Dr. Allison Brager: Improve Sleep Efficiency & Resilience

Perform with Dr. Andy Galpin · Episode 18 · March 26, 2025 · Transcript

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Dr. Andy Galpin
The science and practice of enhancing human performance for sport, play, and life. Welcome to Perform. I'm Dr. Andy Galpin. I'm a professor and scientist and the executive director of the Human Performance Center at Parker University. And today I'm speaking with Dr. Allison Brager. Allison is a neuroscientist who has spent most of her career focusing on sleep, and specifically sleep resilience, which is one way of thinking about how to become more efficient and effective with sleep regardless of the situation. Classic examples of that, her research has looked at everything from athletes traveling from one coast to the other coast, military individuals, sleep on Antarctica and in space, as well as just a ton of research for regular people in how do we just become the most effective we can. What effective sleep is, is actually something I learned a lot about today, and something that you will pick up on as Allison shared what that actually means, how you determine it, how you can actually become more specific and precise to your individual sleep needs, and overall how to better think about sleep for not only surviving, but thriving.

Dr. Andy Galpin
Allison is a fantastic scientist. Her publications are numerous, but she's spent so much time in the field dealing with individuals that I think the true value you're going to get out of this episode is understanding how that information that she has gleaned from her research actually manifests itself in the practical real-world scenario. And so I learned a ton. I know you're going to learn a ton about becoming a resilient and highly effective sleeper. So with that all said, I hope you enjoy today's episode with Dr. Allison Brager. Dr. Allison Brager, thank you so much for coming out. There's a lot of cool stuff I want to get into today. I was hoping we could start off actually with dispelling a huge sleep myth.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
I'm from the West Coast. You're from the Midwest. As you are well aware, there is a huge East Coast bias for sports teams. We all know that. The West Coast gets no love. We get unfair placements and things. Can you please confirm and share with the rest of the world that there is, in fact, a huge advantage for East Coast teams, that it is easier, that they win more, that everything is better, and the West Coast teams are truly at a disadvantage?

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Dr. Allison Brager
It's actually the opposite.

Dr. Andy Galpin
No!

Dr. Andy Galpin
No.

Dr. Allison Brager
During the regular season, it's actually the opposite.

Dr. Andy Galpin
Okay.

Dr. Allison Brager
So that's the classic NFL study that was done by some famous Stanford sleep physicians in the '90s that we sort of reconfirmed in the late 2000s. But this idea that West Coast teams, at least during the regular season, are playing games that are more attuned to their circadian peak than their circadian trough. So basically what that means is, if you just control for biological time, they're playing games more in their mid-morning or early evening. And so that's what gives them this advantage in terms of performance, which has been correlated with injury risk. So they're five times less likely, especially if you look at defensive linemen, offensive linemen, less likely to get injured compared to the New England Patriots and the Philadelphia Eagles and all the above. So I'm sorry, I can't help you with this.

Dr. Andy Galpin
Lies. All lies. I refuse to believe your data. You're clearly bought by Big East Coast sports. I get it. I don't trust it.

Dr. Allison Brager
Hey, I'm actually a huge San Francisco 49ers fan myself.

Dr. Andy Galpin
Even worse. Get out. I coach Fred Warner. He's a good friend of mine. And I tell him, he knows this. He knows I hope he loses every game of the year, but that he wins the MVP. Just like that. I'm open with my rooting on that one. In terms of the injuries, actually, this is sort of interesting. Is there a particular type of injury? Is it brain injuries or soft tissue or hamstrings, or did it sort of just be across the board with types of injuries or something like that?

Dr. Allison Brager
That's a great question. So we more or less just looked at number of weeks spent on injury reserve.

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Dr. Andy Galpin
Yeah.

Dr. Allison Brager
That was the only available to us at the time. But we actually were able recently to get some of the concussion data, because that was something that came out of the NFL lawsuit, is they had to start publicly recording when players had gotten concussed during a game and stuff. So no pressure to my wife, she's trying to help me with those types of analyses now. She's much better at statistics than I am.

Dr. Andy Galpin
Well, I hope she doesn't screw it, and I hope she's not bought by Big East Coast like you are, and we get some real data out of this.

Dr. Allison Brager
She's a Miami Dolphins fan, so I don't know.

Dr. Andy Galpin
She can have it. No one's scared of the Dolphins. Why does it actually matter? How much of a winning advantage is it? What are we talking about? And any insights into... We don't have to necessarily go into deep molecular mechanism, but you're welcome to.

Dr. Allison Brager
Sure.

Dr. Andy Galpin
Why in the world would someone playing a few hours outside of their optimal range actually matter? How does that transfer, I guess, into winning a game?

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
That's a big leap from small thing to winning a football game.

Dr. Allison Brager
Right. That's a great question because these are correlative, they're not causative relationships.

Dr. Andy Galpin
Sure.

Dr. Allison Brager
But it does speak to the robustness of the circadian clock, right? So in general, regardless of if you're a morning person, an evening person, for the most part, the circadian clock and the daily

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rhythms of endocrine function, behavior, and all the physiological processes associated with the circadian clock are predictable. And a lot of these performance attributes have to do with rising levels of cortisol in the morning, right? Upon awakening, that's when cortisol begins to rise, and the Circadian clock begins to reach peak levels of alertness. And then peak levels of alertness are reached roughly around 11:00 a.m. to 1:00 p.m., depending on who you are. And so if you are training, if you are competing during that time, you're capitalizing on that peak of cortisol, which is obviously going to mobilize energy reserves, and contribute to those aspects of attention, vigilance, focus, and all the above.

Dr. Andy Galpin
So it's probably a combination of every physiological factor, physical performance, recovery, cognitive, that's all combining. And I appreciate you saying that was just correlation, but those correlations have been shown in the NBA, the NHL-

Dr. Allison Brager
Yep

Dr. Andy Galpin
... Major League Baseball. I think it's pretty well established at this point that is a real phenomenon.

Dr. Allison Brager
Yeah. I also think too, right, there's a huge genetic component, and that's a lot of what I've studied my whole life-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... is the genetics of sleep physiology and circadian physiology, is I do believe people select for their sport based on if they're a morning person or an evening person.

Dr. Andy Galpin
Interesting.

Dr. Allison Brager
I grew up a gymnast. We always practiced at night. We didn't necessarily compete at night. But I was always coming home from gymnastics practice at 9:00 p.m., doing my homework, going to bed. My parents are both night owls.

Dr. Andy Galpin
Hmm.

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Dr. Allison Brager
And I know, I did the 23andMe raw data analysis.

Dr. Andy Galpin
Sure.

Dr. Allison Brager
I'm a night owl. But I bet it's like that with other sports as well. Like boxing, MMA probably pre-select for night owls. Same with NBA and NHL players.

Dr. Andy Galpin
How much of an effect does it have if you are mismatched?

Dr. Allison Brager
So there actually is data to show that there is a significant effect. There was a study that came out, I can't remember how many years ago, but it was in "Current Biology," and they were looking at rugby players, and they were looking at it in relation to chronotype.

Dr. Andy Galpin
Hmm.

Dr. Allison Brager
And they essentially found that if you had greater inter-individual variability in chronotype on a team, you were more likely those to win rugby matches because-

Dr. Andy Galpin
You weren't as sensitive. I get it, yeah.

Dr. Allison Brager
Yeah. Because you're not just playing games at night-

Dr. Andy Galpin
Right

Dr. Allison Brager
... like an NBA or an NHL team. You're playing games either in the morning, the afternoon, or the evening. Now, I imagine it would probably be the opposite for NBA or NHL teams. I don't know if anyone's actually done this analysis. You probably want less inter-individual variability in chronotype, and you want to pre-select for more evening types.

Dr. Andy Galpin
So we got to start genetically screening people for our draft process.

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Dr. Allison Brager
Gattaca's one of my favorite movies.

Dr. Andy Galpin
Oh, yeah.

Dr. Allison Brager
I'm not going to say it's like the be all end all, but every student that I teach, I always try to expose them to that movie-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... for that reason.

Dr. Andy Galpin
Yeah. It's super interesting. When it comes to chronotype, there's clearly, as you talked about, there are some known genetic components to that.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
I've always been interested, though, of how much of that do we know at this point, and we may not know much, regarding habituation throughout life, right? So if your parents were night owls-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... do you simply become a night owl because of genetic components or because you just simply got brought up in a culture that was like that, language that was like that. Your parents say, "Oh, I'm just a night person," things like that.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Do we have any insights into how much play is genetically predetermined versus systemly grown into the person's behavior?

Dr. Allison Brager
I don't know of any data that exists, but I could say that would make sense, right? Because if

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you're used to being in a household who eats dinner extremely late-

Dr. Andy Galpin
Yeah, exactly

Dr. Allison Brager
... my parents are Eastern European, so we never do anything on time or early, right?

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
So dinner was around 8:30, 9:00, and guess what? I'm still an 8:30, 9:00 p.m. eater. I go to the gym and then I eat really late. But I also go to bed really late and then sleep in and wake up late, too. And whether or not that's nature versus nurture, yeah. We do know at least from adult sleep habits, for example, that the sleep habits that are instilled in you as a child, whether good, bad, or ugly, do carry on with you into college and then when you are an adult and able to make your full decisions. So, a lot of behavioral sleep physicians will tell you that, that's why it's so important for parents to establish bedtime routines and be the examples of good hygiene for their children because that will have a lasting impression when those kids do become of age and can make their own decisions.

Dr. Andy Galpin
Today's episode is sponsored by AG1. AG1 is a vitamin mineral drink with probiotics, prebiotics, and adaptogens. Initially, I was extremely skeptical of AG1, as I am with all supplement companies, but after months of discussions with their lead nutritional scientist and the general team at AG1, I've been impressed by AG1's commitment to sourcing the highest quality ingredients and constantly updating their formulas to have the right ingredients in the optimal amounts. By now, it is abundantly clear that the gut microbiome plays a critical role in everything from body composition to bone health to mental health. And the probiotics and prebiotics in AG1 help to promote a healthy gut microbiome, improve digestion, reduce food cravings, and increase short-chain fatty acids, which play a critical role in regulating metabolism and immune responses. It's for these reasons, and many others, that I personally take AG1 almost every day.

Dr. Andy Galpin
Now, it's of course not a replacement for eating whole, healthy foods, but it is a great way to make sure that you're plugging in any gaps in your nutrition to improve your energy, bolster your immune system, and just generally help promote a healthy gut microbiome and more. If you'd like to try AG1 You can go to drinkag1.com/perform to receive five free travel packs plus a year's supply of vitamin D3 plus K2. Again, that's drinkag1.com/perform to receive five free travel packs plus a year's supply of vitamin D3 plus K2. Today's episode is also sponsored by Eight Sleep.

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Eight Sleep makes smart mattress covers with cooling, heating, sleep tracking, and more. I've personally been sleeping on an Eight Sleep mattress cover for years now, and it's absolutely glorious. I love it so much that I hate traveling away from home because it means I can't sleep on my Eight Sleep Pod 4 Ultra. As you'll hear me talk about endlessly on this podcast, there really is nothing you can do that makes more of an impact on your health and performance than getting tremendous sleep.

Dr. Andy Galpin
And getting great sleep requires having your body temperature drop a couple of degrees at night, and that's hard to do on your own. The Eight Sleep has been a game changer for me because I run hot at night, or as my wife calls it, I'm a furnace. If I don't have something like an Eight Sleep helping me cool down, I'll wake up in the middle of the night overheating and not feeling great. This is something I've also found in many of the people that I coach, especially those who are really physically active. The Eight Sleep Pod 4 Ultra has two times more cooling power, yet is virtually silent, and it has high-fidelity sleep tracking and even has snoring detection that'll automatically lift your head a few degrees to improve airflow and stop your snoring. If you'd like to try Eight Sleep, go to eightsleep.com/perform to save $350 off your Pod 4 Ultra. Eight Sleep currently ships to the US, Canada, the UK, select countries in the EU, and even Australia.

