Episode 105 Transcript

Jaclyn Smeaton (00:01 - 03:02)
Welcome to the DUTCH Podcast, where we dive deep into the science of hormones, wellness, and personalized health care. I'm Dr. Jacqueline Smeaton, Chief Medical Officer at DUTCH. Join us every Tuesday as we bring you expert insights, cutting edge research, and practical tips to help you take control of your health from the inside out. Whether you're a healthcare professional or simply looking to optimize your own wellbeing, we've got you covered.

The contents of this podcast are for educational and informational purposes only. The information is not to be interpreted as or mistaken for medical advice. Consult your healthcare provider for medical advice, diagnosis or treatment. I'm so glad you're joining me for this week's episode of the DUTCH Podcast. I'm so excited for you listen to this episode. It was really eye-opening. We get to talk with a researcher about the history of the gap in women's research and also understanding how kind of the social influences plus the scientific demands have really created this gap. And this is a researcher whose life mission it is to close that gap. Now, one of the things that's so cool about her research is she has looked into what's changing during the different phases of the menstrual cycle.

However, not just with the hormones that we always think about like estrogen and progesterone, but all the other downstream neurotransmitters, inflammatory cytokines and other things that end up influencing the way we feel, the way our brain works, the days we feel more clear or less clear, the days we feel more energetic or stronger in our exercise routines, when we have higher mood versus a lower mood, and really just the way that the cycle has been intended and created and what are some of the advantages and disadvantages of that. We are going to dive in deep today. Dr. Kayla Osterhoff is our guest. She's a neuropsychophysiologist with formal training in health ecology, public health, epidemiology, and mind-body medicine. She's also been a senior scientist at the CDC where she collaborated with groups like the World Health Organization and ministries of health on many public health initiatives. She's the founder of Her BioRhythm, which is a platform really helping advance women's health research and addressing the gender disparities in health education. I really could have talked to her forever. In fact, I think we're going to have to get her back on the podcast soon because there's still so much more to learn. But you're going to love this episode. You're going to learn so much about all the different cycle changes and how we can better leverage what we know to actually get better research for women when it comes to diseases that happen just in women or that are more prevalent in women like autoimmune diseases and also just research in general. So let's go ahead and get started.

So Kayla, I'm so excited to have you on the podcast. And I think the first thing that I really want to know more about is your background because you have such a unique background and training as a scientist. Tell us a little bit more about kind of what led you, what was the path that led you to be exploring female hormones?

Kayla Osterhoff (03:02 - 09:33)
Yeah, my path is not really a straightforward one. It's a little windy, I guess, as probably most people's are. When I started out my career path in undergrad, I was actually studying to be a physical therapist and was going to go to physical therapy school. And I actually worked in a physical therapy clinic for several years ~ during that time. And at that same time, I had an experience that really shifted my whole career trajectory, which was an experience that I had with my mother actually, who had several health issues and was really misled and misguided by the medical community so much so that she ended up having a full blown opioid addiction that was fully prescribed, taken as prescribed by all of her doctors. and it ended up in, an overdose that almost took her life when I was a junior in undergrad.

And when that had happened, it was a complete shock to me and our entire family, really, because none of us knew that there that this issue was happening. We knew that my mom had had different surgeries and had to take pain medication, but she was fully functional from our perspective. So we didn't know anything was wrong. And so that was a huge eye-opener for me. And at that point, I had actually taken a semester off from school to help my mom get into recovery and get back on track with her health and in that process and exploration, it really further opened my eyes to how many blind spots and issues there are in our medical system when it comes to women's health and how much we just simply don't know and are guessing a lot. So from there, I actually switched gears and I went on to get my master's in public health instead of go to physical therapy school with the intention, I wanted to work on the opioid epidemic at the Centers for Disease Control and Prevention. That was my kind of dream career path. And I wanted to understand these disparities and what causes opioid addiction and why our prescribing practices were the way that they were and making changes to the protocols that we're using and all of that. So what I ended up doing was I got the job at CDC, when I finished up my master's in public health, but I didn't end up working in the area that I expected. I didn't work in opioids. I ended up working in global health. And that was also such an expansive and eye-opening experience, as you could imagine. And while I was there, I worked on several different global public health projects, including the Global Hearts Initiative where I was helping to stand up cardiovascular disease programs and clinics in several countries, including Mongolia, Africa, and Brazil. I also got to work on all of the emergency responses while I was at CDC. that included, I don't know if you remember back to Zika and that epidemic that we had.

And then I worked on both of the Ebola responses. And then I worked on the COVID-19 response for several months before I ended up hanging up my government hat and moving fully into the world of research and education and really diving fully into women's health. But what kind of further ingrained my interest in women's health at that point was the work that I had done globally and seeing how things happen from soup to nuts when it comes to public health policies and standardized protocols and clinical practices and gold standards and even research. And what I learned and saw during that time is that women are more of a footnote in all of these areas than an actual focus. And even when it comes to women's health, it's not actually women's health. What we've relegated women's health to is reproductive health, which is just one small aspect of women's health, but all the rest of women's health gets completely ignored. And it was really kind of disheartening to see that our research and quality standards for research were very ignorant of the female body and female...biology and female hormones and what all of that means. And in many cases, a lot of this research that goes into our standardized protocols and practices within our medical community nationally and globally, a lot of that goes back 30 years. And so if you go back 30 years and you look at the research that's gone into these protocols, the vast majority of it, like more than 90%, doesn't include female subjects at all, even though. Isn't that wild? It's absolutely wild. It's atrocious. It's really quite scary. ~ Of course, when we see our medical protocols and prescribing practices, even when it comes to opioids, we can understand how it's affecting women more negatively than men. A lot of these treatments are not only ineffective, but harmful and causing injury and sometimes even death to women like my mom because the science and the data and the research just simply isn't there to understand the differences between the male and female body and what each one requires. And hormones are the key piece that we're really not understanding even to this day.

