, was the London Bureau Chief of Physicians Weekly and her articles have appeared in The New York Times, The Washington Post, The Daily Telegraph, The Guardian, Parents and more.

In this interview, really, we barely scratched the surface but we still talk a lot about the hormones involved in growth, hunger and satiety, menopause, sexual function, those were ones I thought you guys would be especially interested in but we also dive into some of the crazier medical experiments and the stories that she talks about in the book. I mean, there's a lot of like testicle removal and replacement in other parts of the body. I mean, that's something that comes up more than once.

Anyway, I hope you're not squeamish but I hope you do enjoy it, I hope you like it, I hope you're entertained and you learn something and I hope that you share the podcast with anyone you think might be into it and I hope that you like it so much, you leave us a nice review and a rating on iTunes that we can share and teach and connect with more people. You know, I think it's really awesome when I see you guys share the podcast on social media because that's such a, I think, a genuine and sort of real way to express your interest in something.

Especially on Instagram because that's where I spend frankly way too much of my time, that's where I usually am so if you do share the podcast ever on social media, make sure you tag me @themusclemaven and or @paleomagazine so that I can repost you and thank you for helping me get the word out. Okay, let's go get aroused, shall we? I know, so corny, I know. But it doesn't have to be dirty unless you make it dirty, guys. Just so you know, get your head out of the gutter and enjoy my interview with Dr. Epstein after a quick word about our show sponsor, The Metabolic Health Summit.

[SPONSOR MESSAGE]

[00:04:16] AVH: The third annual metabolic health summit is going to be held in LA, in January, late January, early February 2019 and it's a four day event hosted by keto expert, Dom D'Agostino who I'm sure you know all about already. And we are going to have him on the podcast as well so stay tuned. This event is a place where you can learn the latest science

about the ketogenic diet and metabolic therapy from world renowned scientists, progressive physicians and top influencers like our favorite Mark Sisson, Robb Wolf, exercise science researcher Dr. Jeff Volek. Nutrition researcher, Dr. David Ludwig. Cancer biology researcher Dr. Thomas Siegfried and many more.

From what I can tell about this event, it seems like kind of the perfect mix of high level science and research based information sessions as well as nightly networking and kind of fun get together, there's going to be an expo space with new technology in health and nutrition brands that you can learn about and there is a super fancy VIP gala dinner with all of the speakers and influencers who are attending. That would be a pretty cool event to go to and a portion of those ticket sales go to charities. Like the Charlie Foundation for ketogenic therapies and the MaxLove Project which helps kids thrive in the face of cancer and life threatening illnesses, using family support, culinary medicine and nutrition research.

If you're interested in learning more about this event, who's going to be there, how it all goes down or when I get tickets, you can check out metabolichealthsummit.com and you use the code `paleoMHS19` because you are a loyal listener and smart person, you will get 20% off your tickets. Check out the website, check out the event and let me know what you think.

[INTERVIEW]

[0:06:04.2] AVH: Randi, thank you so much for taking the time to be on the podcast today.

[0:06:08.0] RE: Thanks for inviting me.

[0:06:09.3] AVH: Really excited, this book was super interesting and entertaining and I have a lot of questions, I'm going to try to organize them in my head but before we even dive into that, I would love if you could tell our listeners, just a little bit about who you are and your background.

[0:06:23.0] RE: Sure, I'm an MD who writes about medicine, I write articles and I also write books, I teach medical writing as well, which people always say like well, "What does that mean? Teaching medical writing?" I mean, I think writing is writing so whether you're writing about food or sports, I like to think, medical writing though, biased, I think it's the most important

because I do think that what you're writing can influence how people perceive the way their bodies work, if you write inaccurately, you might be raising false hopes. I think it's really important that medical writing is done accurately and in a way that wants people to learn about their bodies and learn about healthcare. I would say, my particular focus has always really been on cultural influences on medicine in terms of how we – and when I say we, I mean, patients, doctors, people who sell medical products, people who are buying them, how the culture really influences our decision making.

[0:07:28.9] AVH: It's cool that you touched on something there about writing, about our bodies and our bodies and our health and medicine in a way that makes people want to learn about it and understand it and I think that that's exactly what you did with the book that we're going to talk about today because I saw a review, I believe it was in the New York Times and I started reading it, of course, the name of the book *Aroused*, I mean, I was already kind of hooked at that point.

When I read this review I thought, this is such a cool and timely topic and it's something that our listeners are always interested in but you wrote about it in a way that first of all, the average, you know, lay person can understand and follow but it's really, it kind of hooks you and I think one of the reasons why is because it's not - like it's a text book about hormones, you talk about the history and you talk about these incredible, sort of experiments and when people are trying to figure out what hormones were and how they worked and how to try to solve these ailments that were appearing that people were utterly confused by.

There's just so much going on in this book that I don't even really know where to start so maybe it will be better if you told our listeners a little bit about what the book was and maybe some – the processes behind how you put it together?

[0:08:41.0] RE: Sure, I mean, I always think it's important to have a story for every topic you're going to write about. I tell that to my students and I think about him and we all know when we read, when we listen to people, it's the stories that grab us. What I looked for when I was working on the book, it's semi-chronological but I really looked for what was going on in the culture at the time and what story would be emblematic to understand why this happened when it did in terms of hormones, in terms of breakthroughs, in terms of what people were doing.

For instance, in the 1920s, I love that time period and hormone research because on the one hand, we had some wonderful discoveries, we had estrogen was isolated, soon thereafter in the 1930s, testosterone, progesterone also. There were these discoveries that were really advancing the field, at the same time, in the 1920s, there were some, let's just call them charlatans because that's where they were, they were people saying, now that we have these hormones, how can I make some money off them?