Dr. Andy Galpin
Again, that's eightsleep.com/perform. Do we have any insights on how changeable chronotype is? So if you, say, got a job and they said, "Allison, you have to be into work at 7:00" and whatever the case is, and you had to change that, how long would it take you to shift into a position where you didn't feel horrible getting up at 5:00 a.m. versus 8:00 a.m., or wherever it went to over time? Are you like a midnight to 8:00 sort of person?

Dr. Allison Brager
I am.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
Yep. My preferred is 11:30, wake up between 7:30 and 8:00.

Dr. Andy Galpin
So if that got shifted by two or three hours, I guess two-part question, can you actually change your chronotype? And then obviously you can adjust to that time independent of changing chronotype. So the second question then is how long would it take you to truly--

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Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
It'd probably take you a few days or a week to where you're not waking up feeling terrible, but you would not be optimized, would be my assumption.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
How long would that take?

Dr. Allison Brager
So I come from the camp of researchers, nature over nurture. And I'll use preclinical animal models as an example. We have engineered transgenic mice to be extreme early morning owls, or extreme early morning larks, or extreme night owls, all through manipulation of the circadian molecular clock.

Dr. Allison Brager
And you can present them with different stimuli in the environment. In the circadian world, we call them zeitgebers.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
So you can present them with repeatable, predictable photic information or non-photic information such as food, some type of rewarding stimulus, exercise, social stimulation, et cetera. But as soon as you remove that predictability of that zeitgeber or time cue, then the organism will revert back to its genetic natural rhythm. And I think the same is true in humans. I'll use, again, anecdotal evidence, but being in the military, at one point, I was a company commander in a leadership position, and in order to establish rapport and camaraderie with my brigade commander, he is an extreme morning person, and he works out at 5:00 a.m. So what that meant is I had to wake up every day at 4:00 a.m. to then get to the gym to work out with him at 5:00 a.m. Again, it wasn't mandatory, but I knew it's just part of the process-

Dr. Andy Galpin
Sure

Dr. Allison Brager
... of being his subordinate. And during that time, I would find myself, if I didn't go to bed exactly at 8:00 p.m., if I didn't keep all those other non-photic things in my life stable, such as when I

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ate, how much I was hydrating throughout the day, et cetera, I got sick pretty often because my body just biologically fights against being a morning person.

Dr. Andy Galpin
So in that particular case, again, you were able to get through it, but you were not thriving.

Dr. Allison Brager
Exactly. Oh, I was not thriving. I wasn't even optimizing. I was just trying to stabilize.

Dr. Andy Galpin
Surviving.

Dr. Allison Brager
Survive. Exactly.

Dr. Andy Galpin
Just getting through the day.

Dr. Allison Brager
Exactly. That's why I tell people, at the end of the day, I will never be anyone important ever in the military, even if I wanted to, because I am a night person, and things such as the military pre-select for morning people. And I am not that person, and I will never be.

Dr. Andy Galpin
One of the issues with those historical organizations, academia is its own little thing, right?

Dr. Allison Brager
Oh, yeah.

Dr. Andy Galpin
In our-

Dr. Allison Brager
That's why I thrived, actually, in academia, right?

Dr. Andy Galpin
Okay, this is what I was getting at.

Dr. Allison Brager
It's a land of night owls.

Dr. Andy Galpin
Yeah. I'm the opposite. I'm a morning person big time.

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Dr. Allison Brager
Yeah.

Dr. Andy Galpin
And I would hate the 11:00 p.m. meetings. I hate just all that stuff.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
But I'm actually wondering if we've done ourselves quite the disservice-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... in those organizations of saying no. Obviously, hopefully we're past the point where waking up early is a badge of honor and-

Dr. Allison Brager
Yep

Dr. Andy Galpin
... do those things. But is that culture still pretty true in the military?

Dr. Allison Brager
I would say it's pretty true. I think people who are night owls are considered to be lazy. Yeah, I know I get judged for being a night owl in the military. Yeah.

Dr. Andy Galpin
But you hold your ground pretty good, right?

Dr. Allison Brager
I do. Well, mine's supported by science. I take no prisoners. I don't care what other people think.

Dr. Andy Galpin
So you're going to roll in four hours after everybody else, but you'll stay there four hours later.

Dr. Allison Brager
Exactly.

Dr. Andy Galpin
And get your stuff done.

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Dr. Allison Brager
Yep.

Dr. Andy Galpin
Going back to your mouse studies, we were laughing earlier this morning about how you got a little bit of a shout-out during the State of the Union.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Maybe it'd be easier. Would you mind sharing a little bit about what I'm talking about? Because it's quite funny.

Dr. Allison Brager
Yeah. So, one of the transgenic mouse models I worked on as a postdoc at Morehouse School of Medicine was the Four Core Genotype mouse line.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
It was a mouse line created by Art Arnold out here actually in UCLA. And what it is, is it's a divergence of chromosomal sex with hormonal sex. And the purpose of developing this mouse line is it presents a unique way to look at the influence of chromosomes, so sex chromosomes, versus hormonal release of testosterone and estrogen on just physiology and behavior.

Dr. Andy Galpin
Mm-hmm.

Dr. Allison Brager
So it actually worked out to be an elegant mouse model-

Dr. Andy Galpin
It's very elegant

Dr. Allison Brager
... exactly, to look at sex differences in sleep. So to understand how sleep pressure builds differently amongst biological males versus biological females. And bottom line of using this sophisticated mouse model is we know that a lot of sleep traits are due to this, it's called the SRY gene.

Dr. Andy Galpin
Mm-hmm.

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Dr. Allison Brager
So the testes-determining gene that is responsible for sex differences in the accumulation of sleep pressure across the waking day, and then the presentation of daytime sleepiness. So bottom line being that biological males are more prone to daytime sleepiness, whereas females are not. And then biological females, although they have greater difficulties entering sleep itself at night, the quality and the efficiency of their sleep is greater than males.

Dr. Andy Galpin
How could you have answered that question without that model?

Dr. Allison Brager
We are only answering the hormonal piece of it, really.

Dr. Andy Galpin
But how would you do it without it?

Dr. Allison Brager
So my postdoc mentor, that was his, I guess, landmark study as a postdoc at Northwestern-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... with Dr. Fred Turek. So Dr. Ketema Paul, that's who I worked with as a postdoc, he essentially would remove the gonads of these adult mice, right?

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
So stopping circulation of estrogen and testosterone. But you couldn't see these nuanced differences, and that's why you needed the chromosomal sex and the genetic manipulation piece of it. And it's important to realize that biological sex differences are really complicated. It's not just hormonal sex-

Dr. Andy Galpin
Right

Dr. Allison Brager
... it is also chromosomal sex that seems to play the greatest role on physiology and behavior.

Dr. Andy Galpin
I actually want to go back to some of those findings about sleep pressure and sex differences. But the reason this came up, I guess, in that speech, was this was one of the examples of

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wasteful spending.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
Is that a fair way that it was characterized?

Dr. Allison Brager
Correct. Yes.

Dr. Andy Galpin
And you and I, and I'm sure many people on your team, had a good laugh at that, right? It's really unfortunate, and we're not going to spend too much time here, but it's very unfortunate that a title of a paper, a title of a study section can get cut when really there is tremendous value for all of us behind that with very little attention paid to who's doing it, what's happening, and its categories.

Dr. Allison Brager
Yep.

Dr. Andy Galpin
So

Dr. Allison Brager
Social political norms aside, men and women are different, and these animal models exist to understand biologically-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... why men and women are different. And then when it comes to treating things such as sleep disorders or managing sleep disturbances, which 70% of the world, if not more, suffer from, that's how you target and to address them is through the lens of biology.

Dr. Andy Galpin
Right.

Dr. Allison Brager
But that's just my own humble opinion.

Dr. Andy Galpin
And now you can't even study it.

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Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Because great. Okay.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Let's get back to some of those findings. And that was an animal model. Do we know anything about how much or how little that is actually going to transfer over into human models? Do we have any data on sleep pressure, sleep inertia, some of those other things you brought up that look like they're different based on chromosomes alone? What do we know about the impact on humans?

Dr. Allison Brager
So honestly, I haven't really seen much in the literature.

Dr. Allison Brager
I'm sure you can look at single nucleotide polymorphisms-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... in the SRY gene, for example. But honestly, I don't know if anyone has investigated that per se. I guess you can look at intersex individuals. So someone who has, for example, androgen deficiency syndrome-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... something like that. But I don't think that's been characterized enough in humans.

Dr. Andy Galpin
Tough study to pull off.

Dr. Allison Brager
I will say, so a few months ago-- When was that? It was about a year ago, I presented at the NSCA conference-

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Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... that's geared towards tactical populations, and I did this whole deep dive lecture. I'm sure some people appreciated it, but a lot of people were like, "Okay, where's she going with this?" But I started with the Four Core Genotype model, and then I transitioned into the studies we know about women and sleep.

Dr. Andy Galpin
Mm-hmm.

Dr. Allison Brager
And what's crazy is all this work that was done by Dr. Rachel Manber at Stanford University and Dr. Terry Lee at Yale University it was done in the '80s.

Dr. Andy Galpin
Yep.

Dr. Allison Brager
And it just stayed in this vault for 45 years until, quite honestly, wearable companies, and I'll give a shout-out to Whoop, recognized that we need to focus on female differences in sleep- And a lot of people think that that research is unknown or unheard of, but actually it was done in the '80s.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
And it was done in a very robust, controlled nature, but it was just forgotten for like 45 years.

Dr. Andy Galpin
What do we actually know about sleep differences between men and women? And what I actually want to know about is chromosomally.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
So when you tease out the hormones, how is it that a particular, whether it's a polymorphism or some other activity at the level of the genome, how is that actually manipulating, manifesting itself into sleep?

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Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
Any idea what mechanisms could possibly be there, if it's not endocrine?

Dr. Allison Brager
So in terms of mechanism of action, we know that, again, there's differences in sleep pressure. And if you unpack the onion, sleep pressure is manifest from increasing levels of adenosine production, extracellular adenosine production within the brain, particularly the basal forebrain, which is a wake-promoting area. So if sleep pressure is accumulating quickly, which seems to be the case in biological males by way of the testes determining gene, then there's more rapid accumulation of extracellular adenosine, and the only way to pay off that increasing sleep pressure is through daytime sleep.

Dr. Andy Galpin
Yep.

Dr. Allison Brager
And so with females, it just essentially means their rate of accumulation of sleep pressure is lower, which means that the production of extracellular adenosine would be lower. Now, whether that's been studied, it hasn't, but hypothetically, just knowing with all the myriad of studies around accumulating sleep pressure and extracellular adenosine, we predict that's the mechanism of action.

Dr. Andy Galpin
That's the closest we can come-

Dr. Allison Brager
Right

Dr. Andy Galpin
... at this point, right? Is it fair, is it a trope-- I certainly know that it feels like the guys that I know versus the girls that I know, guys fall asleep fast.

Dr. Allison Brager
Yep. Oh, yeah.

Dr. Andy Galpin
Has that actually been demonstrated? Do we know that?

Dr. Allison Brager
Yep. So that's been demonstrated, again, in these preclinical transgenic mouse models using the

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four-core genotype. It's also been demonstrated in human studies. So in those studies that were done in the '80s by Terry Lee and Rachel Manber, that's exactly what they found, is sleep onset for men is much quicker. But then when you look at time to restorative sleep, so that entry into stage three non-REM and then REM sleep, the latency is quicker for females. So it might take them longer to fall asleep, but to get that restorative sleep, it's much quicker and then much more efficient across the night.

Dr. Andy Galpin
Do we have any teleological or evolutionary guess as to why that setup is there?

Dr. Allison Brager
I think it all goes back to child rearing, right?

Dr. Andy Galpin
Got to be, right.

Dr. Allison Brager
Who's responsible for children, right? Men are responsible for propagating children, but women, they are the caretakers, and I think these are these built-in neurochemical, neural, and anatomical circuits that exist because of relationships between who actually takes care of the child.