Jaclyn Smeaton (09:33 - 10:31)
Wow, well, I wanted to take a minute to soak that in, because you have quite a why and a powerful backstory. And just want to express my gratitude with you sharing all that. It's clear that you've taken a really difficult, probably horrible situation to go through and transformed it into a way to really help others. And I think that's amazing. So just want to acknowledge you for that. Thank you for taking hardship and turning it into gifts for yourself and others. It's really wonderful.

I can't agree more. It's when we look at on the research spectrum, the way you phrase it, there's harm being caused. It's not just lack of opportunity. It's actually harm caused from misunderstanding. And it's amazing to think about research being done on men with such dominance when women are half of the population. There's no other word but shocking, really, I think, to utilize that.

Kayla Osterhoff (10:31 - 13:04)
It really is. And you know, the problems span beyond just inclusivity. Even the research that we are doing that does include women at appropriate numbers is still not being done properly. And this is the biggest piece that I think everybody is missing. We've seen a lot in maybe the last five years where there's acknowledgement like, hey, yeah, we haven't included women in research. We haven't even included female subjects when it goes all the way back to using lab animals in early clinical studies, we're still using male lab animals for the majority of the time. We understand why that's the case. You know, the female body is very complex. It's ebbing and flowing all the time. We're essentially different research subjects many times throughout the month, at least four times throughout the month, but really every day we're shifting and changing. so it makes it very difficult to research us. It's very resource intensive. It takes way, way, way more time very expensive and it takes a different level of expertise that we just simply don't really have. and so when we are including women in our studies, we're still not using the right data collection methodology, which has to be different for females versus male subjects. We're still not handling the data appropriately. We're still not analyzing the data appropriately. And even when it comes to reporting.

Most people are shocked to find that studies that do hit those benchmarks of inclusivity for female subjects when it's on a disease topic that affects women, ~ even when it's appropriate to like the population level statistics of who's affected by that disease area, the findings are still not reported by sex. And so you might as well throw that data out, ~ because it's, it's not accurate and relevant until you look at sex as a biological variable, which is an NIH policy that was supposed to be implemented starting in 2014, I believe, ~ and still has not been implemented to this day. ~ Studies are not supposed to get funding unless they follow these basic requirements, ~ and they're still not doing it. So we still have a huge problem within our data within our ~ scientific community with the way that we're doing research. And of course it trickles into our medical protocols, systems, policies.

Jaclyn Smeaton (13:04 -14:07)
Hmm. It's fascinating. Just as an aside, I'm reading this book right now. It's actually written by a zoologist, an evolutionary zoologist. So it's a little bit outside the human realm, but it's all about, well, it's all about basically how females of the species get, of many species and really all get labeled as that kind of maternal gentle side. But this book talks about all of the species that break the norm. And there's so many that it actually they're, that isn't the norm. And the first chapter, she actually talks about Darwin's work, which was so influential for her as an evolutionary zoologist and the role of, or maybe I'll just say the impact of having really all male zoologists who developed that work. And like so much of

what Darwin wrote was correct, but there was a bias even back then that underpins the basics of how we understand science and sexual differentiation, it's really like.

It's deep. I was like, wow, when you lift the lid, this goes way beyond humans. And this problem is like really, really, it runs deep and it's been generational.

Kayla Osterhoff (14:07 - 14:35)
Absolutely. And you know, this isn't a new issue that we're facing. This is something that's been around since as long as we've all been around. And it really dates back to this male bias that we find within our science, within our really societal level ~ policies and even our economy, everything. But there's actually a good reason why it is the way that it is.

Jaclyn Smeaton (14:35 - 14:36)
Please. Yeah. Tell us.

Kayla Osterhoff (14:36 - 20:51)
It all starts back in ~ looking back in human evolution. We want to start with the agricultural movement. This is when people stopped being nomadic and they started settling and growing crops. This created the first ability for economy, even though economy wasn't established at that point yet, but this was the starting point of economy and society as we know it today.

And so what this did was ~ land rights and ownership had to go under ~ the name or the ownership of a person. And it just so happened that the men were the ones working and tilling the ~ land most often and owning the cattle and all of that. Right. So the land ownership rights ended up going under the male name, the male last name.

Because of that, ~ what happened is that ~ when the male last name became kind of the benchmark for everything that fell underneath of that, ~ women and children were also included under that ownership. And so that's where the beginnings of a woman taking a man's last name started was for to put all the ownership of the assets under one name. And it just so happened to be the male name. Then, you know, we have thousands of years of that and we fast forward and we go into the age of enlightenment. And during that time, this is when our first scientific and research institutions pop up. This is when our first universities come into play. This is when we start asking.

the big questions and we, this is basically the beginning of science as we know it. And during that time, it was mostly males that participated in that whole environment. So males were not only the teachers, they were the students, they were the researchers, they were the scientists, they were the philosophers. There were very, very few ~ instances of women playing in those spaces.