The 1920s was a crazy time of people saying, hey, you want your libido boosted, how about that goat testicle I can implant in you? You know, it's an animal testicle but it's got the same manly juices, I'm sure it will work. There were people selling all these nostrums that had supposedly ovarian things in it, secretions that would help you with your menstrual cramps or menopause or all types of things. I jump into one particular story in the 1920s that to me, highlighted this era of great discoveries but also people hearing testimony and thinking, gee, maybe that's what I'll try but with story that I talk about in the book is this whole craze in the America in the 1920s.

For men to get vasectomies, thinking it would boost their libido, help their brain functioning, all sorts of things. It was a little crazy that you know, this is what they thought, there's lessons to be learned as there always is from history. Despite the fact in the 1920s that some doctors were saying, we're not really sure this vasectomy is going to boost your libido, there was so many testimonials in terms of men saying, but look, my friend had a vasectomy and said his wife says he's like his 20 year old self.

10 friends telling you they felt better seem to be more influential than one doctor with evidence saying, maybe not. I think those are things that sort of relate to what goes on today with medical information.

[0:11:32.3] AVH: Right, yeah, that's just one of the crazy stories that's in this book. I want to bring up a couple more so that you can talk me through the stories around them but I think one of the things that you just touched on that was really interesting that I maybe have not thought of was that really, we've only known about the existence of hormones, we've only known, even generally speaking, what they are for like about 120 years, right?

Before that, we didn't even know that they existed, much less knew that there were so many different kinds and different places and the way they work together and all that stuff, right? I mean, this is really a very new field.

[0:12:10.3] RE: Absolutely. I mean, think about it, I mean, I like to say that your hormones work like your internal WiFi and I'm not even sure how WiFi works but I know the way hormones work, that they are chemicals, released from a gland that hit far away targets. When we think about that now, it seems like ordinary, so what? So that a chemical can reach a far away target. We send emails and we hope that they reach far away targets but if you go back to the mindset of someone in the early 1900s, 1905, when the theory first came out.

The thinking was that any message in the body had to march along the nerves, like a physical connection. It was a pretty controversial theory at the time. That to me, that's remarkable to go back and appreciate that just the person who came up, the two doctors in England that came up with this theory of hormones and they were right. How revolutionizing it was at the time and also how controversial.

Now we have to think about what we know in terms of the way hormones work and what that sort of says about what we're learning about our own bodies. When we think that – we like to think of hormones in terms of each one has its own little silo like horses going out on the race track.

The more we've learned about hormones, the more we've realized that they're all connected. If you're going to take growth hormone, it's not just going to make you grow, it's going to get – it's going to have impacts on your testosterone, your estrogen, your insulin, they're all more like a cobweb, that would be the better picture to have in your mind.

[0:13:59.1] AVH: At what point do you think we collectively started understanding that concept that they are all connected because it's cool and it's easy to understand in the book, like the chapters, they do connect but they do also kind of cover discrete studies and hormones and different ailments that people were trying to fix through hormone work with hormones but when do you think we kind of –

We figured out that there were different hormones and then we figured out that they can work together and it's like a much more layered and complex kind of situation. When do you think that all kind of came together?

[0:14:36.2] RE: I think it's really been gradual since the very beginning even though it's something that so many of us still have trouble remembering, you know, outside of the medical field but I think it's been gradual and like so many things in medicine, it has to do with studying people with diseases.

For instance, we recognized sort of mid-20th century that children born with deficiencies and growth hormone, unless they're given growth hormone, they wouldn't go through puberty. First, it's like, well, why – they could be short and still go through puberty. No, because growth hormone has to do with estrogen and testosterone so you need growth hormone to kick start puberty.

A lot of times, it was really from studying people with a deficiency or a disease that we'd realize, it's not just doing this, it's throwing their insulin off kilter or it's also having this impact. That's how we started to realize and now, the exciting thing now is we're realizing that these new focus on your gut bacteria, all the germs, the good ones and some of the not so good ones that line are good, they secrete hormones too and this is really on the forefront of the dendrochronology in terms of looking at how are the hormones in our body affecting our gut micro biome and also the other way, how's the gut micro biome affecting our hormones.

[0:16:05.5] AVH: Okay, that's a whole other topic that I had not been aware ever, or considered. Okay, this makes me – this brings me to the next question which is, for people like me who are interested in this stuff, I'm not a doctor and I'm not, you know, I'm a lay person, I'm reading it and I'm very entertained and I'm interested and I'm learning about the history but I'm also learning how much we still maybe don't know and how complicated a lot of these issues are in terms of chronic disease or any other kind of issues that we're looking to fix through our hormones.

My question is, what does the average person stand to gain from this book, other than being entertained and you know, like learning some things but practical information that we can take

with us because I think sometimes the more we learn, the more frustrated we get because we're like, this is so – there's so much going on here that's so complicated and everything's still connected that if I feel like I have low testosterone, it really could be a million other things and so people get overwhelmed.

How do we begin to take this information and use it in a practical way?

[0:17:11.1] RE: Sure, I'm so happy that you asked that question. Because yes, I do hope that my stories are entertaining but here's what I hope people get from the end of the book. I hope that because there's so much information about hormones out there today and there's people selling supplements. I hope that people can come away with an understanding, not just how your hormones work but being able to distinguish between what's marketing hype and what are real advances.

So that they can make better decisions about their own health care. Whether you're a woman considering hormone replacement therapy and you'll have the better understanding of why it seems that it was good for you, bad for you, good for you. What we think now or your man worried about your testosterone or you've heard of all these other diseases that you're thinking, are they real or they're not real.

Do I need to spend money on this supplement? Should I see an OBGYN, endocrinologist, urologist? I would hope that by the end of the ebook, you feel that you can make better decisions about your healthcare and you can understand what's real and what's sort of marketing hype?

[0:18:22.6] AVH: At least feel, I suppose, empowered enough to ask those questions instead of just –

[0:18:27.3] RE: Absolutely.