Dr. Andy Galpin
How much of it is if you know psychology versus biology there? So the classic thing you'll hear is like, oh, women ruminate more. They think about stuff more. They're paying attention. Or is it simply any host of cascades haven't kicked off yet? The pressure isn't high enough. Do we have any idea what-- I'm sure it's both are contributing.

Dr. Allison Brager
Well, I think that's the psychological aspect, from my lens, is a part of that biological-

Dr. Andy Galpin
Yep

Dr. Allison Brager
... blueprint. Is because females are going to have greater vigilance across a day. Well, what neurochemically is vigilance? It's increased acetylcholine release and activation of acetylcholine areas of the brain, like the basal forebrain-

Dr. Andy Galpin
Right

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Dr. Allison Brager
... that are going to lead to that. But again, I see the world from the lens of-

Dr. Andy Galpin
Hey

Dr. Allison Brager
... nature versus nurture. So I'm not a very good colleague in departments of psychology.

Dr. Andy Galpin
Well, you have a degree in psychology.

Dr. Allison Brager
I have an undergraduate degree in psychology, but really it's-

Dr. Andy Galpin
Neuroscience

Dr. Allison Brager
... it's all neuroscience.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
I was fortunate enough that I did go to a university that really thrived on its neuroscience curriculum.

Dr. Andy Galpin
Well, nonetheless, I heard you're a psychologist, and what I just heard you say was psychology is just misunderstood physiology. I get it. I get it. That's what you said.

Dr. Allison Brager
I agree. Yes, it is.

Dr. Andy Galpin
Dr. Brager said it.

Dr. Allison Brager
There you go.

Dr. Andy Galpin
Hold my stamp to that. Acetylcholine.

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Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
Is that a total concentration issue that generally is higher, or is it a receptor density, or is it both? Do we have any idea of what are actually the sex differences between acetylcholine?

Dr. Allison Brager
That's a good question.

Dr. Allison Brager
The studies that I know exist on sex differences focus on one particular area, which is the basal forebrain.

Dr. Andy Galpin
Mm-hmm.

Dr. Allison Brager
That is the seat of major acetylcholinergic production and release and activation within the brain. And then there's cascading effects on other areas. But no, I actually think this is the land of great unknown.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
There haven't been a lot of studies on sex differences in physiology and behavior, and if there were, they were done, again, in the '80s and '90s.

Dr. Andy Galpin
Totally.

Dr. Allison Brager
And now you got me curious about going back onto PubMed and-

Dr. Andy Galpin
Good

Dr. Allison Brager
... Google Scholar and looking this up.

Dr. Andy Galpin
Yeah, the stuff that has been done since then, a lot of it is questionnaires.

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Dr. Allison Brager
Yep.

Dr. Andy Galpin
It's pretty low-fidelity stuff.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Which is good and helpful.

Dr. Allison Brager
You need self-report.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
With our sleep studies that we do in humans now, we always have an objective endpoint, endocrine or ... even a behavioral cognitive measure, but it's always paired with self-report, and sometimes the self-report data is what lends to more interesting findings.

Dr. Andy Galpin
So women, men fall asleep differently. We get that. What about total duration and waking up time? Any sex differences that are notable there?

Dr. Allison Brager
So I'm happy you asked that because I feel like that data has been taken a little bit too far on social media-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... that men, excuse me, that women need more sleep than men. There is a difference in total sleep time between men and women that was found again in these studies in 1980s, and it's about 25 minutes to 30 minutes different. But I come from this lens, is that clinically significant?

Dr. Andy Galpin
Mm-hmm.

Dr. Allison Brager
And that, I can't answer that, but I feel like in social media people have taken that information

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and have run with it that women need to spend... I think I saw something recently like, "Because women take this long to fall asleep, they need to be in bed for nine and a half hours," versus-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... a guy who falls asleep quickly, they only need to be in bed for eight. And I think at a certain point, that's just going to create anxiety around the act of sleeping that-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... it's going to be more harmful than helpful.

Dr. Andy Galpin
I assume then also based on this, men nap more than women do.

Dr. Allison Brager
Yep. Yeah. No, we know that. We know that experimentally, we know that anecdotally. You just look at cultures around the world that have siestas-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... and it's adopted and celebrated that people nap during the day. As we know that men, in general, across cultures are more prone to daytime sleepiness.

Dr. Andy Galpin
Do you know if-

Dr. Allison Brager
And transgenic mice too.

Dr. Andy Galpin
Oh, yeah.

Dr. Allison Brager
You know?

Dr. Andy Galpin
Name there. Are people napping more or less or the same than we have historically?

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Dr. Allison Brager
That I don't know. I feel like at least in the last 10 years, that stigma around napping has been reduced, I would say. It still exists in the military. I don't think it's-

Dr. Andy Galpin
Of course

Dr. Allison Brager
... going away.

Dr. Allison Brager
My colleagues and I from Walter Reed, we have a paper that we published in the flagship Journal of Sleep about around... It's called "The Stigma of Workplace Napping."

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
And we strategically, anonymously took quotes from senior leaders in the military, and we were flabbergasted. They were like, "No. If my employees nap, they're lazy. They're not productive." And I'm like, "You're okay. Just whatever."

Dr. Allison Brager
No comment there. But yeah. I feel like the stigma has been reduced. But I would argue that earlier in generations, decades earlier, that napping was still more celebrated than it is today. I know, for example, President Eisenhower, or then General Eisenhower used to nap. In the middle of worldwide conflict in World War II, he took a nap every day.

Dr. Andy Galpin
Probably very beneficial.

Dr. Allison Brager
Yeah. For sure. Absolutely.

Dr. Andy Galpin
What do we know about successful versus unsuccessful napping?

Dr. Allison Brager
In terms of a nap, it has to be 30 minutes or less. We do know that with the exception being a night shift worker or someone who-

Dr. Andy Galpin
Big circadian shift

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Dr. Allison Brager
... has chronic insufficient sleep, right? The recommendation there is 90 minutes to complete a full sleep cycle.

Dr. Allison Brager
But historically, what the clinical data has shown is if you are someone who normally gets sufficient sleep and you take a nap that is longer than 30 minutes, then you're more likely to have issues with sleep onset that night or just have issues with regularity in your sleep.

Dr. Allison Brager
But there's also data to show that a 20 to 30-minute nap is sufficient for immediate improvements in mood, athletic performance, even cognitive performance.

Dr. Andy Galpin
Do you have any sense of what percentage of people nap?

Dr. Allison Brager
I don't.

Dr. Andy Galpin
I would imagine it's fairly low, right?

Dr. Allison Brager
Yeah. I would think it's fairly low, except when you're talking about these microcosms of cultures, right?

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
Like professional athletes, it seems to be completely acceptable and celebrated of napping.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
And I'm sure there's a few ringleaders like I know LeBron James, we were just talking about that. He's a huge proponent of-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... daytime naps, and I've heard that he takes multiple naps across the waking day, but it

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depends on the culture, right?

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
I can tell you in my workplace, very few people nap.

Dr. Andy Galpin
I struggle napping. It just does not work for me at all.

Dr. Allison Brager
Yeah. It doesn't work for me either. If I have had a string of nights of insufficient sleep, or if I'm traveling, I will lie down and close my eyes for a bit, but I think it's just the nature of being a highly functional ADHD person. I can't... Yeah.

Dr. Andy Galpin
If I happen to fall asleep accidentally or even on purpose during the day, I'm going to just feel horrific the whole rest of the day.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
I'm going to feel terrible.

Dr. Allison Brager
Yep.

Dr. Andy Galpin
Is that just a good indication I just shouldn't do it, or are there ways that I could change that so I feel better when I wake up? Or should I just avoid it?

Dr. Allison Brager
So it's interesting you say that because one of the things that has become more popular is this idea of a nappuccino or like-

Dr. Andy Galpin
Mm

Dr. Allison Brager
... having caffeine prior to a nap. And I learned anecdotally that this was adopted by the trucking industry in the 1970s and-

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Dr. Andy Galpin
Oh, no kidding

Dr. Allison Brager
... the reason behind it is, right, like a cup of coffee or any caffeine, preferably not an energy drink, before a nap. It takes about 20 minutes for the adenosine receptors in your brain to be impacted. So in that 20 minutes, you can take a nap and then wake up Feeling boosted or less groggy than you otherwise would without the caffeine. And that has been experimentally tested in the lab too.

Dr. Andy Galpin
What circumstances need to happen for you to say, "Hey, you should consider napping." How does somebody know that they should think about napping? Is there anything that you say, "Hey, if A, B, and C is going on-"

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... you might be a good candidate for napping, or is this something they just need to go figure out?

Dr. Allison Brager
So, in the populations I work with, I work in a world where most people-- I'd like to think I'm a good example, but again, that's also why I'll never really amount to any position.

Dr. Andy Galpin
Well, I think you've already amounted to plenty of pretty good positions within the military, but most of which we can't even talk about.

Dr. Allison Brager
Yeah, exactly. Is chronic insufficient sleep, right?

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
If you are not getting sufficient sleep, so most people between seven and nine hours a night depending on who you are, you need to nap or you should nap. Or engaged in some sort of 20-minute non-activity throughout the waking day to help offset that accumulating sleep pressure. Because you're already waking up in the morning with a high level of sleep pressure because you weren't able to effectively release it at night when you sleep. While we do recommend in those populations like, "Hey, try to get 20 to 30 minutes." I understand that some

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people can't get in that mental head space. But that's why we have things like technology now to assist. I'll give a shout-out to our dear friends at Shiftwave.

Dr. Andy Galpin
Oh, yes. Yeah.

Dr. Allison Brager
I think that is going to be a great tool, especially for the tactical populations I work with, to help them get into that head space of just turning their brain off, and getting into that meditative deep rest state, even if it's for 10 to 15 minutes.

Dr. Andy Galpin
I spend most of my recreational time paying attention to wildlife.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
It's a huge passion of mine.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
If we can go out and where I live, black-tailed deer and elk and that's what-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... I spend most of my passion time on. If you hang around people that do that, hunters and conservationists and outdoors and biologists and stuff-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... they can take a three-hour nap in the middle of the day like nothing.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
Just nothing. They can go lay down, and they're just gone for hours.

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Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Every time I try that, I lay there on the side of a mountain, I'm just rolling around. There's zero chance it's happening. I think I know your answer here, but I would assume that not a healthy behavior that they have with sleeping for three hours a day in the middle of the day. Is that a fair characterization of a poor sleep strategy?

Dr. Allison Brager
So I'm going to actually challenge you on that because that's how-

Dr. Andy Galpin
Fantastic

Dr. Allison Brager
... humans used to sleep before Thomas Edison-

Dr. Andy Galpin
And electricity

Dr. Allison Brager
... commercialized electricity.

Dr. Andy Galpin
Oh, tell me more.

Dr. Allison Brager
So that was like multiphasic sleep was what through the course of human evolution used to practice. And honestly, if you look at indigenous communities, they still practice that where they have four hours of sleep at night, and then there's four hours of wakefulness, and then they have morning sunrise activity, and then they have a three, four-hour period in the middle of the afternoon. Now, it makes sense when you look at the circadian clock. Because there's two circadian peaks and two circadian troughs throughout the 24-hour period. The first dip, obviously, is in the middle of the night. That's when core body temperature driven by the circadian clock is its lowest between 2:00 and 4:00 a.m. But then there's a second dip in the circadian alertness signal in the middle of the afternoon. For most people, between 2:00 and 4:00. And so that's why it is good to push people towards sleeping or napping during this time, but in people who live off the land and-

Dr. Andy Galpin
Mm-hmm

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Dr. Allison Brager
... live a more indigenous lifestyle, they're just catering to their natural circadian rhythm pre industrialized exposure.

Dr. Andy Galpin
And do we think that those people can be perfectly healthy? Is there any reason to think that that is actually a problem?

Dr. Allison Brager
No, I don't think there's an issue at all, to be honest with you. You're not fighting against human evolution and biology. Because if you look at most chronic disease states-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... in the country, it's because of fighting against evolution and biology, and also too, it goes back to your point of I think there is evidence, for as limited as there is between people who are one chronotype and then try to be the other chronotype and looking at morbidity and mortality. Perfect example, shift workers.