Then we go from there and we fast forward to the Industrial Revolution, which was another thousand years or so. When we hit the Industrial Revolution, find ~ true industry. This is when industry was established. This is when we find big cities. This is when we find the beginnings of ~ economy and economic policy as we know it today. That's when it was all started to establish and really put on the map. And at that point, it was still men who were mostly playing in those spaces. There was a big divide between home roles and work roles. This is when the nine to five work schedule was established at this time. This is when labor forces and labor ~ rights and labor laws were put into place.

Oftentimes women were not even allowed legally to work in these spaces or do that type of labor. So again, it was mostly men and males who were operating within these structures. Then we go all the way to basically a hundred years ago. So we're talking thousands of years, right? Where mostly men are operating within the structures and creating the structures and building the policies and the systems and all of that, right?

They're the main players. Then only a hundred years ago, which is basically like a blink of an eye in this timeline, women hit the scene in a significant way because we go into the World War era. And when that happened, a lot of the men who were the workforce were involved in war efforts. And there was a requirement for women to then step into these spaces and start to become an important part of the labor force and the workforce.

And this is also when women's rights and women's empowerment movements were going on. so women were then able to ~ not only work, but they were also able to establish their own identities in a more powerful way. were established ~ ownership rights of things, properties, bank accounts, ~ you know, these types of things that mostly men had the roles of prior to that. And then we fast forward to today, which is the age of information.

And so it's all about data. Everything that we do is evidence-based. Data is king. Everybody wants data, and everybody wants the fastest, cheapest data possible. And everything that we build in our society is based upon our data. Now, here's the big problem with that. Our data, even to today, because of what we were talking about earlier about women not being included in our scientific inquiries, in our research, in our data, really up until about 15 years ago, we started to see a little bit of a shift, but even to today, it's still vast majority male centered, male focused when it comes to research and data, especially around health. So if we think about that, we have this whole data set and database that is probably somewhere close to 99%, coming from male subjects ~ in all the data that we have. And this is the data that we have built our society upon evolving from all of these societal mechanisms that come from ~ the male perspective and the male experience because

they were the ones who were active within these systems for the vast majority of the time. So again, there's a reasonable explanation of why we're here and where we are.

Jaclyn Smeaton (20:51 - 21:58)
This is so fascinating. And I really appreciate you walking us through kind of the, the history of social change and just kind of acknowledgement and the role of the different genders. And you've done it in such a non-political way, which I feel like is an additional, additional wow is deserved there. But, you know, I think even, yeah, even well-intentioned individuals who like embraced the role, the important role that women play, like there was just this cultural overlooking of the importance of research for that gender. And I'm appreciative that it's changing, especially as women's lifespans are getting longer. We are seeing that there's some really important critical gaps in research that we really need to spend some time to overcome. So given all that history, what do you see as the top problems today? Like that where...we've under researched and it's affecting women's health today. Are there any key areas that really stand out to you? Like maybe it's drug metabolism or you know, are there thinking like, ~ gosh, these are the top priorities that we really need to like figure out what's going on?

Kayla Osterhoff (21:58 - 23:36)
Yeah, mean, drug metabolism is for sure an issue, but it's bigger than that. So drug metabolism can affect all kinds of disease areas, right? And we know now that estrogen and progesterone levels ~ have a significant impact on how ~ drugs are metabolized and to what extent and what rate drugs are metabolized. So that is something that we need to take into consideration ~ when we're prescribing and it needs to adjust to those levels as they change and shift not only through the month, but also throughout the lifespan and different life phases. And it's not something that we're doing, but it is something that is needed in order for women to be healthy and thrive. But I would say zooming out from there, we have all of these ~ disease area discrepancies where women are vastly more affected and the research is still favoring male subjects and also favoring, ~ disease areas that affect males more than females are getting a lot more funding. So there's still this bias at play. That's still, part of the old systems and structures that are still very much alive today, unfortunately. ~ and that shows up in things like autoimmune disease, which mostly affects women, but gets, some of the least funding out there. It's things like multiple sclerosis. It's things like, know, name any one of the autoimmune diseases, lyme, lupus.

Jaclyn Smeaton (23:36 - 23:38)
Yeah, exactly, yeah, so many...

Kayla Osterhoff (23:38 - 25:24)
So, there's these things and they're also categorized as ~ difficult to diagnose, ~ kind of hard to put your finger on, very difficult to treat or sometimes even untreatable. They call it manageable but not treatable, right? And the reason is because we just don't have enough research to tell us what's the underlying mechanisms and what's actually going on and what the important sex differences are. Also spans over to ~ bigger swaths of problems like mental health. We have ~ depression and anxiety that affects women almost twice as much as men. And this affects not only women's health, but it also affects our economy, our national and global economies, as well as we see women who are let down by the medical society, the medical community, their doctors, ~ and struggling with their mental health, but we don't have a lot of research that's focused specifically to understand what are the sex-based mechanisms that cause women to be more sensitive or more impacted by certain mental health disorders. And even to this day, we still don't have the research focus efforts funding and the proper research ~ mechanisms in order to really understand these important sex differences. However, we do know for sure that there are significant sex differences that do cause a different disease ~ progression and manifestation in men versus women.