[0:18:28.5] AVH: Yeah, you know, reading something and saying okay, if I want to support my testosterone, I'll take these supplements because that's what they say it does and so you know,

just kind of being able to feel empowered to do a little bit more research and ask the questions that will get you the answers you need, right?

[0:18:43.8] RE: Exactly.

[0:18:45.4] AVH: Okay. That actually reminds me one of the questions I wanted to ask, it was the oxytocin chapter. This brain hormone that helps the womb contract during childbirth and it's said to help foster bonds and people you know, call it the love hormone because it's involved in bonding and things like that and – but of course, like every other chapter in the book, it's more complicated than just that.

It was interesting, I read in the chapter that apparently you can buy oxytocin spray, like you can buy these stuff over the counter, is that true?

[0:19:17.5] RE: Yes, I mean, you know, the funny thing about some of these over the counter stuff, like oxytocin is yes, you can go on the internet and buy this nasal spray that's supposedly, you just spray around you and the guy at the bar next to you is going to want to bond with you.

What I would recommend is save your money from that bottle of oxytocin and buy him a drink instead, you'll have better luck.

[0:19:45.3] AVH: Right.

[0:19:45.9] RE: The other thing I would suggest or I'd like to say is that when you buy something like that, that has not gone through the FDA, that's not considered a drug, you actually don't know if you're getting an oxytocin spray or you're just getting like a water spritzer, you have no idea what's in that bottle unless you took it to a chemical lab.

Even if it had oxytocin in it, despite the fact that there are some phenomenal research going on, looking into what oxytocin may or may not have to do with social skills. A lot of that research is still in mice and rodents and monkeys. We do not know if you take an oxytocin candy which I was offered from a clinic in Los Angeles or if you just spray some up your nose, we don't know

how much is tapping into your brain. You know, we have these blood brain barriers, we don't know how much is getting there and we really don't know the specifics of how oxytocin works.

You know, a few things I want your listeners to be clear about, we're talking oxytocin, not Oxycodone, the narcotic which sounds like a joke but actually, the names are familiar and people get them mixed up. We're talking oxytocin and as you said, yes, we know, this is the hormone that squeezes the uterus to get the baby out, that's a fact.

We know that this is the hormone that starts your milk flowing to breastfeed. We also know that if you block oxytocin in the brains of goats and rats that are in the process of giving birth, they will not bond with their newborns and they will just like kick them, they will treat them like strangers.

That's how this whole mother/baby bonding thing came along. We know that oxytocin is necessary for mammals to bond with their babies. That's a leap to say, I'll give myself a little extra oxytocin and the person next to me is going to bond with me, we're not there yet. There is interesting research going on though, in labs at New York university, at MRE and in other places, trying to figure out what oxytocin does have to do with social skills. So far, the studies using oxytocin to help kids with autism have not panned out but there is still research going on to see how we can learn about human behavior and also what we might be able to use oxytocin for.

But right now, no, I would save your money and not –

[0:22:30.7] AVH: Okay, good, yeah. Because when I was reading this chapter, I mean, I'll admit, at the very beginning I was like, you can buy this stuff? That sounds cool, why not take a little spritz, maybe feel a little bit better about the people you're with. That can't hurt, right? Is there also not –

Correct me if this is a myth, a hormone myth as well but even if you could buy legit oxytocin on Amazon and it was what it said it was, are there not concerns about if you're taking exogenous hormones that your ability to produce your own is then compromised? Is that the case with all hormones or none or how does that work?

[0:23:08.1] RE: Absolutely. You're spot on with that. I mean, that's the fear. There are people for instance, there's a disease that's – like a disease that's talked about in magazines and doctors don't feel it exist called adrenal fatigue syndrome. We know that your adrenals can get fatigued but we know that there's not an adrenal fatigue syndrome which means I think it just means like you're tired.

There are some people that are prescribing cortisone, cortisol, like your stress hormone, just if you're a little fatigued, just give some of that adrenal gland hormone. The problem is, if you take it, it tells your body, you don't need as much. So then it can dampen the amount of hormone your body's already making, same as testosterone, you shoot yourself with too much testosterone, that signals your body that you don't need it and will stop your body's natural mechanism of making testosterone.

[0:24:04.2] AVH: Right. I guess then, it just goes back to sort of doing your research, having a doctor who I guess you trust to do your research with the doctor too because in some cases, exogenous hormones are supplementation, those things are necessary but you kind of want it to be a last resort because it could cause further issues down the line, right?

[0:24:25.4] RE: Absolutely.

[0:24:27.5] AVH: Okay, another topic that I thought would be of interest to our listeners is the chapter on menopause. I thought that one was really interesting and it seemed like, I mean, if you ask my mother, they still haven't sorted out how to alleviate those symptoms. Can you walk us through that chapter a little bit on hormone therapy for menopause and the research on eliminating hot flashes and all that stuff?

[0:24:49.8] RE: Sure, I mean, I'm 55 so I was like, I was writing this book and researching it right when I was smack in the middle of it and all my friends around my age, thought my entire book was going to be on menopause because we all get really obsessed, that's, you know, you think hormones, either I had women saying my God, I have such bad hot flashes where I think I'm going crazy or I had women who were past menopause and said, well I don't have hormones anymore so I'm not interested in this but no, we are.

You have hormones, your husband, no matter if they're young or old or whatever, we all have hormones. The menopause story is interesting because like so many things in medicine advances common, we think this is the greatest thing, we realize that estrogen is good for stopping hot flashes, for not all but for many women.

All of a sudden, in the 90s, it became, not only is it good for hot flashes, it's going to prevent Alzheimer's, it's going to prevent heart disease, it's going to prevent everything. It became hugely popular. We over hyped it and then what happened? We found out that estrogen alone, when you take estrogen alone and you still have a uterus which is such a weird thing to say. I prefer to say, if you haven't had a hysterectomy.