Dr. Allison Brager
People who do night shift work have an estimate of a 15 years decrease in their lifespan.

Dr. Andy Galpin
15?

Dr. Allison Brager
15 years. So there's a large-scale epidemiological study that looked at cancer rates as well as longitudinal study of lifespan of night shift workers or rotating shift workers, and their lifespan was reduced by 15 years. They had significant increases in cancers across the board, so not just a particular cancer, but all different types of-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... bodily cancers. And then even the World Health Organization has labeled shift work as a level two carcinogen.

Dr. Andy Galpin
Ooh.

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Dr. Allison Brager
And it goes back to fighting against our evolution and biology and what our genetic program is.

Dr. Andy Galpin
How do they generally define shift work? What hours of work? Or is it overnight, or is it swing shift? What counts as shift work?

Dr. Allison Brager
When we say shift work, we're usually talking about people who start work at 11:00 p.m. Work the graveyard shift.

Dr. Andy Galpin
Right.

Dr. Allison Brager
11:00 p.m., get off 7:00 a.m.

Dr. Andy Galpin
Today's episode is sponsored by LMNT. LMNT is an electrolyte drink mix that has an ideal electrolyte ratio of sodium, potassium, and magnesium, but no sugar. Hydration is critical to performance, both physical and mental performance. Countless studies have shown that even a slight degree of dehydration, even as small as 1%, can lead to decreases in physical output and mental performance. We also know that electrolytes are critical to proper hydration, which I've been harping on for years. But you can't do that, proper hydration, by only drinking water. You need to get the right amount of electrolytes in the right ratios, and that's why I'm a huge fan of LMNT. In fact, many of you will probably remember that I featured LMNT in my YouTube series on optimizing hydration nearly five years ago. I featured LMNT in these videos because their blend of 1,000 milligrams of sodium, 200 milligrams potassium, and 60 milligrams of magnesium really is unique and different than any other electrolyte on the market, and it has great scientific support.

Dr. Andy Galpin
I use LMNT constantly, particularly when I'm sweating a lot, and I routinely make it a part of my clients' optimization programs. If you'd like to try LMNT, you can go to drinkLMNT.com/perform to claim a free LMNT sample pack with the purchase of any LMNT drink mix. Again, that's drinkLMNT.com/perform to claim a free sample pack. Today's episode is also brought to you by Parker University. Parker is the only university in the world dedicated exclusively to human performance, and it's also my new academic home. I first heard of Parker after attending their NeuroCon seminar and was stunned. I've been to countless clinics and conferences, and nobody is even close to Parker Seminars. The speakers, the setup, and the experience are frankly jaw-dropping. All their seminars are great, but the upcoming Miami show, which is June

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6th through 8th, is going to be extra special. It's featuring special guests like my friends Dr.

Dr. Andy Galpin
Gabrielle Lyon and fitness expert Jeff Cavaliere, and plenty more. But on top of that, I'm actually hosting a personal co-seminar that's all about the practical side of strength training and that blends perfectly with the Parker program. So imagine going to a phenomenal lecture on how the nervous system works, and then popping over and lifting weights with me personally. All-access tickets are on sale now, but at a special rate of only $249. But these will increase as the dates get closer, so do not wait. And yes, you heard that right, $249 gets you full access to the entire Parker Seminar, exhibit hall, nightlife events, plus a learning and lifting in the gym with myself and Dan Garner. To see the exact schedule, full list of speakers, and get signed up, visit parkerseminars.com. One more time, that's parkerseminars.com. I can't wait to see you there. We have dealt, I've actually, in a number of our companies, we've dealt with a lot of surgeons-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... emergency medicine, nurses, firefighters, police, and they have to work-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... right? At some point. There are better and there are worse policies for that.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
We've seen some people where they four days day shift, four days night shift, right?

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
You can't design a worse possible setup for those individuals. So if somebody has to work night shift, because we need it, right?

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
We need surgeons, we need physicians, and nurses, and-

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Dr. Allison Brager
Military

Dr. Andy Galpin
... so on, so forth.

Dr. Allison Brager
Right?

Dr. Andy Galpin
Military, right.

Dr. Allison Brager
We win our nation's wars at night. We need people who can operate at night.

Dr. Andy Galpin
How do you then set them up for least amount of failure if they have to work night shift?

Dr. Allison Brager
So, it's funny you ask that because I feel like I'm back in my dissertation defense in graduate school.

Dr. Andy Galpin
Do it.

Dr. Allison Brager
But I think that's where the power of genetics and these genetic screening tools come into play is-

Dr. Andy Galpin
Mm.

Dr. Allison Brager
In this circumstance, why not pre-select people who are more optimal at night for these types of positions? I know in medicine, that might be a little bit more controversial, but again, going back to communities, like the ones I work in is like, I would want to have people who are good at operating at night-

Dr. Andy Galpin
No question

Dr. Allison Brager
... to win our nation's wars, to reduce casualties, to increase combat effectiveness, things like that.

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Dr. Andy Galpin
Are there tools to screen for that? Do you know, are there markers? Are there tests? If somebody wants to just do this on their own, so they want to figure out, "Hey, I'm considering taking this job. It's a night shift job or not. I want to know if I'm there." Do you know of any effective tools for that stuff?

Dr. Allison Brager
You just spit in a tube and send it off to the lab for analysis. That's all it is. There's robust known genetic markers, single nucleotide polymorphisms that are linked to being a morning person, an evening person. We know those PER2 SNPs. That's the gene, the circadian clock gene, PER2.

Dr. Andy Galpin
PER2.

Dr. Allison Brager
Yep.

Dr. Andy Galpin
And that can be any genetic company, or is there particular ones that sell kits that test for these that are better than others?

Dr. Allison Brager
To the best of my knowledge, most of these genetic screening companies will test for this SNP.

Dr. Andy Galpin
Okay.

Dr. Allison Brager
So.

Dr. Andy Galpin
And it's almost as simple as that one marker-

Dr. Allison Brager
Uh-huh

Dr. Andy Galpin
... that is-

Dr. Allison Brager
Yeah. Well, it is, because that's what's been identified in preclinical animal models, and again, has been shown in large scale genomic-wide studies in humans is, yep, changes in the circadian clock genes.

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Dr. Andy Galpin
Which one was that one again, just?

Dr. Allison Brager
PER2.

Dr. Andy Galpin
PER2. Okay.

Dr. Allison Brager
So PER2 is associated with an evening chronotype, and PER1 is associated with a morning chronotype.

Dr. Andy Galpin
What percentage of people are evening versus morning versus somewhere in the middle?

Dr. Allison Brager
So, we know most of this not from the genetic work, but from this robust questionnaire that's been around for Honestly, 40 years. It's called the Morningness-Eveningness Questionnaire. There's a newer modified version of this that Dr. Till Roenneberg has created to include social influences. But based on just, again, large-scale epidemiological population-based studies of this questionnaire, about 80% of us are intermediate types.

Dr. Andy Galpin
Mm.

Dr. Allison Brager
Meaning we normally go to bed or prefer to go to bed around 10:00 PM, wake up around 6:00 AM.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
You have 10% of the population who are like me, who are more evening types. Now, I'm not an extreme evening type. I feel like I used to be, but as I've gotten older, my clock is now phase advancing like most people when they age-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... who prefer to go to bed around midnight, 12:30, wake up 8:00, 8:30. And then the other 10% are these people like you who are the morning types who prefer-

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Dr. Andy Galpin
Right

Dr. Allison Brager
... to go to bed at 9:00 and wake up at 4:00 AM. That's how my wife is.

Dr. Andy Galpin
I would like to go to bed earlier than that.

Dr. Allison Brager
It definitely is.

Dr. Andy Galpin
But yeah. 9:00. We'll just say 9:00. Yeah.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
If you ask my wife, she'd be like .

Dr. Allison Brager
Is your wife a night owl?

Dr. Andy Galpin
She's more of a night owl.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
When we first met, she was 11:30, like 11:00.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
Wake up at 6:00 sort of thing.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
And now over the years, she's drifted way down towards me-

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Dr. Allison Brager
Yeah

Dr. Andy Galpin
... where she's there.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
I'm definitely like, especially if I didn't have kids-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... 8:00, I'm in bed.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Like 1,000%.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
And then she's just like, "No. Not going to happen. Get up, we have to go do whatever." But the likelihood of us watching a movie or something after the kids go to bed, zero.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
It's just not going to happen.

Dr. Allison Brager
It's funny because, well, I'm a geo bachelor, but when I do get to spend some time-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... with my wife, it's the same way. It's just I have to-

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Dr. Andy Galpin
She's done

Dr. Allison Brager
... motivate her to ... I am your wife, essentially.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
I have to motivate my wife to-

Dr. Andy Galpin
Like a four-hour shift between you guys.

Dr. Allison Brager
Yep. Exactly.

Dr. Andy Galpin
When you want to get up and do stuff.

Dr. Allison Brager
Yeah. Where I am in North Carolina and she's in Florida, by the time she's going to bed, which is around 7:45, 8:00, I am just leaving the gym to go home and eat dinner and have an extra two, two and a half hours of my day before I go to bed.

Dr. Andy Galpin
Are you like my wife, where we will be silent for 30 minutes?

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
In bed or whatever, and I'm like, "Finally, time to go to sleep." And then there has to be some deep conversation happen. It's just like talk about some big thing. I'm like, "Oh my God." But she always does that.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
It's a bad cliché.

Dr. Allison Brager
You know, it's true.

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Dr. Andy Galpin
Are you like that, too?

Dr. Allison Brager
No, I am. Yes.

Dr. Andy Galpin
Yeah. And she's just like, "Stop. Stop talking to me."

Dr. Allison Brager
Yep. And then I'll just drift off into sleep in the middle of the conversation.

Dr. Andy Galpin
Oh, I'm gone. I'm definitely gone-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... in that conversation.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
So many times I've fallen asleep in the middle of her story because I'm just like, "I can't."

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
I'm done for.

Dr. Allison Brager
Yep. No.

Dr. Andy Galpin
Okay.

Dr. Allison Brager
Yeah, that's me, too.

Dr. Andy Galpin
All right.

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Dr. Allison Brager
I fit that stereotype.

Dr. Andy Galpin
Fantastic.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
I was asking you earlier about people that have this, not quite polyphasic, but multiple sleep-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... several hours of sleep during the day.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
In the world I come from, that's often because of sunlight. Where you're out doing stuff-

Dr. Allison Brager
Yep

Dr. Andy Galpin
... you head back towards camp, and then by the time you get back and do stuff, and then you only have four hours or five hours where you got to get back up again, feed the horses, do things-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... so you can get out before sunrise, right?

Dr. Allison Brager
Yep.

Dr. Andy Galpin
So, then you have three to four hours of sleep, and you're going to sleep more there.

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Dr. Allison Brager
Yeah.

Dr. Andy Galpin
I know you've done a bunch of work in, of course, the military.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
Tons of groups in there. You've done stuff with astronauts.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
You've done stuff in Antarctica.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
Right?

Dr. Allison Brager
Yep.

Dr. Andy Galpin
How do you handle it when light is either not the cue, it's not there at all times-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... you're up in space, it's there at all times. How do you manage a sleep schedule when light is completely eliminated from the equation? Or maybe not eliminated, but you know what I mean. It's completely off schedule.

Dr. Allison Brager
Yeah. So, that's actually what speaks to the robustness of the sleep system is work in these extreme environments. And I'll use our study in Antarctica as an example.

Dr. Andy Galpin
Yeah.

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Dr. Allison Brager
Honestly, to date, that is probably the coolest project that I got to be a part of.

Dr. Andy Galpin
How could it not be?

Dr. Allison Brager
So we did essentially a year-long longitudinal assessment of sleep down... It was actually in collaboration with the Argentinian Navy. So they have this navy base down there called Belgrano II, and it's actually the southernmost point in the world. And what's interesting is six months of the year, it's kind of like being stationed on the International Space Station-

Dr. Andy Galpin
Yep

Dr. Allison Brager
... is you have access to food, water resources, and then medevac. But the other six months of the year, if something happens medically, they have to figure it out. So, there's a lot of stress during the winter because they don't have access to food, resources, or any contact with the outside human world.