Jaclyn Smeaton (25:24 - 27:48)
Yeah, it's so interesting because I think I see this borne out even in the clinical setting like on a day-to-day basis where a patient comes in and they're like, yeah, my GP ran my hormones and here's my estradiol and here's my progesterone and you're like, well, what day or cycle did you test it on? And they're like, I don't know. Yeah, exactly. And you're like, okay, well, the normal range is like zero to a million and like, you were somewhere in between, but is that normal for the day that you tested? But even that kind of...like fundamental distinguishing factor of like understanding hormones fluctuate and understanding if you're going to evaluate them, you should choose the right day and compare it to what would be normal for that day. That is something that really doesn't get taught and even to integrative providers. Like when I'm speaking, I'm asked that question all the time.

How do I know when to time? And I'm so glad people are asking. So if you're one of those people who's asked, this is a call out for how awesome you are because I know you're critically thinking. But I mean, even just those fundamental basics of, I mean, let's shift gears a little bit to talk about hormone stuff because this is, know you're really where you're spending your time today is like that hormone optimization and the connection to

neurology and mental health. And I really want to have the time to talk about that. But this is just like the basics.

You know, we're starting to think about it more. We're starting to ask those questions. And this is an area that I really want to shift and talk with you about, because I think our understanding, particularly of like neuropsych conditions and hormones, it's getting better. There's more people interested. There's more people asking questions. And it's there's critical connections. I saw this interesting study that popped up on my PubMed feed. I should have saved it, but I didn't because I have like HRT as a like a proactive search that delivers results into my email inbox. I should show everyone how to do it on the podcast because it's fun. I'm sure you do that too. Yeah. But it was a study on women in the VA who had served in wars and women who had been on HRT had like multiples lower suicide rates compared to women who were not put on HRT, who were suffering with PTSD and some of the symptoms that a lot of our veterans have to handle. even those fundamental basics, like...I'm glad we're finally asking these questions and like how amazingly profound that hormones could have that kind of an impact on a woman.

Kayla Osterhoff (27:48 - 29:21)
100%. And the biggest mistake that we're making within our scientific and medical communities is ~ looking at estrogen and progesterone and luteinizing hormone and follicle stimulating hormone and testosterone as just sex hormones, as just reproductive hormones, because they're not, they're also critical neurotransmitters. They're critical global...physiological modulators and they affect in the female body specifically estrogen and progesterone affect every single system globally. We're talking cardiovascular system, the respiratory system, the musculoskeletal system, the metabolism, the immune system, the neurology, the brain. And of course that has an effect on a woman's experience and her life and not only her health, but her mental health, but also the way that she is able to show up in the world and how her day goes, right? And these are things that we're just still not understanding, even though it's getting acknowledgement, we're still not really understanding all of these mechanisms and how they all tie in together because we're still looking at things in such a siloed way. And that is a mistake. You know, when we look at the reproductive system, just as the reproductive system, we've already made the biggest mistake that is really oppressive to all women. And we have to move away from that model.

Jaclyn Smeaton (29:21 - 30:24)
Meaning we have to like broaden the way that we view estrogen, progesterone, testosterone. I think, I mean, I would say and argue that that's also the case for men because when we think about testosterone as a male hormone and estrogen as a female hormone, which is how they get simplified today, you underestimate actually like every

male's cell has an estrogen receptor in it as well. It's like estrogen is the first compound known to bind to a receptor and change the nucleus and activate transcription. That's in males and females. Exactly. I completely agree with you. I think even if we look at males, to understate the importance of estradiol in males is equally problematic. I'd point that up not to counter. Women's research is underrepresented. need understand it more to say that this is a problem really across the board that oversimplification, completely agree with you.

Kayla Osterhoff (30:24 - 31:32)
It is, however, it is much more important for females to acknowledge because of the simple fact that from day to day, the male biology, neurology, all those other systems I mentioned, they operate on a repeating 24-hour system that is more in alignment with the adrenals and the circadian rhythm than anything else. And so for them, even though we're simplifying things, it works because they're biological processes are the same and consistent from day to day. So it's actually okay to do that. It's not harmful for us. Yeah, it's extremely harmful because we're not the same from day to day. There's changes happening every day, little by little. And there are several big, big changes that occur throughout the month for actively cycling women and over the lifespan for all women ~ that are ~ like critical, shifts in biological function that males don't experience. And so that's why it ends up being more of a women's health issue. yes, oversimplification is.

Jaclyn Smeaton (31:32 - 31:56)
That makes a lot of sense. So let's shift gears a little bit and talk a little bit about the role that like fluctuations in estrogen, progesterone, cortisol influence the brain. And because I know this is an area that you've really specialized in. When we think about mood and cognition, tell us a little bit more about the role of the menstrual cycle and the hormonal changes that happen with the menstrual cycle on those conditions.