For women who have not had a hysterectomy, if you take estrogen alone, it does increase the risk of uterine cancer. That's why hormone replacement therapy these days has estrogen plus progesterone. Progesterone protects the uterus from getting uterine cancer. Do we know everything about these hormones? No, we don't, but what doctors think now, and we're always doing things with a bit of uncertainty, we never know 100%.

What doctors think now is you know, if you're low risk, if you've never had any heart disease, you've never had breast cancer, if you're waking up every hour on the night with hot flashes the way I was and some women, it's not so much the sweating but sometimes this hot flash which is more than just a flash I have to say and anyone that's gone through them can make you feel really anxious. It's the same sort of, it's not just feeling hot, you feel suffocated like you need space. You don't want to be on a crowded subway, you think you'll go crazy.

You don't want to be on a tiny little plane stuck in the gate, you think you're going crazy. That's not just because you're going crazy, that could be your menopausal hormones giving you a hot flash that makes you feel like you need more air. If you're really suffering like this and not sleeping, for many of these women without having a history of breast cancer or heart disease, these low doses of estrogen progesterone, the same hormones in the birth control pill but different doses.

Can alleviate the hot flashes, can alleviate the vaginal dryness and help women feel better

during menopause, it's not for everyone. In my book, I write about some new research looking at the actual mechanism of why do we have hot flashes in the first place? We think we're honing in on one particular cell in the brain that's different in menopausal women versus pre-menopausal women.

Hopefully, that will lead to new kinds of treatments. We're trying to look at new, maybe non-hormonal ways to help with vaginal dryness. One of the things that seems to be recurring in menopausal women and this is not from a scientific study but from me, just talking to hundreds of women, paring menopausal, menopausal, is that we don't realize it when we're going through it, we tend to think menopause is – especially middle aged women.

Menopause is something that happens to women 10 years older than we are, no matter if you're 40 or 50, whatever, we just think we're not in it yet until we're really in the full throws. It's those pairing menopausal days is that can be in your early 40s or mid 50s where you start feeling like on edge more, PMS gets worse, again, just like you were a teenager, we tend to think because it's that age where we're juggling kids and career and family that most women tend not to think, it's my hormones, they just think I'm doing too much.

[0:28:58.9] AVH: It's life, you know?

[0:29:00.7] RE: This is life and just get used to it. Where it actually – yes, it's life but it also could mean hormonal changes.

[0:29:08.2] AVH: Wow, plenty to look forward to, it's very exciting. Did we – I'm not sure if you covered this but you were saying that there is some research being done about hot flashes, do we know if there is a biological reason why we have them or if it's just because a side effect of something that's an internal process, there's no real reason that we need to have them certainly, right?

[0:29:29.9] RE: Well, you know, people have asked me this before, I can tell you from a physiological perspective, there was wonderful research done by this neuropathologist, a pathologist who studies brains where she decided, she had been studying puberty, the hormones of puberty and then decided, she's more interested in menopause as she got older.

She was the scientist that actually honed in on this one cell in the hypothalamus and that's like command central for your hormones, the hypothalamus in the brain.

She looked at brains and we're talking like the actual brain of dead women. She got them from a morgue. The brains of women who are post-menopausal versus the brains of women who are premenopausal and she honed in and found this one cell in the hypothalamus that was much larger, 30% larger in menopausal women versus premenopausal. When I looked at the pictures, I can say that that cell looked like blueberry size in the older women, the older brains and caper size, you know, little caper that you put on your fish, a little caper size in the premenopausal women, what does that mean?

Here's what she thinks. She thinks it means that the estrogen, when it starts to plummet is sending a signals to the brain saying this body needs more estrogen. When there's not estrogen in the reserves in the ovaries, the brain just keeps getting bombarded with this signal and that bombarding of the signal flows up this cell.

That cell, she thinks has to do with temperature control mechanisms. They actually are studying a drug and it's had some good results so far in Europe, a drug that actually taps in to that cell and blocks a certain chemical and it seems to be helping women with their hot flashes.

[0:31:29.1] AVH: Okay.

[0:31:30.1] RE: Interestingly, there might be a non-hormonal way to help women with hot flashes but it won't do anything for vaginal dryness which is another side effect of menopause, the vagina wall thins and for some women, sex becomes painful and there's creams that they can take, some contain estrogen, some don't but this new drug and this new research that's going on about tapping into this brain cell is really for hot flashes and it's really for the head stuff and not the vagina stuff.

[0:32:00.5] AVH: Right, which both are very important.

[0:32:03.9] RE: Exactly.

[0:32:05.0] AVH: You want to have both sides covered. Okay, this might be a little bit outside of the scope of talking about the book and I realize we're going on a tangent here but I'm interested. Because so much of what we are concerned with, with the podcast is sort of health and wellness in general is proactive lifestyle changes we can make to optimize our health so that we don't have to resort to reactive, like medicating symptoms. Are you aware of any kind of lifestyle, proactive behavioral things that women can do to alleviate or to at least deal better with menopause symptoms?

[0:32:45.5] RE: What I'm going to say is based a little bit on research but more, hearsay so there's not definitive studies but I'll say two things. In a study of menopausal women and really focusing on hot flashes. This one doctor who set up this crazy thing in his lab. So he actually made women have hot flashes. He got really hot because you are not as menopausal, women are more sensitive to temperature changes. So you get a little tiny bit hotter and we are just going to be sweating and getting really uncomfortable. So he made women do this, they volunteered because I think they were so eager to have any research done on menopause.

He did find that meditation and deep breathing not a specific kind, just unwinding and deep breathing did seem to help a bit not as good as the hormones but helped a bit for day time hot flashes. Again, it is hard to meditate through the night. So it didn't help during the night time ones. I tend to believe and again, this is just my hunch and just from doing my research, I do think that learning stress release mechanisms whether that is meditation or exercise.