Dr. Andy Galpin
You can't get a plane in and out because of weather.

Dr. Allison Brager
You can't, yeah, because of the weather. And so what we did was we used actigraphs, which-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... still are clinical grade measures of sleep. Two weeks worth of actigraph data translates to a night in a sleep lab, so a night of polysomnography.

Dr. Andy Galpin
Yeah. This is a wrist wearable, right?

Dr. Allison Brager
Exactly.

Dr. Andy Galpin
Yeah.

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Dr. Allison Brager
And it's extremely durable. We've taken these wearables out into combat zones, and they've come back working completely fine.

Dr. Andy Galpin
Right.

Dr. Allison Brager
So, they're made to withstand these extreme conditions. And what we found is the structure of sleep across this time being stationed in Antarctica does change from the summer to the winter. So, for example, in the winter, there's fewer sleep episodes, but the sleep episodes are longer.

Dr. Andy Galpin
Hmm.

Dr. Allison Brager
And then in the summer, there's more sleep episodes, but the sleep episodes are shorter. But when you look at overall daily 24-hour sleep amounts, they're the same, winter versus summer. And what's really interesting is that also lends to changes in physiology Blood pressure and cognitive performance too. So we also measured blood pressure down there. So we did four times a day, they did blood pressure measurements because they wanted to catch predicted times at the circadian peak versus circadian trough.

Dr. Andy Galpin
Mm-hmm.

Dr. Allison Brager
And then same with the gold standard for vigilance, which is the psychomotor vigilance test.

Dr. Andy Galpin
Oh, yeah.

Dr. Allison Brager
None of these parameters change seasonally, and I do believe it's because of the fact that under complete observational study that the sleep system didn't change regardless of what was changing in the environment. That's just how robust our sleep system is.

Dr. Andy Galpin
Biology figured it out.

Dr. Allison Brager
Exactly. Yeah.

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Dr. Andy Galpin
It got there, right?

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
We talk a lot about when we coach people, we try to avoid using sleep optimization. Right? What we really try to go after is sleep resilience.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Right? I want you to be able to have effective quality sleep independent of all these things.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
I think one of the things we have helped people with a lot is I don't want you to have to have a 90-minute routine and a 45-minute breathwork session and have everything perfect for you to have a reasonable night of sleep.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
You become super sensitive, right?

Dr. Allison Brager
Yep.

Dr. Andy Galpin
We want you to be more resilient against that. Sounds like that's exactly what you're talking about, that NAR study.

Dr. Allison Brager
Yeah. So back in the military sleep lab, we've done these types of studies too, right? Because we've done very well-controlled either acute sleep deprivation to mimic combat operations-

Dr. Andy Galpin
Mm-hmm

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Dr. Allison Brager
... like what we're exposed to when we're deployed, or chronic sleep loss. And we actually find, when you go back to self-report, even if someone had a really poor night of sleep objectively, right, but they are convinced-

Dr. Andy Galpin
Mm

Dr. Allison Brager
... that they got restorative sleep-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... or that they have high sleep resiliency, their next-day performance on objective tasks such as the psychomotor vigilance test will be better than someone who rates themself as not being resilient to sleep deprivation. So, you go back to that debate of biology versus psychology. Yes, I still sit in the biological camp, but I understand there are psychological influences.

Dr. Andy Galpin
Don't you waver on me, Dr. Brager. No.

Dr. Andy Galpin
How long is that tail going to last? In other words, you've been outspoken about this. There's a difference between clinical deficiencies, right?

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
Whether this is because you have a sleep disorder or because you're in a special situation where you legitimately have sleep restriction-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... or whatever's going on. Going from that to okay sleep is not the same thing as going from good to great sleep.

Dr. Allison Brager
Mm-hmm. Right.

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Dr. Andy Galpin
And there's huge performance advantages of going from good to great sleep.

Dr. Allison Brager
Yep.

Dr. Andy Galpin
But at the same time, you've also just told me, even if I have a terrible night of sleep, if I think I'm okay, I perform the best.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
So if I sleep like shit all the time, if I just think I'm fine, am I going to be okay? Where is the line here? You know what I mean? Where's the breaking point?

Dr. Allison Brager
I will say with confidence, just from the studies we've done, the breaking point is 72 hours.

Dr. Andy Galpin
Oh, no kidding.

Dr. Allison Brager
Yeah. It is a very short-term effect, I will say. And to quote the godfather of sleep medicine at Stanford University, Dr. William C. Dement, who passed away two years ago at the age of 98, he used to say, "Sleepiness makes you stupid." Because it is true. It's like this false sense that you're okay-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... but objectively you're performing horribly. And that's really what we see in studies we've done, and then even those endocrine studies where you're getting insufficient sleep and there's an immediate drop-off in circulating levels of testosterone. By day three, the system is at its max. We even found that with a study my colleague, Dr. Tracy Jill Doty, did back at Walter Reed, where essentially caffeine will help stabilize your cognitive performance under insufficient sleep up to three days, and then after that, caffeine stops working. There's no amount of caffeine that can replace lost sleep. Only sleep can replace lost sleep.

Dr. Andy Galpin
So would it be fair, then, to characterize it as just saying, if you have a bad night of sleep or two,

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don't worry about it.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Past that, though, we need to start making changes.

Dr. Allison Brager
Exactly. Yep. I get asked this question all the time. Is it good to keep the same sleep schedule? Say you're getting insufficient sleep-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... on the weekdays versus keeping that same schedule on the weekends. I come from the camp that I believe in sleep banking and trying to replace sleep pressure or build up on anticipated sleep pressure as much as possible. So for me, I work with populations where they're getting insufficient sleep during the work week, and so they need to disrupt their circadian rhythm on the weekend to bank on that sleep to make up for lost sleep, but also prepare them for the week ahead. And there is some data now. I know there's a study that came out a few months ago.

Dr. Allison Brager
Again, large-scale population study that found that people who sleep in on weekends, if they are getting insufficient sleep on weekdays, have a 20% reduction in risk for cardiovascular disease.

Dr. Andy Galpin
Are there frameworks in which you can do it where it doesn't mess up circadian rhythm? So the obvious example would be, and you're not saying this to be clear, if you wake up at 5:00 in the morning-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... during the week, then, hey, it's okay to stay up till 4:00 at night on the weekends as long as you sleep till noon. That's not what you're saying at all.

Dr. Allison Brager
No.

Dr. Andy Galpin
So clarify what you mean by banking or extending out on the weekend so we don't get

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misinterpretations here.

Dr. Allison Brager
Yeah. That is true. So what I mean is you're going to keep one of those things the same usually, right?

Dr. Andy Galpin
Fall asleep, wake asleep.

Dr. Allison Brager
You hope so.

Dr. Andy Galpin
Wake up. Yep.

Dr. Allison Brager
In this circumstance, if you're waking up at 5:00 a.m. and say you're going to bed at 11:00 p.m. on the weekdays, then if you go to bed at 11:00 p.m. on Friday night and Saturday night, but now you're sleeping in until 8:00 or 9:00.

Dr. Andy Galpin
Yep.

Dr. Allison Brager
That's what I'm talking about. So you're keeping one of the two things consistent. Now, I don't think this would probably work in people who use Friday night, go to the club-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... stay up really late, and then try to sleep in.

Dr. Allison Brager
I know in the clinical world, when you look at cognitive behavioral therapy for insomnia, for example-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... when those behavioral sleep medicine physicians are trying to extend sleep, they do it in 30-minute intervals. So that is something we do know about the circadian clock, is that you can do things in 30-minute increments over an extended period of time to reduce the amount of

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physiological stress on the system.

Dr. Andy Galpin
I wanted to actually ask about, on a similar note, sleep in space.

Dr. Allison Brager
Okay.

Dr. Andy Galpin
I know you're in the process of hopefully becoming an astronaut yourself.

Dr. Allison Brager
Hopefully, yes.

Dr. Andy Galpin
You're waiting back on that. We'll see. Maybe we'll have you back after you've spent a year in space, but-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... how do you think about how do we handle sleep in space when we've lost not only light, but a thousand other cues?

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
So first question on this. Do people in space sleep okay? Is it a huge problem? What's it look like up there?

Dr. Allison Brager
So anecdotally, from what I've heard, it depends. So for example, Colonel Frank Rubio, we had him-- He actually gave a leadership lecture to those of us at work from the International Space Station when he was waiting to come home because, as you know, he was up in space-

Dr. Andy Galpin
Yep

Dr. Allison Brager
... for the longest of any human ever in the International Space Station. He said he slept great in space.

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Dr. Andy Galpin
How long was he up there for?

Dr. Allison Brager
It was over a year.

Dr. Andy Galpin
Way over a year, yeah.

Dr. Allison Brager
Yeah. I understand the psychological-

Dr. Andy Galpin
Yep

Dr. Allison Brager
... demands the current astronauts are facing right now is difficult, but he talks about that as well, just missing important family events and whatnot. But he said that he slept great in space. I've met a few other astronauts who said that it was the opposite for them, and then there's lingering effects back on planet Earth, such as difficulties with entries and maintenance of REM sleep, for example. It makes sense to me in terms of a microgravity environment impacting sleep because just like with other sensory systems of the nervous system, what is the epicenter of sleep maintenance and sleep continuity is the thalamus, right?

Dr. Andy Galpin
Mm-hmm.

Dr. Allison Brager
The thalamus is the gateway for sensory information, and there's a direct connection between your vestibular balance system and the thalamus that's going to influence sleep states. Again, this hasn't really been studied at a deep physiological level in space, but hypothetically, what we know about the circuitry of the vestibular system and how it synapses on the thalamus, that's what I predict is what's influencing these changes in sleep architecture with microgravity.

Dr. Andy Galpin
They have light taken care of for the most part, right?

Dr. Allison Brager
Correct. Yeah. That's one thing is a lot of what we know about the influence of light and photic information on human physiology, behavior, and performance actually comes from, honestly, NASA. They have a really fantastic crew, and they always have, of sleep and circadian fatigue scientists. My friend, Dr. Erin Flynn-Evans, she's one of the main fatigue scientists for NASA, and she comes from that body of training at Stanford and Harvard who have been the founding

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fathers and mothers of sleep physiology and medicine.

Dr. Andy Galpin
What do they do for physical sleep? Are they tying them down to the side of the space station so they're not floating around? What is actually happening? Because to your point about the thalamus, when you just look at pressure-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... differences, there's a physical pressure that changes when you spend your entire day erect-

Dr. Allison Brager
Yep

Dr. Andy Galpin
... and you go horizontally.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Fluid shifting. You have a whole host of things that are happening. This is one of the things that actually I've seen in the research recently about problems with sleep related to obesity that are not just airway blockage.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
You have fluid shifting. You have other things-

Dr. Allison Brager
Yep

Dr. Andy Galpin
... that are going on that are real problems, so how do they handle that stuff? Do they sleep horizontally? That wouldn't matter, right?

Dr. Allison Brager
So my understanding is they're sleeping vertically, and it's like you're Velcroed in-

Dr. Andy Galpin
Right

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Dr. Allison Brager
... essentially. That's my understanding of it. I don't know. I'll report back to you once I'm up there.

Dr. Andy Galpin
I want direct report. We want to actually do a follow-up episode from the space station.

Dr. Allison Brager
Well, they do. So when I went for a selection the first time, and we went to mission control, there is a phone. And their day is very structured and scheduled, but they do have time where they can use this phone in the space station and call down to their family.

Dr. Andy Galpin
Oh, cool.

Dr. Allison Brager
And they'll use it to watch a movie and stuff with their family.

Dr. Andy Galpin
Nice.

Dr. Allison Brager
Yeah, I'll use that time for a podcast.

Dr. Andy Galpin
Perfect. Well, I'm going to hold you to that. Have you thought at all about sleep and Mars?