Kayla Osterhoff (31:56 - 34:51)
Yeah, again, we want to kind of zoom out and look at estrogen and progesterone through a new lens. ~ And this will shift the way that we see women's generally because estrogen and progesterone both have a pretty extreme impact on our brain and our nervous system. All of the other systems I mentioned, but this has an effect on our cognition, on our mental health, on our ability to focus, on our cognitive skills, ~ and all of these things. I'll just kind of go through a regular cycle, ~ but I'll talk about it in the lens of what I call the biorhythm. So the female biorhythm is this month long rhythm that is set to the pace of the ovarian hormones, but it's not just the menstrual cycle as we talked about before. It's actually this global biological system that ebbs and flows and everything has a shift based on where these hormones are at these different checkpoints throughout that month long cycle. And the male biorythm, as we were just talking about before, is a daily rhythm set to the pace of

two different hormones, is cortisol, melatonin, that sleep-wake cycle, and everything seems to follow that ~ circadian rhythm versus a sex hormone rhythm in males.

So going back to the female biorhythm, when we start at the very beginning of the menstrual cycle where estrogen and progesterone are at the lowest level, and all the sex hormones are at the lowest level, this is during the period menstruation. this is oftentimes when women will feel very ~ tired, they have less energy, they have less of an ability to kind of have this mental focus. They may struggle with things like ~ depression or anxiety a little more strongly during this time versus other times in the cycle. And all of that makes a lot of sense because when estrogen specifically is low, it has an impact on key neurotransmitters, our excitatory and mood boosting neurotransmitters that subdues their activity. things like epinephrine, norepinephrine, glutamate, serotonin, dopamine, all of these excitatory and mood boosting neurotransmitters are positively correlated with estrogen, meaning when estrogen is higher, the activity of these neurotransmitters are higher.

Jaclyn Smeaton (34:51 - 35:24)
Sorry, just to take that one step further, the research shows women feel good when those hormones are higher. This I want to call out because I think estrogen gets a bad rap. So many people are like, estrogen dominant. It's such a problem. We love progesterone. Progesterone, I joke, is like the princess of the hormonal system. People love to think about it and talk about it and give it. I just want to reiterate that because...this is what the evidence shows. Like I don't give FGEN a bad rap. It's not a bad guy. It's so important. It's important to make us feel great. So thank you for calling that out so clearly.

Kayla Osterhoff (35:24 - 37:51)
Yeah, estrogen is really king when it comes to women's brain health and function. ~ I would say it's the most important neurotransmitter that we have as women for our brain health. Now, of course, issues come in when we look at estrogen detox, and that's really what we're talking about when estrogen gets a bad rep, but most people don't really understand what that means.

Anyway, when estrogen and progesterone are at their lowest level, this is kind of a downshift of the whole female biological rhythm. This is a downshift of all of these global physiological processes. Everything from metabolism to some of these brain functions that we just talked about to ~ nervous system regulation all take kind of a downshift, meaning it's happening slower within the female system. It's kind of like a pause moment. ~ A lot of people will call it like the winter of the cycle. ~ It's that hibernation. It's the going inward focus that happens during that time because we have less resources as women. And so if

we understand that, we do kind of want to go more into a hibernation type of mode in order to conserve and utilize our resources that we have in a more smart way.

So then we go into the next ~ phase of the menstrual cycle, which is the follicular phase. And that is when estrogen is rising to a peak. This is kind of the key hormonal checkpoint at that time. ~ And when we look at the biorhythm at large, what's happening is the female metabolism is starting to ramp up. And that means ~ not only is there more fuel for the body because both glycolysis, glucogenesis, free fatty acid availability, all of these things are becoming more optimal in the way the metabolism is working during this time. And so it's converting food into fuel, you know, taking our fats, carbs and proteins, metabolizing it through the citric acid cycle. Sorry.

Jaclyn Smeaton (37:51 - 37:55)
Yeah.

Kayla Osterhoff (37:55 - 38:32)
Metabolizing through the citric acid cycle and converting into ATP, is, you know, the power, the generation for the cells. It is our energy that we have for our body. And that whole process is starting to speed up as estrogen rises. And so of course, women in turn start to feel like they have more energy because they do. ~ They start to feel a little bit better because again, those neurotransmitters that we talked about, those excitatory and mood boosting neurotransmitters are also ramping up in their activity as estrogen rises.

Jaclyn Smeaton (38:32 - 39:23)
What's really like pre-ovulation period where you're like, really interesting because I know the idea of biorhythms is like, I mean, it's known obviously that hormones fluctuate, but let's say the impact of biorhythms on women is sometimes overstated like in social media and very controversial. like you need to do this type of workout this time and this time at this. You need to eat these foods. There's optimization, but there's not, you know, and there's alignment, but sometimes it can go too far, think, the suggestion made. this is a big one that I've personally experienced, which is that energy boost pre-obulation. And I lift weights, and I find that the workouts I do in the two to three days before I ovulate, I lift so heavy. And it feels easy. I completely am having that personal light bulb moment with what you're saying right now.

Kayla Osterhoff (39:23 - 39:46)
There's actually ~ the area that has the most amount of data and research is looking at female athletic performance in relation to menstrual cycles. And so there's a lot of evidence that explains what's going on there. But essentially women have higher power, strength and endurance as estrogen rises. So it's that simple. Apply that how you will.

Jaclyn Smeaton (39:46 - 39:49)
Like getting us ready for reproduction.