I believe it does help calm your body and it is positive for your hormonal balance but here is what I also think, if it turns out that well, oh actually the stress release stuff didn't minimize the hot flashes or didn't help as much as I thought, I don't think it hurts to actually learn to stress release. I think it is one thing, if I were to say take this supplement, there could be a side effect. I think any side effects of stress release has to be semi positive.

So it may not work for all women but it is something I try to incorporate now. I also think that there's hints of studies of people that get involved in exercise and really get your heart rate up a few times a week that the reason why you feel better you know this runner high, that lead do think that it has to do somehow with something we called your endorphins and it's like this

opioid receptors in your brain and that if we are really exercising somehow it affects your serotonin in positive ways.

So I do think that there's something and I just was talking to a researcher the other day and she said that's what she prescribes to her patients. She doesn't like to say exercise because too many of her patients are like, "Oh I hate exercise," right but she says, get moving and get your heart rate up. So even if that means walking a bit faster to work or wherever you're going, try moving your body. She believes that is a huge help.

You know and again on another sort of wishy-washy sort of this can't hurt kind of thing, you know in terms of exercise it is interesting. I find for myself in terms of just positive mood, yeah. I like to exercise and I think that sometimes it can make me feel better. Is it the heart rate or what is about it? I find that there is a big difference if I am on a stationary bike in a gym versus if I go out for a run and I can tell you my runs are pretty lame now at the age of 55 and it is not an age thing.

I am not blaming that but I would say my running is more the equivalent of moving meditation but when I am in the park and I'm in nature and I am completely unplugged for whatever it is, 45 minutes and moving my body in a running sort of way at a ridiculously slow pace that does make me feel better. Do I know exactly what it's doing to my hormones? No but I do have to think that it is affecting your cortisol, your stress hormone, your serotonin in positive ways and if it's not, it can't hurt. It does make you feel better.

[0:36:41.4] AVH: Absolutely. I mean this is making me feel better because it seems like we really have a high level lifestyle factors that we, Paleo Magazine but health and wellness people of the world over are all touting which is to manage our stress, to have a mindfulness practice, to move your body and be outdoors. I mean those things positively affect every aspect of your life and you may not be able to connect it scientifically always or medically or whatever.

But like you said, those things rarely ever hurt, right? So if they can help any facet of your life and make you feel better and make things work a little bit more smoothly, why not try it? Like you said, there's no side effects, you are not paying to take deep breathes and go outside in the sunshine so why not?

[0:37:28.1] RE: And I also want to clarify in terms of distressing. I am sure you know this already too and your listeners probably do as well. You know some stress is good. You have to take an exam, you'd better get your stress level up a little bit so that you can focus. So that stress is good. The body when you are sick, that stresses the body in a good way. It jump starts your immune system to heal you. So these bouts of stress are actually good.

What we think is worrisome is a chronic low level stress. If you are anxious all the time, if you are mauling over something all the time that doesn't help you focus. Sometimes it goes beyond and you can't focus when you are that stressed out and we also do worry that what is this doing to your cortisol or your stress hormone that it's at this chronically high level. So it is really I think if people are in a high stress job, if you are a surgeon or a nurse.

Or whatever you are doing that you have a burst of stress during your work day I wouldn't say, "Oh go get another job. You should be lying on the beach all day," because I am not sure that is the healthy way to go because actually this bursts of stress are actually good for us. It's gets your brain going, it gets your immune system going. It is this chronic low level constantly – it is stress that can lead to feeling of helplessness as well.

[0:38:48.7] AVH: Right, chronic stress is the bad one. Okay, so you mentioned earlier too, we talked about adrenal fatigue and there are sort of two camps that talk about this being a thing and then people saying that it is not really – your adrenals can't really be fatigued as such. You were just tired or maybe you are dealing with chronic stress or whatever but what is the connection with adrenal? I guess compromised adrenals and chronic stress and chronic high cortisol, how do those two go together?

[0:39:17.7] RE: Sure, well we think the adrenal gland does secrete cortisol, it also secretes another hormone that helps maintain your water balance, your salt intake just to keep it all regulated. So there are people that can have diseased adrenal. So I am not saying it doesn't happen and when you have adrenal failure or a tumor in your adrenal glands that can really affect your blood pressure. It can affect the cortisol levels.

There are people with Addison's disease that don't have enough cortisol that need to take it during the day. So those are real diagnosis that we know. It is the adrenal fatigue that you were saying that I don't think it is a real diagnosis but again, going back to this chronic cortisol stress, we don't exactly know. There are some theories that if you're stressed and if you're producing this chronically low level of cortisol it could potentially then throw off things in terms of increase your risk of heart disease.

People think it can throw off other hormones such as glucocorticoids which has to do with metabolism and breaking down in sugar. So it is all sorts of inter related specifically how, we are not sure but the big thing that worries me is the diagnose of adrenal fatigue and then people thinking, "Oh well I need to take that extra cortisol where they might not need it," and that will certainly shut down your adrenal glands which is something you don't want to do.

[0:40:41.8] AVH: Another particular story and topic that I want to touch on from the book because obviously this podcast focuses a lot on nutrition. So I am really interested in that case, there is a boy named Nate who had a really rare endocrine disorder and it made him just insatiable and he ate more than was normal even from a very young age and he couldn't seem to – there was no less satiety signals. Can you talk about that story a bit because it is really interesting?

[0:41:10.3] RE: Sure. I spent two days with this family and I have to say his mother, I mean I just have so much respect for this woman because she home schools her son now. She has to because he is just compelled to keep eating and he can't control himself. He is only nine, she home schools him. Her house is the happiest home that looks like this wonderful school day care center and she just keeps him busy like 24/7 she is with him so that she can make sure he is not constantly eating into a severely unhealthy state.