Dr. Allison Brager
Yeah. I have. So that's why I think it's going to be personally more important than ever for NASA. If we want Mars to actually be a viable, feasible thing, you are going to need physicians, and you are going to need scientists, and obviously engineers-

Dr. Andy Galpin
Makes sense

Dr. Allison Brager
... behind that to lead that mission. Because Physiology in extreme environments, as we just talked about with the work we've done in Antarctica, even all the work we've done in active combat zones in the military is very different. And we need to understand those nuanced differences. And also understand nuanced differences between men and women, right? Because it's going to have an impact there.

Dr. Andy Galpin
Do you think it could be part of the screening process for those folks that go out there?

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Dr. Allison Brager
Oh, absolutely. I think when it comes for training for Mars-- And full disclosure, so the class of astronauts that I was part of in 2020, that first class selected is hypothetically the first class to prepare for Martian exploration.

Dr. Allison Brager
I think they're going to look at health above all else. Skill set and talent is important, but I feel as if the talent is less important than finding an incredibly healthy person who does not have any family history of any disease whatsoever, or just is genetically very healthy.

Dr. Andy Galpin
I've been saying for a long time, Mars is not going to be a rocket problem. It's a physiology problem.

Dr. Allison Brager
It's a physiology problem. Absolutely. Yep.

Dr. Andy Galpin
What would you do personally to prepare for that? Would you just figure it out along the way, or is there any sleep resilience stuff you could do? Is there any different training or any other stuff you would do in preparation for Mars?

Dr. Allison Brager
I don't know if this sounds far-fetched, but I wouldn't treat it any differently than these preclinical mouse model transgenic studies we used to do. Right? Or I have done is you have to first understand the physiology and behavior. You have to break it down, and then again, study sex differences in this behavior because it's going to impact males and females differently. And then that's where you use the power of pharmaceutical, nutraceutical, and genetic interventions, even to the point of I think it's necessary and sufficient at this point to use things like CRISPR and gene editing to-- It becomes the ultimate biology, physiology problem. Having that opportunity to explore Mars, sure, you want these people to live long, healthy lives after they're done with the space program. But at the end of the day, you also have this person who has this mentality that they're willing to be yeeted off the planet-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... into the unknown. So, I feel like people like me who are willing, and who have wanted to be an astronaut their whole life, we're willing to accept some pharmaceutical or nutraceutical or genetic interventions in order to get the job done.

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Dr. Andy Galpin
Yeah. I guess what you're saying is if you're 95% of the way there-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... and there's just a couple of things that are stopping you, why not-

Dr. Allison Brager
Exactly

Dr. Andy Galpin
... take those and get all the way out there. Yeah.

Dr. Allison Brager
Exactly.

Dr. Andy Galpin
Well, I fully support that. Do you know of any animal models that are doing things like that? Like gene editing, obviously not for Mars, but for other aspects of sleep. Are you aware of any clinical trials happening or people tinkering with that, or labs that are working on stuff?

Dr. Allison Brager
So in regards to space exploration, I don't know that, but I will say CRISPR and gene editing to better understand sleep physiology has been a thing. I think that's really what you see now when you look at the evolution of using preclinical animal models to understand mammalian physiology's behavior-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... right? I came from the generation where we were still working with these transgenic mouse models just through sophisticated breeding of heterozygous and homozygous mice to hope and pray you get the genotype-

Dr. Andy Galpin
Yep

Dr. Allison Brager
... based on Darwinian hereditary genetics that you're hoping for. But now we can actually go in and directly manipulate the genome through gene editing or, as a postdoc when we were doing that skeletal muscle physiology project, we were using a transgenic mouse model where we just

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had to give the mouse doxycycline, so the antibiotic-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... to either turn on or turn off genes.

Dr. Andy Galpin
Oh, because you had already put something in there, and you just had to activate it.

Dr. Allison Brager
Yeah. I didn't put it in there, but the-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... group at Southwestern that had created these genetic mouse models.

Dr. Andy Galpin
Those lines, yeah.

Dr. Allison Brager
Yeah. That's a whole other world of molecular genetics that I don't understand, and I-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... just really appreciate that they're clever and intelligent enough to do something like that. But, you know.

Dr. Andy Galpin
There are a number of people who sleep poorly, and there's a select number of people who sleep horribly, but somehow get away with it.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
Right? And you talked about it earlier, and I know that there's plenty of studies that look at a lot of people who think they're getting away with it aren't. Right? So cognitive function is way lower, even despite people's perception-

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Dr. Allison Brager
Yeah

Dr. Andy Galpin
... of their cognitive performance, right? They're significantly lower.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
That's been shown many, many times, right?

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
So we argue this all the time, when you're like, if we look at your data and your numbers are not great, but you think and your perception is high, there's a good chance that it's not actually as high as you think.

Dr. Allison Brager
Yep.

Dr. Andy Galpin
But there are those select few, right? Those people who can get away with a few hours of sleep a night-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... right? Four or five or probably is probably more appropriate. Do you think it's realistic at all for us to be able to engineer something like that?

Dr. Andy Galpin
How much do we know about the genes behind those-- Is there a phrase for people that sleep for four hours a night and actually get away with it?

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
What do we call them?

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Dr. Allison Brager
We could. So they're short sleepers.

Dr. Andy Galpin
Short sleepers.

Dr. Allison Brager
Yeah. So, that gene was isolated and discovered in a preclinical mouse model, and again, population genome-wide study in humans I'd say 10, 15 years ago. It's called the DEC gene, D-E-C. So those are individuals who ... are able to sleep four hours.

Dr. Allison Brager
Again, hypothetically, what I think is going on is they're reducing their extracellular adenosine really quickly. Because that's really what it is, is how quickly can you reduce sleep pressure? That's what determines your physiological set point for sleep. So I need, for example, myself, I'm like an 8.2, probably eight and a half hour sleeper.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
So I know my sleep pressure dissipates very slowly, but in these individuals, it dissipates very quickly.

Dr. Andy Galpin
How much actual work has been done on those individuals in terms of physical performance? Obviously, we know long-term, they don't die earlier.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
That's the clinical markers we have.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
But are they really physically performing at their best? Are their cognitive function highs? Has there actually been reasonable research on that?

Dr. Allison Brager
No, there hasn't.

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Dr. Andy Galpin
Okay.

Dr. Allison Brager
If I had money to do that work, I would. US presidents are a great example. Just historically, anecdotally, what we know about most US presidents is they don't really sleep a lot. But again, they were sort of self-selected. I would say the same with military leaders, right? They're self-selecting because of genetics. When you get to that level, I think we know this in sports too, right?

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
That's why one of my favorite books is "The Sports Gene."

Dr. Andy Galpin
Mm-hmm.

Dr. Allison Brager
Because it really talks about how your genetic blueprint can sort of guide you into what sport you play and what sport you excel in. Yeah.

Dr. Andy Galpin
I know that there was actually some stuff that came out recently on President Trump, and they were able to assess his sleep duration-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... simply by his online activity.

Dr. Allison Brager
Oh, yeah, I do remember that. Yeah.

Dr. Andy Galpin
Right? So he's-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... one of these guys that apparently legitimately does-- And I know there's lots of-

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Dr. Allison Brager
Yeah

Dr. Andy Galpin
... lots of people talked about President Obama as well-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... as working these.

Dr. Allison Brager
Yeah. Stanley McChrystal, Admiral McChrystal, he was known to be a two, three-hour sleeper. I see that even in my own workplace, too.

Dr. Andy Galpin
Right.

Dr. Allison Brager
You know?

Dr. Andy Galpin
Folks you work with.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Is there a way that you could get to that? Right? So kind of what I'm getting at on the back of-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... that thing is saying, hey, can we, number one, be more resilient, be more efficient? And then-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... will that actually allow me to shorten my hour demands down to a reasonable-- Is that what's happening with these presidents? Are they just hyper-efficient? Is their sleep architecture, is their sleep resilience, is their sleep stability just way higher, or are they kind of the same? And it doesn't matter if it's actual presidents, right? It's just people-

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Dr. Allison Brager
Yeah

Dr. Andy Galpin
... that get away with it. Or are they just the same, and they just can get away with way less hours?

Dr. Allison Brager
No, it's more efficient, right? Because that's what the, again, these preclinical animal models that we can glean into is like-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... the sleep pressure's dissipated really quickly. So there's a significant increase in slow-wave activity-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... very quickly, and it's extended for a period of time. Because at the end of the day, that's the manifestation of dissipated sleep pressure is-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... stage three non-REM sleep or slow-wave activity. But I do think it's one of those things, again, that has to be guided through the lens of biology, and it can't be trained, right? It is because it breaks down to differences and the architecture of the neuronal circuitry and the neural chemistry. And I don't think any amount of training or behavioral intervention could lead to a physiological change of that significant capacity.

Dr. Andy Galpin
Too much just endogenous natural function.

Dr. Allison Brager
Exactly. Yeah.

Dr. Andy Galpin
That has to be manipulated.

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Dr. Allison Brager
Yep.

Dr. Andy Galpin
Let's go the opposite direction.

Dr. Allison Brager
Okay.

Dr. Andy Galpin
Sleeping a lot.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
You have made the case, I have made the case, that high performers, we are probably looking at more like eight and a half to nine, maybe nine and a half hours of sleep, right?

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
That's been shown many times.

Dr. Allison Brager
Yep.

Dr. Andy Galpin
I'm going to spend a lot of time on that. But before we get there, really quickly, what about past that point? What do we know about people sleeping routinely nine and a half hours, 10 hours?

Dr. Andy Galpin
Assumption is that's not a good thing.

Dr. Allison Brager
Yeah. So actually, my buddy, Michael Grandner at the University of-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... Arizona.

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Dr. Andy Galpin
Yeah.

Dr. Allison Brager
He's looked at that, right? It's not good to be on either tail end. So hypersomnia, as it's called, is just as bad as insomnia, and if you look at morbidity and mortality in those individuals who need 10, 11 hours of sleep because-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... their rate of dissipating sleep pressure is just so low. They suffer from the same health outcomes as someone who obviously willingly short-changes their sleep because of life.

Dr. Andy Galpin
Why does somebody need 10, 10 and a half, 11 hours of sleep? Is that an insanely inefficient sleep pattern, or are they sleeping that because of other reasons?

Dr. Andy Galpin
I guess another way to think about it is when they wake up the next day, and they still feel tired, right?

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
It's like, "I slept nine hours, and I still feel tired."

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Probably something's happening, I assume, right?

Dr. Allison Brager
Yeah. My assumption is there's a physiological disruption there-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... mixed with, for example, we know people who are clinically depressed, for example, do fall in this category of hyperinsomnia.

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Dr. Andy Galpin
Mm.

Dr. Allison Brager
And some of that, again, is physiologically rooted but compounded by life trauma, too, that-

Dr. Andy Galpin
Right

Dr. Allison Brager
... could be contributing to that clinical depression. But that's where I think we most oftentimes see these issues with hypersomnia, is they're usually also associated with some sort of mental health condition as well-

Dr. Andy Galpin
Mm

Dr. Allison Brager
... particularly clinical depression.

Dr. Andy Galpin
Interesting.

Dr. Allison Brager
Or someone with chronic pain, like fibromyalgia, for example.

Dr. Andy Galpin
Yeah, that makes sense. How much do we know, if any, about cause and effect there? Which direction?

Dr. Allison Brager
Oh, that is still, to this date, a constant debate in the sleep medicine community. So- I've been going to the annual Sleep Medicine conference now since 2006. I've only missed one. That was the year I was competing in the CrossFit Games. But besides that, that's still one of the centerpieces of the meeting is like, is chicken or the egg?

Dr. Andy Galpin
Mm-hmm.

Dr. Allison Brager
Is it the sleep manifestation of then depressive symptoms or do the depressive symptoms contribute to the sleep symptoms? And every year there's new data presented, not just in preclinical animal models, but in-

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Dr. Andy Galpin
Yeah

Dr. Allison Brager
... human studies as well. It's so complicated and nuanced. And even with the ability to effectively treat clinical depression now, not just with pharmaceuticals, but also with, for example, transcranial electrical-

Dr. Andy Galpin
Mm

Dr. Allison Brager
... stimulation or transmetatic stimulation, there's still just not a consensus in terms of is it the sleep or is it the depression?