Kayla Osterhoff (39:49 - 43:09)
Exactly. Yeah. So what's also interesting is when we look at like cognitive skill sets, we see that women ~ have different stronger cognitive skills in different phases of the biorhythm because of these different levels of hormones. And it affects how the brain operates differently. And this is very new research and some research actually that I'm about to publish that I've done, looking at the EEGs of women throughout their menstrual cycles, ~ shows that there are significant changes in the electrical activity, the connectivity specifically of the female brain and how essentially different areas of the brain speak to each other at different times in the cycle because of mostly the impact that estrogen has on how the brain functions in women.

Yeah. So it's really, really interesting. There's a lot more that we need to uncover to truly understand what's happening here. But again, if we want to take broad strokes that are applicable to any woman, we can understand. And we know for sure that these excitatory and mood boosting neurotransmitters are positively correlated with estrogen. So what does that translate to? It translates to more mental energy, the ability to focus better.

And there literally is more fuel for the brain because of the metabolic shifts that happen in the higher estrogen states. So oftentimes not only will we have higher power strength and endurance in the gym or whatever physical activity we're doing, but we also can work longer hours and focus longer on work projects ~ and be able to have more of this outward social focus within our lives. And one interesting thing is that our, communication skills and our emotional intelligence, which isn't, it's hard to measure emotional intelligence, but our emotional intelligence ability in a functional way, increases also as estrogen increases. And when we hit this peak of hormones that happens around ovulation where estrogen hits its peak, ~ we also get this nice little peak in, luteinizing hormone, follicle stimulating hormone and testosterone, it creates this whole ~ hormonal cocktail that makes women feel usually their best unless there's some major dysfunction going or there's some detox issues. Then it can make women feel really actually quite sick. ~ But ~ that's kind of that peak point where we hit that phase three of the biorhythm where it's just this beautiful cocktail of hormones that make women feel their best. And here's the mistake that women are making. Here's the mistake that we're making as a society by allowing this to be the case is that when women hit this point where they feel basically like superwoman in comparison to the rest of the month, they set their bar there. They set their personal bar there.

Jaclyn Smeaton (43:09 - 43:10)
Of course we do.

Kayla Osterhoff (43:10 - 43:34)
Their performance bar there. They set their work goals there. They set their family goals there, their social goals there. And it's simply not sustainable because it's about three days maximum that you're going to feel this way. And it's just, it's not something that we can set a bar to. However, it is something that we can leverage because it does occur every month while we're actively cycling.

Jaclyn Smeaton (43:34 - 43:43)
That's a really great reframe. So let's just pause on that. This is such an important thing to reframe. And have you ever read the book, The Red Tent? It's like a classic. The concept of it. in historical cultures, women would kind of come together during the time of menstruation. And women often menstruated on the same rhythms because we were living more connected to nature and with the moon. And a lot of women cycle with the moon.

Kayla Osterhoff (43:43)
I know, but I'm familiar with the s-

Jaclyn Smeaton (44:01 - 44:43)
They've gotten away from that with artificial light, but it is shown to have happened historically. So women would kind of remove themselves and menstruate together. And it's such an interesting thing to think about as you talk about these shifts and changes because it was a time of separation from the same level of expectation for performance and relationship and engagement and a time to kind of sit in quiet, camaraderie in a way. It's really interesting how that, when you look at that historical practice, it really looks to be in line with what science maybe would suggest.

Kayla Osterhoff (44:43 - 47:05)
100%, what's also really interesting about that from a neuroscientist perspective, something that I've really ~ dove deeper into to understand what this was, not only from like a cultural perspective and the power and significance of having that skillset of the women within the community being able to utilize ~ the benefits of their cycle for communal ~ progress.

But also from a neuroscientific perspective, there's some really interesting things that happen. One of which is during that low hormonal state of menstruation, which again, we talked about is like this whole downshift of all the female physiology. There's also really interesting things happening to how the brain functions during that time. And one of the cognitive skills that actually gets stronger during menstruation is a woman's intuitive ability,

really what that translates to is discernment. A woman has a higher ability for discernment, meaning she's more sensitive and is able to take in more cues from the external environment and process them through her internal environment to make better decisions. So now if you think about that in the context of a whole society of women, because at that time society was tribes, right? They were smaller units. So let's think of that as our, let's just say our country, the United States is a tribe, right? And let's just imagine that we don't have all these endocrine disruptors and we don't have artificial ~ circadian rhythms and lights and all these things disrupting us. And we're all cycling mostly with the moon. If you have a whole country where all the women within that country, are going through this phase of a few days around the same time and they have this higher ability for discernment. They have the permission from society to slow down and tap into this higher level of wisdom and intuition within their body and within their brain. What could we do with that? We'd be able to change the world.

Jaclyn Smeaton (47:05 - 48:03)
Yeah, absolutely. And it really is, again, another, I think, really cool reframe, taking science and biology and like helping us understand, because I like how you say, a lot of women describe that time as like PMS-y, right? So it gets this negative connotation of like, what you described as a sensitivity becomes a negative thing. And what I'm hearing you say, which I love, and I'm going to repeat and shout from the rooftops and spread this kind of new lens to look through, which is that that sensitivity is actually a gift that helps women go through a time with greater sensitivity to discern the environment around them and make decisions that are best for themselves and their families and things like that too. So I just, really appreciate that reframe. It's a nice, if any woman's ever gone through that period and felt frustrated at feeling irritated, sad, withdrawn, you know, it's just, I appreciate when we have the opportunity to like flip the coin over and look at the other side from a different point of view. So thanks for giving that to us all today.