So here's what we know about children or people like him. There are people that have defects in leptin and that's what I like to call the "I feel full hormone". When you have this rare defects, there are some people that can get injected with leptin and then they go back to normal. They need it for the rest of their lives. They are giving themselves this hormone, it helps balance everything out and just like we were saying, everything is connected.

So you need your leptin balance in order for your insulin to work right, in order for growth hormone and all your other hormones to be in balance. They are all connected. This poor child he cannot take leptin shots because he doesn't have a decrease in leptin. He has a defect in the leptin pathway. His body doesn't respond to it so all the leptin shots in the world cannot help him. His body doesn't recognize it. There are drugs in the pipeline. He is too young to be in the trials yet.

His mother is just hoping that the older people that are in the trial get positive results and she can use this new hormone treatment on her son but here's what it means for the rest of us. It does not mean that we can go out and be in a so called leptin diet and there are those diets touted. It doesn't mean that we can take leptin shots and feel more full. Good news and bad news from this is that the good news is that we are learning the way the human body works.

As our bodies are meant to stay alive which is a good thing which means that if there is some sort of part of the brain that makes us feel full or makes us lose our appetite, our bodies do not want to starve to death. So for most of us, another part of the body will kick in so that we will not refuse to eat. So that is a good thing, we survive. Yay, go humans, we are going to survive. For those of us that want to lose a little weight, that is not such a great thing.

It means that it is more complicated. It means that even if our leptin were okay and a few other appetite suppressing hormones, we can override it. We all know that. We all know that if we are feeling a little full sometimes yes, we will just have that dessert for whatever reason because we are stressed because we deserve it because we just ran an extra seven minutes so now we are going to have 300 calories to make up for it.

[0:44:07.2] AVH: Yeah, we've all been there.

[0:44:08.9] RE: Exactly, so there is the good and the bad from that but in terms of the future, there are scientists now really looking into what are these basic drives in terms of what do we know about not just our metabolism but what compels us to eat and we are just unravelling it now. What do we know now? Well it sounds like the same old advice coming around but there's reasons for it. We know that in terms of sugar levels and insulin and our hunger hormones.

And our “I feel full,” hormones that for people that want to be healthy and to prevent overeating too much you are better off eating little bits at a time. You don’t want your sugar to drop so low that you are absolutely famished. We all know those feelings of sometimes when we are stressed a little bit and we think it is related to the cortisol, when you are stressed a little bit you are not hungry and you can go for the day not eating that much.

And then all of a sudden the stress of size, you’ve taken the test, you did your presentation at work and then it kicks into your body. Wow, I’m really low sugar and you will consume more calories after that than you would have had you just eaten little bits during the day. So we know it is important to keep the balance of hormones. It makes us feel healthier overall and it is probably best in terms of the ebb and flow of the hormone system.

[0:45:34.3] AVH: In Nate’s case because as you said it was a pathway issue. It wasn’t like he didn’t have enough or he had too much leptin or whatever, what is the sustainable plan for him moving forward aside from having someone who is really monitoring his intake because that is a stressful way to live like I was reading the story and it’s upsetting because he wants to keep eating and he doesn’t understand like he is not ever satisfied and that’s a rough way to go through your life when food is a necessary part of your day every day.

[0:46:04.1] RE: Exactly and it is a real compulsion. So it’s not that they are not enjoying food. They are compelled to eat it so I will tell you that the mom, Nate’s mother who’s wonderful who right now is just going to help she leads him during the day saying, “Okay we have 45 minutes and then you can have your next meal,” and she breaks it up into portions and then when he’s done, he’s asking for more and she’s like, “Okay we are going to do an activity,” and she’s just keeping this kid busy.

And she has to keep her eye on him. What she did tell me though this drug that they’re testing for people with this rare genetic defect, she was in touch with a 20 year old young man in England who is on a trial and he said, he must be getting the real thing not placebo because for the first time in his life he’s feeling full and the other interesting thing he said is for the first time in his life he is enjoying food. He never enjoyed it before. So it’s not like they’re wanting to eat and loving it.

It is a compulsion. So yes, for poor Nate and his mom is just crossing their fingers that these drug trials are going to work and it is going to help with this genetic defect that he has.

[0:47:12.6] AVH: I think that this chapter was especially interesting for me and for the world that I am in because we all know that food, we can have such a complicated relationship with food obviously because many of us who overeat, we're doing it for emotional reasons rather than physiological ones but that often it can be sort of a vicious cycle that feeds on itself because if we are continually overeating for emotional reasons that can start to affect us physically right?

Can we through our behavior turn off leptin signaling or affect it because we are just constantly overriding that satiety signal?

[0:47:48.7] RE: Well it's interesting what you said, there's two things we now know. One is which I was shocked, the fat cell which I used to think was just a little blob of butter in the body, the fat cell actually is an endocrine gland. So your fat cells secrete leptin and probably other things that signal your hunger which means that the heavier you're getting when you get into obesity, your body is getting different signals about how hungry you are.

Making it harder for some people to take off the weight. So it's not just that they're lazy or that they're cheating. They are on a different playing field. In terms of what we can do behavior wise in leptin, we do know now that we always learn from extreme cases, people who are anorexic, anorexia nervosa, the kind where you are not just from cancer but you bring it on yourself, those people tend to have low leptin levels which means that they are hungry.

They are not training themselves. They lose their hunger signals because they convince themselves what is a hunger signal isn't and we do know that when you bring on anorexia, when you are severely limiting your food intake and fighting against hunger signals, that puts the body into stress and that stressful situation is really bad for other hormones. So you might think okay, I can live this then but what it does is it sends signals to your pituitary gland.