Dr. Allison Brager
More than likely, it's a combination of both.

Dr. Andy Galpin
It's got to be, right?

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
In some people, you could certainly see a bunch of chronic poor sleep-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... lead to poor health effects. And certainly-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... you can see the opposite. Something else happened in life, created mental health concerns, and then because of that, you can't sleep. You could certainly see the only reality here is there's room for both.

Dr. Allison Brager
Yep.

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Dr. Andy Galpin
Both are potential causes. So trying to isolate and say one is always driving the other one is... Honestly, it's quite nonsensical-

Dr. Allison Brager
Exactly

Dr. Andy Galpin
... right now where we're going to go.

Dr. Allison Brager
Yeah. We see the same thing in my community with traumatic brain injury is like-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... we know from the clinical studies, like this one study we did at Walter Reed, that if you have even just a mild traumatic brain injury, it's going to lead to long-term changes in sleep architecture. But then you have all the lifestyle factors that also are influenced by that, right? Like using alcohol to cope with-

Dr. Andy Galpin
Mm. Right

Dr. Allison Brager
... the lack of sleep or difficulties with sleep now that weren't in existence prior to traumatic brain injury. The inability to regulate stress and how because of that inability to regulate stress, that's going to impact sleep.

Dr. Andy Galpin
Totally.

Dr. Allison Brager
Right? You can never have things in isolation.

Dr. Andy Galpin
Today's episode is sponsored by Momentous. Momentous makes the highest quality supplements on the market, period. Many of you know me, and you know that I do not trust the vast majority of supplement companies, and for good reason. Many studies have shown that anywhere between 10 to up to 40% of supplements have accidental contaminants, intentional alterations, mislabeling, or other serious issues. But Momentous is different. I literally spent years vetting the company, their products, and leadership team before personally officially

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partnering with them in 2023. Every single one of Momentous's products is third-party tested to ensure quality, and many are even NSF certified for sport. Now, while I love all of their products, the ones I use the most, both personally and with my clients, are what I call the big three. And these are the omega-3 fish oil, creatine, and newly improved whey protein formula.

Dr. Andy Galpin
These three supplements have fantastic data supporting their benefits. Whey protein for lean muscle mass, omega-3s for brain health, and creatine for both muscle and brain support. And they have been shown to be very safe across basically all populations of people: young, old, men, women, et cetera. Now, nobody has to use supplements, and I hope you never feel pressured to do so. But if you're interested in supplements, it's important that you get them from the highest quality providers. You don't want mercury in your fish oil or lead in your whey protein or anything like that. So that's why I stick exclusively to Momentous. If you'd like to give Momentous a try, go to livemomentous.com/perform to get 20% off your order. Again, that's livemomentous.com/perform to get 20% off. How do we create more efficient sleep?

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
So when somebody says, "Allison, I've got A and B job, whether it's going on like six and a half, seven is just the most realistic thing."

Dr. Allison Brager
Yep.

Dr. Andy Galpin
"Can I get more efficient in that time?"

Dr. Allison Brager
Yep.

Dr. Andy Galpin
And I'll give you a little bit of a pass here. You can skip past all the basic hygiene stuff, right?

Dr. Allison Brager
Yep.

Dr. Andy Galpin
Like cold dark room. Yep, we get it, all that.

Dr. Allison Brager
Yeah.

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Dr. Andy Galpin
What past that can we do?

Dr. Allison Brager
I think that's where the circadian system really takes over, right? I talked earlier about these time cues or zeitgebers.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
When you have predictable time cues in your environment, and this isn't just human, we see this in mouse and rodent models as well. Once that time cue's presented, that behavior will then follow that time cue.

Dr. Andy Galpin
Hmm.

Dr. Allison Brager
So if you are eating at a particular time, if you're engaged in social stimuli at a particular time, if you're viewing sunlight at a particular time, then at night, right, if you're now exposed to dimmer light at a particular time, you have eaten dinner at a particular time, and then whether you have a sleep hygiene routine or not, but you are now going to bed at a particular time. Your brain will now consolidate sleep into that period of time.

Dr. Andy Galpin
I work with a bunch of entrepreneurs.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
A bunch of business owners, executives for sport teams, and things like this, right? We get this question constantly. So let me frame you with a theoretical that's actually not at all a theoretical, I just don't want to say the person's name, example. And I'm going to give you a ton of incomplete information.

Dr. Allison Brager
Okay.

Dr. Andy Galpin
But just do your best to what something could look like.

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Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
I will also give you more caveats for you. This is maybe not the optimal system or best system, but hopefully what you'll provide for us is just one example of what it could look like.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Fair game?

Dr. Allison Brager
Sure.

Dr. Andy Galpin
All right. Awesome. So you got an individual, and they're going to flat out say Midnight is when I'm going to go to bed, and I got to be up at 6:00.

Dr. Allison Brager
Okay.

Dr. Andy Galpin
That's the rules of the game, period.

Dr. Allison Brager
Okay.

Dr. Andy Galpin
Right? Whatever it takes. I will get into bed at about 11:50, and the alarm is off at 6:00, and I'm getting up and out of bed, period.

Dr. Allison Brager
Yep.

Dr. Andy Galpin
I have hundreds of millions of dollars, closer to billions actually, on the line.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
So I need my cognitive function to be at its highest.

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Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
I want to perform well physically, but that's my second-tier priority.

Dr. Allison Brager
You're right, yeah.

Dr. Andy Galpin
So cognitive function is this person's top, but will not accept low energy, will not accept terrible physical performance in the gym.

Dr. Allison Brager
Yep.

Dr. Andy Galpin
Is going to train every day, will do some conditioning, will do some lifting, do a variety of stuff-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... right? Also has children.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
Right? So will pay attention to the children from 3 to 8:00 or so, and then because he's working with kids from 3 to 8:00, or playing with his kids and being very present, he's definitely going to go back to work at 8:00.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
It's going to happen, right?

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
8:00 to 10:30 or so, maybe up to 11:00 is-

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Dr. Allison Brager
Yep

Dr. Andy Galpin
... back to work, and then 11:00 to midnight is shower, wife-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... situation. Before I start asking you questions, any more critical information you have to know about this person?

Dr. Allison Brager
I do want to know if they think they're a morning or evening person.

Dr. Andy Galpin
This person will tell you doesn't matter.

Dr. Allison Brager
Doesn't matter? Okay, they're in between-

Dr. Andy Galpin
Whatever-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... it's going to take to make-

Dr. Allison Brager
Got you

Dr. Andy Galpin
... this is the schedule. But I would say he's certainly self-induced himself to be a morning person.

Dr. Allison Brager
Okay.

Dr. Andy Galpin
Whether he is there or not, like-

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Dr. Allison Brager
Got you

Dr. Andy Galpin
... that's the-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... think very much military business, like-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... you got to be in the office by 7:00. That's just what you sort of do.

Dr. Allison Brager
Yeah. Got you.

Dr. Andy Galpin
Stimulants are on board.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
Pharmaceuticals are on board. Don't care. Doesn't drink alcohol excessively, but whatever-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... it takes to perform the best. Doesn't want to compromise long-term health, doesn't want to die earlier, any of those things.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
But if you say take melatonin, great. If you say don't take melatonin, great. If you say drink caffeine, great. Doesn't care. Whatever-

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Dr. Allison Brager
Mm

Dr. Andy Galpin
... it's going to take to get the job done.

Dr. Allison Brager
Okay.

Dr. Andy Galpin
So that said, let me just do a theoretical kind of high-level thing. Waking up at 6:00, anything that he should particularly take, do, don't do for the first, I'd say he'd give you 45 minutes in the morning.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
Right? Anything that would jump out in your list of critical stuff to do at that timeframe to get going cognitively.

Dr. Allison Brager
Well, since stimulants are allowed, caffeinate, right? Because what we know from our clinical studies is the easiest way to reduce sleep inertia in the morning, that grogginess, is to caffeinate as soon as possible.

Dr. Andy Galpin
As soon as possible.

Dr. Allison Brager
Less than 200 milligrams.

Dr. Andy Galpin
Okay.

Dr. Allison Brager
Because 200 milligrams, we know from our randomized clinical trials, we've done numerous circumstances under conditions of acute sleep deprivation, chronic sleep deprivation, even looking at genotype, for example, 200 milligrams is the ceiling effect for caffeine. So, two cups of black coffee.

Dr. Andy Galpin
So if you go to 300 or 400, you're just hitting the gas pedal and you're not going any faster.

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Dr. Allison Brager
Exactly. Yeah. Right.

Dr. Andy Galpin
Okay, so 200 within the first few minutes of getting up.

Dr. Allison Brager
Correct. Yep.

Dr. Andy Galpin
Anything else?

Dr. Allison Brager
Obviously sunlight.

Dr. Andy Galpin
Yep.

Dr. Allison Brager
Right? That's a given.

Dr. Andy Galpin
He'll work out whatever time. He'll work out in the morning, he'll work out in the afternoon-

Dr. Allison Brager
Yep

Dr. Andy Galpin
... whatever. When should he train?

Dr. Allison Brager
So that's why I asked if morning person, evening person. If I was him, I would probably train in the morning, right? Because now you're capitalizing on that rise in cortisol-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... so you're going to optimize your training more so than you would in the afternoon. And then you're going to get that extended cognitive mood energy to be more productive in the latter half of your morning as your cortisol continues to rise.

Dr. Andy Galpin
Okay. Makes sense. Anything else we should consider in the morning or should we move throughout the day?

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Dr. Allison Brager
I would say during that time too, depending on where this individual lives, like vitamin D supplementation.

Dr. Andy Galpin
Mm-hmm.

Dr. Allison Brager
Even if you are getting natural sunlight, if you're up in Boston or New York-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... like a lot of Wall Street executives-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... it's good to supplement with vitamin D.

Dr. Andy Galpin
Okay. Anything he should be doing specifically throughout the day or not doing until that 3:00 goes, gets kids, and sort of all there?

Dr. Allison Brager
So again, with strategic caffeine dosing, that's why we had done all those studies in randomized clinical trials. So you can supplement with 200 milligrams of caffeine every four to six hours as needed.

Dr. Andy Galpin
Mm-hmm.

Dr. Allison Brager
You can even do two to four hours as needed, stopping at least six to eight hours before bedtime.

Dr. Andy Galpin
Okay, so he could have his 6:00 caffeine, and then maybe have it again at noon?

Dr. Allison Brager
Mm-hmm.

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Dr. Andy Galpin
Something like that?

Dr. Allison Brager
Or even 9:00 in the morning if he wants.

Dr. Andy Galpin
Yeah, you can do it-

Dr. Allison Brager
So then do it again at noon, right?

Dr. Andy Galpin
And then maybe even again at 3:00 or 4:00?

Dr. Allison Brager
Mm-hmm. Yep.

Dr. Andy Galpin
Would be totally fine.

Dr. Allison Brager
As long as, yeah, because that's within the eight-hour time window before-

Dr. Andy Galpin
Before midnight.

Dr. Allison Brager
Yeah, before midnight.

Dr. Andy Galpin
Okay. He's going throughout the day. He's going to go back to work, like I said, at 8:00.

Dr. Allison Brager
Yep.

Dr. Andy Galpin
And he's not going to stop until an hour before-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... he goes to bed. Are there any best practices, any things he can do either during that three-hour work window or right after it? What can he do to make sure that when he gets into

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bed at 11:50, he is asleep by midnight-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... or close to it, and has the highest quality six hours possible?

Dr. Allison Brager
Well, so that's why he's not going to have a full-on sleep hygiene routine. And here's the thing, that sleep hygiene routine, that 90-minute routine isn't necessary if you're keeping everything else in your environment consistent.

Dr. Andy Galpin
Yep.

Dr. Allison Brager
But in order to help facilitate that sleep, so you have a 10-minute sleep onset, that's where blue light blocking glasses, right?