Kayla Osterhoff (48:03 - 49:44)
Of course, it's my pleasure and really, you know, the negative experience that women have during that time comes from a societal level misunderstanding of what's happening and what's needed and a lack of acknowledgement and permission for women to do what's best for themselves during that time, which essentially would be best for their communities, for their families, for, ~ you know, larger swaths of people that women tend to be the center of.

So, yeah, so we can, even though we're not doing this as a country or even as a state or even as a community wherever you are, we can do that as individual women kind of taking

our, ~ power of our body back into our hands and say, you know what, this is what's happening with me on a biological level. These are my basic biological needs.

And I'm also going to lean into and leverage the benefits that are available to me when I take care of my biological needs as they change and shift throughout the month because so much more becomes available to us if we start to operate in harmony with our body and understanding what's happening in our body and what's needed. And again, there's so much more that needs to be discovered and uncovered and researched to really explain more of these mechanisms and understand the full picture, but we do have enough data and enough inputs at this point to understand that this is the most powerful mechanism within the female body that is the entire operating system, which is very different than the male operating system.

Jaclyn Smeaton (49:44 - 49:51)
Gosh, I can't believe we're 45 minutes into this podcast because I feel like we're just getting juicy and I have a lot of questions and a lot more I want to explore with you.

Kayla Osterhoff (49:51 - 49:53)
Well, we might have to do a follow up.

Jaclyn Smeaton (49:53 - 50:22)
I think we might, but there are two more areas that I want to cover today. The first is what women can do with this information. How do you recommend women leverage these periods of their cycle? So that's number one. The second one is about kind of biohacking and tracking and hormone measurement, of course, something that we're really passionate about. We cannot let you off today without spending some time talking about your perspective on that. So where do you want to start?

Kayla Osterhoff (50:22 - 55:25)
So we'll start with both of those things, but I do want to back up and just finish. We ended at the third phase, but we have the whole fourth phase that we didn't go to. So just to let women know, we didn't leave you hanging. You do have another fourth phase, which is actually the whole back half of your cycle, the whole back half of your biorhythm. And this is ruled by progesterone, not by estrogen. So the first half we have estrogen is our main star player. This is what's causing most of the changes.

Then we have progesterone come into play. And as you mentioned, progesterone gets highlighted as like the princess of the hormones. We all love it. We all want more of it. It's oftentimes the first thing that we get when we go for HRT. ~ And it's related to providing like this natural anxiolytic effect. So it's like this helper to help us regulate our nervous system. It's this helper to... to provide a little more ease and improve our sleep and do all the things

that we really do require and need during this time because estrogen is low again, which means that our stress capacity, our ability to regulate our nervous system is shrinking. So we've all heard the ~ concept of the stress bucket, right? Everybody's stress bucket is a certain size based on the quality of their nervous system. And...as the quality of their nervous system changes, their stress bucket might get smaller or bigger. so there's two things that are important here. One is how much stress is going into the bucket. So this is everything from toxins, the foods that you're eating, ~ relationships, stress, environmental factors, ~ any kind of type of stress you can think of, exercise, positive forms of stress, it all goes into the bucket. And then the other thing is the quality of your nervous system, which determines the size.

So what happens in women is our stress bucket gets bigger and smaller throughout this biological rhythm based on the levels of our hormones. And so when we are in the higher estrogen states, our bucket increases naturally. And when we're in the lower estrogen states, our bucket decreases. But progesterone comes in and actually helps. So it increases it as estrogen is decreasing it. So essentially we want to get to a point where we're kind of even where we're regulated with levels of estrogen and progesterone so that that stress bucket doesn't have huge shifts. But we also want to be aware that our bodies are more sensitive to stress as we go into that fourth phase, the luteal phase, and as estrogen decreases again, especially as we enter closer to that first phase again of the menstruation. So we want to keep those things in mind. These are all at play. But the important part is progesterone rises to a peak during this phase. And what progesterone does specifically to the brain, we talked about what it does to the nervous system, but what it does to the brain is pretty interesting. It increases brain derived neurotrophic factor, which is one ~ area of interest with progesterone, which increases our neurogenesis and our neuroplasticity. So what that means is our brains are a little more plastic and adaptable during that high progesterone state. What that translates to is a higher ability to like adapt, to learn, to be more resilient, essentially. The other thing that's even more important than that, that has a stronger impact on the female brain is that our GABA neurotransmitter gets upregulated and our microglial system within the brain gets activated by progesterone. So what that translates into is better ability for higher quality sleep, but it also requires more sleep during that time. And it also requires us to be prioritizing sleep.

Otherwise, we don't get those same benefits. ~ So this is why I call it the brainy phase of the biorhythm because our ability to grow, adapt, learn, also kind of co-regulate with the environment can be enhanced during that time if we're understanding that our needs and requirements are changing, ~ including the metabolism, right, which is slowing down. But there are different metabolic requirements, ~ including a higher caloric need during this

time. So these are all factors that need to be taken into consideration. And again, they're broad strokes, but things that women can start to think about now in the way that they operate and start to adjust little things within their flow, their environment. This gets into that next question that you asked. What can women do with all of this?