And we know for young girls that it stresses the body so that they stop producing enough estrogen and progesterone so then they become infertile and we know that that's a problem. We think we know now that people who are underfed, it affects your immune system not just

because you are not getting the food that you need but because hormonally, your hormones are connected with your immune system. So it is unhealthy for those reasons too.

But in terms of what behaviors that we can do, I mean I think again it goes back to you don't want to get yourself too hungry. You don't want to restrict so much that this signals are just ravenous in your body and then you will bounce back the other way.

[0:49:56.2] AVH: Right or be constantly eating past the point of discomfort because then your body can start to maybe adjust to that too right? I know people – yeah if you are used to eating these massive meals and force feeding and people in the body building world are people who are trying to gain weight because most of us can't fathom wanting to gain weight but there are a lot of people who that's an issue and that's a concern and people who are constantly eating past the point of what they're body wants them to do. That can affect you the other way.

[0:50:24.5] RE: Yeah and there are certain expectations that we have to have for ourselves too so we are not stressing out too much. I know for me when my kids were younger I think I spent most of my day within the kitchen. Someone was hungry, I was making a meal and I think that a lot of people that are cooking meals, probably by the time I tasted what I was making for dinner had an entire meal before we sat down for dinner and then had the second one also.

So there are just certain things and was that hormonal? People would say to me you know well you know your kids are so young, it is probably your hormones. I'm like no, it is actually my kitchen. It is not my hormones, it's my kitchen. I think we put ourselves into situations where because we are prone to want to eat because of the smells of the kitchen because of what's going on it can make it very hard or tempting or out of boredom or for whatever reason.

So there is so many different pulls and I think for some of us that means that we have to have a different reward system. We can't reward ourselves with, "I am good all week. I will get that ice cream sundae," or, "If I run that extra mile I'll eat this," the problem with most of us unless you are an elite athlete is we're not burning as many calories as we think and I think somehow, I mean I know for me that if I go for a run, I'll be famished but I know that the amount I'm hungry is much more than the amount I just burned off running.

I think for some people that really need to lose weight. You are probably better off not exercising so much so that your hunger stays down. Is that hormonal? Probably.

[0:52:03.5] AVH: Right, yeah I mean all you have to do is go like how many burpees you have to do after eating a donut or something and you understand that you cannot outwork a bad diet that's why everyone says if you are looking for weight management that it is much more about figuring out your diet and just working out more because it just doesn't balance out that way.

[0:52:24.2] RE: Absolutely unless you are a professional athlete. I would say I like to think of it this way. Exercise is for stress reduction, is for feeling better, keeping your body moving and for weight loss, its diet. It is really rare that people just increase their exercise and haven't changed their diet and can really shed those pounds.

[0:52:45.7] AVH: Again, going back to I mean this is obviously an issue in our world, we've got more people that are obese and overweight than ever before and we've got this hyper palatable foods and we are overeating them and it's a world that is set up to make us have impulse control problems but how can folks who maybe are listening to this and feel like they have compulsive eating behaviors or they have issues with satiety, how do we know if it may be a hormonal issue versus an emotional mental behavioral issue, how can we tell the difference?

[0:53:20.8] RE: I am not so sure it is that important. I think that if you do have a leptin defect you would know. These people are voraciously hungry. I think sometimes people can have thyroid issues. You can get your thyroid checked and then that can be effecting your hunger either. You are either burning calories, you are hyper thyroid you'll be losing weight. So I think those can be checked. In terms of lifestyle changes unless you are on the extreme end I see it all burned together.

I think your hormones effect your behavior. I think they affect your emotions and I think for most of us who don't have a thyroid defect, who don't have a leptin defect it is not that important to separate out is this a hormonal drive. You know when people say to me, "Oh you have young twins, it must be your hormones." Well whether it was hormones or not I was eating a lot. It could be lack of sleep that affects your hormones but if your hormones are out of kilt because you are waking up all night with the baby.

And you are lacking sleep and that's affecting your insulin levels or making you more hungry, it is not going to be a hormone cure but it would be trying to get enough sleep cure. So I think it is all mushed together and we don't need to separate unless you have some huge hormone defect that you need external hormones for. I don't think it matters so much to say whether it is hormone or whether it is behavioral because it's all mixed together.

[0:54:41.8] AVH: Okay that is a good point. So there are so many more stories, so many more experiments and just crazy elements of the history of hormones that I could ask you. We are almost at the end of an hour here already and I think that folks maybe just pick up this book and read it for themselves because some of these stories, I mean honestly I am reading it like this can't be real life. It's so crazy that you couldn't make it up I guess.

But it is pretty incredible but I guess one of the questions I'd like to ask you as we are coming to a close here and this is your world and what you research and what you do but was there anything over the course of putting this book together that really surprised or shocked you particularly like a story or some piece of history that you were especially shocked by?

[0:55:29.4] RE: I'll say two things. I think one which I had mentioned is that the fat cell being an endocrine gland that really shocked me. It's like, "Wow I just thought it was a blob of fat." And I think looking into the history, I hear again, I write about people who identify as transgender in the book and I saw many people saying to me, "Oh it's a thing of now." You know more people now identify as transgender. You know what is going on in our society is this endocrine disruptors.

It's the hormones in the water and no, I think I am surprised by all these questions. When you go back into the history, we've always had people that identified as transgender but without a community. A lot of people didn't come forward. So we know from our surveys now that if you live in an area whether it is an area in the world or a state in the United States that is more open to people to be able to say that I feel that I identify as transgender.

Those surveys have many more people in those communities will tick yes on a survey versus if you live in an area where you will be discriminated against. So I think I was surprised about how

many people are coming forth. I was surprised that every time someone opens up a clinic, a pediatric endocrinologist who is willing to work with the transgender community that their flooded. There is a wait list so there's so many people that are born feeling that the body they were born into doesn't match the gender that they were given.