Jaclyn Smeaton (55:25 - 55:55)
I think you're right that we're going to need a second episode on this one because I don't think that that's a brief answer. And I really want to make sure we can be thorough about that because I think there's so much that can be done. this is a packed conversation. I think the last question that I have for you is really around ~ like monitoring hormones, testing hormones. Tell me a little bit about your point of view on how those are helpful, when they should be leveraged.

Kayla Osterhoff (55:55 - 57:46)
This is of paramount importance, not only for individual women, but also for research, for medical practices, for ~ educational purposes. This is something that needs to be a critical gold level standard within all of these areas. And unfortunately at this point is not. And this is why I love Dutch. I send everybody to Dutch. I make everybody go get a Dutch.

I really think that Dutch plays and can play a very critical role in the way that we are shifting our research practices to not only accommodate women, but to serve women better, which is happening little by little. ~ And what we need to do is we need to make hormone testing, quality hormone testing a requirement for the way that we're studying women, for the way that we're treating women. And it needs to become just an easy, there needs to be an easier way and a more accessible way for women at home to be able to test their hormone levels or at least do it on a regular, some kind of a regular basis every six months or something like that, where they can understand what's going on within their body because as we've talked about through this whole podcast, these hormones, are of such critical importance to every single aspect of our health and of our lives that we're flying blind and it's absolutely wild. Like this is the most important piece of our health that we need to understand. And basically none of us do unless we go to the extreme efforts to seek this information out and get it for ourselves.

Jaclyn Smeaton (57:46 - 58:53)
Yeah, it's fascinating because I completely agree with you. mean, you're speaking about women who have regular cycles too and just like adapting to the changes of a regular cycle. But then you think about people with irregularity or let's call it cycle-timed symptoms like migraines, depression, anxiety, whatever. This is like an untapped research opportunity for us to better understand how we can help people. And one of the things that's really interesting is like even

Well, the role of hormone change within conditions like PMS and PMDD are now understood to not only have a root cause of hormone change in some women where hormones are irregular, but that some women with regular changes in hormones experience greater symptom pictures. That can be very severe. So we're just trying to understand step one, which is what are your hormones doing? But then you have to layer on what are all those downstream neurotransmitters, inflammatory factors, all the things that you mentioned earlier, what's happening downstream and... Well, I'm glad you're in the mix with the research, Dr. Osterhoff, because we definitely need this information.

Kayla Osterhoff (58:53 - 1:00:32)
Yeah, I'm very happy to be in the mix and kind of at the forefront of these policy changes within our research. It's really, really important ~ and really understanding all of women's health through the lens of what are these hormonal drivers and factors. ~ I think is of very critical importance to start teaching our young girls starting in elementary school before they go through their big hormonal change, they should learn the importance of what that's going to mean for their life and how to navigate with it and be provided tools so that they can measure and understand as they go through their life. ~ And, you know, I think as we start to improve our research practices, which is something that I'm very passionate about and actively working within our U.S. government and our global ~ health ~ policy, is to improve research standards and quality, including hormone monitoring for all female subjects, ~ which is of such critical importance, not only for women's health, but really for global economic policy, ~ really for all of our infrastructures and systems that we talked about, the way that they've been developed within the US and globally, ~ need to have this critical data and information in order to serve better half of the population in order to support half of the population that now is actively ~ operating within these systems.

Jaclyn Smeaton (1:00:32 - 1:00:38)
Fabulous. Well, if listeners want to learn more about you and the work you do, what's the best way for them to find you?

Kayla Osterhoff (1:00:38 - 1:02:13)
Yeah. So I would love to connect with anyone who wants to learn more about the female biological rhythm, about female neurophysiology, and even about women's health policy, research practices, ~ education practices around women's health. You can connect with me at doctor.kaylaosterhoff on social media. So Instagram is the best place ~ and feel free to send me, a there. I answer all of my messages personally, so just give me a little time if you do, but I would love to connect with you there. And then you can check out my website, ~ herbiorhythm.com. There's a lot of information about the different initiatives that I'm

working on and ~ different programs that you can learn more about the female neurophysiology through.

And one thing that I'm really excited about is a women's mental health practitioner certification that will be coming out later this year that brings in all of the neuroscience and the neurophysiology aspects as it relates to women's health and also shines a light on some of the gaps of knowledge that we have here and the limitations that we're working with in some of these medical practices, even looking at things like PMDD or ADHD as it applies to women and how we're operating with these different medical practices. So I look forward to that as well and ~ stay tuned if you're interested.

Jaclyn Smeaton (1:02:13 - 1:02:31)
Thank you so much for joining me today. Like I said, we're gonna have to get you back on for like a episode two to dive into more about what women can do in relationships. There's obviously so much to unpack and uncover here. And you're really offering so much to the community. So thank you so much for joining me today.

Kayla Osterhoff (1:02:31 - 1:02:33)
Thank you so much. look forward to it.

Jaclyn Smeaton (1:02:33 - 1:02:41)
If you're wanting to learn and really expand your expertise in hormones, you're not going to want to miss our podcast. So make sure you tune in each and every week for our new content.