And so I think that we all as a society have to realize what a spectrum this is in terms of gender identity. We have to be more tolerable and that hopefully will find out and we'll figure out the best treatments.

[0:57:16.1] AVH: Yeah, that was another very interesting chapter and I guess this goes back to something you were mentioning at the beginning of our talk which was so much of this is about culture and about the time and place in which things were discovered and people were learning and how much has changed. You know in the last century, one of the examples I wrote down here and I just have to mention it because it is so crazy.

It is a great example of how far we've come and some of the everyday technologies we have now that we take for granted and that is the pregnancy test. It is in the book that involved I guess I don't know when this was, you can tell me when in history this was that a pregnancy test, it was a urine sample that they injected into mice and after a 100 hours or so they would check the mice ovaries and if they were swollen that meant the woman was pregnant.

[0:58:08.5] RE: Absolutely this is an ancient history. That is the pregnancy test that my mom was given for my brother. This goes back to the late 1950s.

[0:58:18.2] AVH: So this was not a long time ago.

[0:58:20.1] RE: This was not a long time ago. So right, this pee on a stick method is really recent history and I love to tell the story which I write about in the book. It was really a female medical student in the 1940s who did some of the initial research that led to that pee on a stick pregnancy test and what I love about the story is one, there weren't that many women in medicine at the time. So she really just pushed forward, applied to go to medical school, got in, she was at Johns Hopkins.

And two, she did this study in medical school that debunked medical dogma before she even graduated from medical school. The other part of the story going into the basic science of how we came up with the pee on the stick pregnancy test is when she did this first initial study as a medical student, the investigator who ran the lab said to her you have to publish this. It is publishable, let's send it into Science and Eminent Magazine.

But he said, "You know if they see your name which is Georgina, you're not going to get published so just use your initial." So fortunately she had a very masculine middle name Emory, so she sent it in as G. Emory Segar and she got published in a prestigious medical journal as a medical student and that research eventually led to what we know as the modern pregnancy test which is very modern which your parents, for me my parents.

For other listeners maybe it is their grandparents were doing that inject urine into the mouse long term pregnancy test.

[0:59:58.6] AVH: It's just so incredible. That is one of my favorite stories in the entire book and I mean thank goodness for people like Georgina who were willing to pave the way and do the extra hard work because they were not treated the same way as their male counterparts and so they have to be sneaky to get the work done but thank goodness they did or we would all be still using the mouse method which doesn't sound too great for me but yeah, incredible.

So Randi, thank you so much for taking the time and I know again we've barely scratched the surface but I think that we've certainly talked enough to wet the appetites of our listeners who I'm sure will be very interested in this book. So can you tell us a little bit about where we can find out more about you, where we can get the book and I know that you're currently on tour. You are touring about the book right now, right?

[1:00:48.6] RE: Yeah and I am going all over. So you can find out about me at my website, randihutterepstein.com and if you go to my speaking engagements, the list where I'll be speaking I'll be all over. So I'm heading New Jersey and Chicago and Michigan, San Antonio which I've never been to. So I am very excited to go around the country and I am meeting some wonderful readers and also some amazing scientists along the way.

And the book, *Aroused: The History of Hormones and How They Control Just About Everything*, is available hopefully in your local bookstore. You can ask them, we have to keep this independent bookstores going but it is also available on Amazon and Barnes & Noble and other places that you may get your books online.

[1:01:41.6] AVH: Awesome, all right Randi thank you again for taking the time. Thank you for making such a complicated and complex topic. So entertaining and so accessible for the rest of us. So I appreciate that and best of luck with your tour.

[1:01:55.8] RE: Thank you, I really appreciate that you reached out to me. I really enjoyed being on this podcast.

[1:02:00.5] AVH: Awesome, thanks Randi.

[END OF INTERVIEW]

[1:02:06.1] AVH: All right everybody, thanks for listening. Thank you again to the show sponsor, The Metabolic Health Summit, this four day keto and metabolic therapy event that's happening in LA at the end of January in 2019. I may need to go to this because I feel like there's going to be a lot of smart people, a lot of cool things. So if you guys are going to go, let me know. Send me a message on Instagram and maybe we'll all hangout and eat some keto stuff together.

But a reminder, if you do want to go or if you just want to learn more about what the event is all about, you can go to their website, metabolichealthsummit.com and you can use the code "paleomhs19" and get 20% off any tickets. So that includes tickets to the actual event as well as the VIP dinner. If you want to be real fancy so yeah, check out metabolichealthsummit.com and hope to see you there.

All right, so join me next week. I am going to be talking with Sal de Stefano. He is one of the co-hosts of the hugely popular Mind Pump Podcast. This guy has a lot of experience in the fitness industry as a trainer. He's got a lot of opinions which I am into. We have a great conversation. I love his podcast myself, I listen to it all the time and I always felt that I was a silent partner in his podcast because he was talking about things that I was interested in.

I love the conversational tone of his podcast and I always wanted to be a part of it. So I very selfishly asked him to be on my podcast so I could ask him questions and finally be a part of that conversation he was having. So we talk a little bit about paleo, I get a little confrontational it is kind of funny but we mostly talk about social media and its role in the health industry. We get really meta because we end up talking a lot about the goal and really the point of these health and wellness podcast.

And what we are achieving, what we are hoping to achieve and this huge influx in the way we get health and wellness information out there and whether it can be helpful and hurtful sometimes and so anyway, we're health podcasters talking about health podcasts on a health podcast. It's really like a whole inception kind of thing but it was a really fun conversation and I hope you listen. So join me next week and that's it for now. Have a great day.

[OUTRO]

[1:04:14.8] AV: Paleo Magazine Radio is brought to you by the Paleo Media Group and is produced by We Edit Podcasts. Our show music features the song *Light It Up*, by Morgan Heritage and Jo Mersa Marley, and on behalf of everyone at Paleo Magazine, thank you for listening.

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