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
As you're working, that's what I would have this individual wear because now you're still promoting that dim light melatonin onset to then- Let that individual go to sleep.

Dr. Andy Galpin
So while he's still aroused from work activity, he can mitigate some-

Dr. Allison Brager
Exactly. Right. Because you're still going to have brain activity and gamma, beta activity.

Dr. Andy Galpin
Yep.

Dr. Allison Brager
It's not going to be anywhere close to alpha, but at least you're not disrupting the dim light melatonin onset through not having blue light-blocking glasses.

Dr. Andy Galpin
Anything that he should take from a food or a supplementation or drug or anything? Maybe you don't have to go too far into drug without knowing more medical history there.

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Dr. Allison Brager
Yeah.

Dr. Andy Galpin
But anything that he should take either eight o'clock, nine o'clock, midnight, or right before bed, or just sort of stay away as much as you possibly can?

Dr. Allison Brager
So it is okay to eat... There are, believe it or not, sleep-promoting foods. So very recently, there's isolated a protein factor in, believe it or not, warm milk.

Dr. Andy Galpin
Warm milk.

Dr. Allison Brager
Warm milk-

Dr. Andy Galpin
Mouth taping

Dr. Allison Brager
... that is sleep promoting.

Dr. Allison Brager
Other sleep-promoting foods that have been studied in randomized clinical trials include things like kiwis.

Dr. Andy Galpin
Yep.

Dr. Allison Brager
Well, we already talked about tart cherry extract.

Dr. Andy Galpin
Mm-hmm.

Dr. Allison Brager
That's good for skeletal muscle recovery, so that's something I would take-

Dr. Andy Galpin
Yep

Dr. Allison Brager
...

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Dr. Allison Brager
in addition to working, right?

Dr. Andy Galpin
Yep. Any-

Dr. Allison Brager
Or as, what do you call them? Slow release protein, like a-

Dr. Andy Galpin
Oh, yeah

Dr. Allison Brager
... casein whey protein.

Dr. Andy Galpin
Yeah. Okay. And are there any common mistakes that they're making that are maybe disrupting the sleep? We talked about melatonin earlier-

Dr. Allison Brager
Yes

Dr. Andy Galpin
... right? So what about chronic use of melatonin for someone like this, who's like, "Hey, I want to make sure I get to sleep quickly, so I'm going to take 10 mgs of melatonin every night."

Dr. Allison Brager
Yeah. You don't need melatonin, and actually, that melatonin will prevent you from entering the restorative stages of sleep.

Dr. Andy Galpin
So not a good idea.

Dr. Allison Brager
So yeah, at night, if you want to take anything to help influence sleep maintenance-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... it would be magnesium bicarbonate. So a powdered form of magnesium, it's going to have greater bioavailability, but that would be a good thing. That also helps offset loading of the central nervous system throughout the day, especially if this individual is doing strength and conditioning-

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Dr. Andy Galpin
Yeah

Dr. Allison Brager
... as part of their physical fitness routine.

Dr. Allison Brager
But no, melatonin does not work as a nighttime sleep aid. It acts as a phase shifter-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... but not as a nighttime sleep aid.

Dr. Andy Galpin
Yeah. Great.

Dr. Allison Brager
And it can have negative impacts on sleep architecture if not dosed appropriately.

Dr. Andy Galpin
What about any tools or technologies, any brainwave stuff he could do or not do? You mentioned the Shiftwave chair earlier, but anything else like that, or you feel like this would be a pretty good setup for this person?

Dr. Allison Brager
If they keep having these time cues-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... and keep working in this environment night after night, again, the brain will remember and consolidate those time cues to then help promote efficient sleep.

Dr. Andy Galpin
So just build the pattern.

Dr. Allison Brager
Yep, exactly. Patterns are everything.

Dr. Andy Galpin
Yeah.

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Dr. Allison Brager
I would say the last hack, like we talk about the cool, dark, quiet room.

Dr. Andy Galpin
Yeah. Sure.

Dr. Allison Brager
But believe it or not, taking a hot shower, even like a five-minute hot shower before bed, that compensatory mechanism is to cool you.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
Right. Don't cold plunge before bed. I always tell people that. That is one social norm that-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... has become popular and that mouth taping, so.

Dr. Andy Galpin
Tell me about the cold plunging and mouth taping.

Dr. Allison Brager
Big fan of it-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... but it has to be the right time of day. If you think about it, you take a hot shower, compensatory mechanism is your body wants to cool down.

Dr. Andy Galpin
Yep.

Dr. Allison Brager
If you cold plunge, compensatory mechanism is your body wants to warm up. You don't want to go into bed warm. You want to think of sleep as a state of hibernation.

Dr. Andy Galpin
Yeah.

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Dr. Allison Brager
And essentially, that's what happens at sleep. There's a significant drop in core body temperature, and the greater the drop in core body temperature, the greater the propensity to spend in deep restorative non-REM-

Dr. Andy Galpin
Right

Dr. Allison Brager
... and REM sleep.

Dr. Andy Galpin
Right.

Dr. Allison Brager
So mouth taping, general consensus, American Academy of Sleep Medicine, understand that nasal breathing is promoting the parasympathetic nervous system. That's fine, but if you're going to mouth tape, do it during the day to train your diaphragm to-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... activate appropriately to then be able to breathe through your nose at night and not your mouth when you're asleep. The idea is when you're asleep, you're not unconscious, but you're-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... in a subconscious state.

Dr. Allison Brager
And you need every bit of air you can get into your system. And depending on what sleeping position you're in, especially if you're sleeping on your back or if you're sleeping on your stomach-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... you're not going to have the full capacity to activate your diaphragm to take in air.

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Dr. Andy Galpin
Mm-hmm.

Dr. Allison Brager
So if you're limiting the ability to take in air through your mouth because you don't have a well-trained and strong diaphragm, then you're setting yourself up for risk of apnea-like episodes.

Dr. Andy Galpin
Right.

Dr. Allison Brager
Um-

Dr. Andy Galpin
What about nasal dilators?

Dr. Allison Brager
Oh, those are great. Yeah. Any reduction in mouth breathing and increase in nasal breathing will promote restorative sleep. And nasal dilators can help with that process.

Dr. Andy Galpin
Okay. So if you're going to use something up there, opt more towards just helping air flow through the nose rather than blocking it through your mouth-

Dr. Allison Brager
Mm-hmm. Exactly

Dr. Andy Galpin
... as a better approach. How did you handle the jet lag last night? How would this guy or anybody else... Let's just say that the normal person is traveling once a month or so-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... for two or three days, right?

Dr. Allison Brager
Yep.

Dr. Andy Galpin
And let's just assume at least a three-hour change. Obviously, if you're going a one-hour difference, it's not-

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Dr. Allison Brager
Yep

Dr. Andy Galpin
... a big deal. But what can we do best to enhance If you don't want to call it jet lag, fine, because it's probably not that, but you get it.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Time shifting like that. Multiple hours. And I still got to do my business meeting, I got to do my work-

Dr. Allison Brager
Yep

Dr. Andy Galpin
... I got to do whatever. Perform the next day.

Dr. Allison Brager
Well, it's a whole process, right? And I'll give a shout-out to my friend Andy, who is the CEO of FlyKit or Fount Bio.

Dr. Andy Galpin
Good.

Dr. Allison Brager
Actually, his chief science officer, Clayton, and I, we started in the same sleep lab as undergraduates-

Dr. Andy Galpin
Oh, really?

Dr. Allison Brager
... at Brown University. Yeah.

Dr. Andy Galpin
Awesome.

Dr. Allison Brager
It's always such a small world in human performance. But it was an intentional process, right? So, what's in this FlyKit is there are a certain pack of supplements that promote or that reduce inflammation. So, combination of fish oil, high-dose vitamin B, tart cherry extract-

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Dr. Andy Galpin
Yeah

Dr. Allison Brager
... things like that. I also wore the blue light-blocking glasses that are in the kit on the plane.

Dr. Andy Galpin
Mm-hmm.

Dr. Allison Brager
I don't really watch TV or movies. I know that seems like I'm a weird psychopath-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... but I just used them, and I was reading, right?

Dr. Andy Galpin
Right.

Dr. Allison Brager
And then when I got to LAX on the way to the hotel, that's when I took the melatonin.

Dr. Andy Galpin
Hmm.

Dr. Allison Brager
But I only ever take melatonin when I travel, and that's only within the first day or two to help coax my system into adjusting. But once I'm adjusted, I stop taking melatonin.

Dr. Andy Galpin
How much do you take typically? What's an effective dose for you?

Dr. Allison Brager
So, effective dose for me, honestly, is one milligram. But anything over three we find to not... It's the ceiling effect, really-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... three.

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Dr. Andy Galpin
Well, we've seen a lot of people, you'll see a lot of recommendations of five to 10.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
When we use it, one would be about the high end-

Dr. Allison Brager
Yep

Dr. Andy Galpin
... as well. Much more than that, you're not getting-

Dr. Allison Brager
Right

Dr. Andy Galpin
... really anything. We stay pretty low. It also stays around. It's supposed to have a half-life like everything does-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... but when you consistently dose it, it stays around for a long time.

Dr. Allison Brager
Yeah. Oh, well, I will tell you. So I'm one of those believers, I think Oliver Sacks is like this.

Dr. Andy Galpin
Hmm.

Dr. Allison Brager
In order to believe the things he studied neurochemically, he would take them themselves.

Dr. Andy Galpin
Mm-hmm.

Dr. Allison Brager
So I went into -- Since you went out to North Carolina, I went into one of those country Dollar General stores-

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Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... on the drive to work, and I found a 20-

Dr. Andy Galpin
Oh

Dr. Allison Brager
... a 20-block of melatonin.

Dr. Andy Galpin
Ooh.

Dr. Allison Brager
I took it. Oh my God, I was fucked up for two days.

Dr. Andy Galpin
Oh, I believe it.

Dr. Allison Brager
Yeah .

Dr. Andy Galpin
Yeah, I do not care what-

Dr. Allison Brager
I was actually worried at first about taking it, because, again, I live alone, so I called my wife. I was like, "Oh, honey, if I don't wake up in the morning , call 911." It was a two-block pack too, so some idiot-

Dr. Andy Galpin
No

Dr. Allison Brager
... could've taken 40.

Dr. Andy Galpin
Four of them? Yeah. Yikes.

Dr. Allison Brager
Like 40.

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Dr. Andy Galpin
That's so much melatonin.

Dr. Allison Brager
Yeah. But I took the 20. I was brain dead for two days.

Dr. Andy Galpin
I was telling you this morning, we used to measure urinary melatonin. So this is a metabolite, right?

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
It should be metabolized.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
It should be very minimal. We don't need more. But we did it in what I would probably say, I don't know, over 10 times. We saw people that were 20 to 30x-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... upper range-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... reference range values for melatonin, and you're like, "Whoa."

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
We don't have any sleep problems to fix here.

Dr. Allison Brager
Yeah.

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Dr. Andy Galpin
The reason you feel like a zombie all day is because you're sedated.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
You are sedated with melatonin constantly.

Dr. Allison Brager
Yep.

Dr. Andy Galpin
And just removing melatonin from them, all of a sudden, all their years of sleep testing issues-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... gone.

Dr. Allison Brager
Right. Yep.

Dr. Andy Galpin
It's just gone. They're like, "Oh." You're just walking around sedated.

Dr. Allison Brager
Yeah. And plus too, they probably weren't getting the effective entries into deep restorative non-REM-

Dr. Andy Galpin
Nothing

Dr. Allison Brager
... and REM sleep.

Dr. Andy Galpin
Nothing.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Yeah. They were on the classic stimulant sleep drug cycle.

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Dr. Allison Brager
Yep.

Dr. Andy Galpin
Feel terrible.

Dr. Allison Brager
Oh, yeah.

Dr. Andy Galpin
Take a load of stimulants.

Dr. Allison Brager
Yep.

Dr. Andy Galpin
Then you can't get to bed, so you take a load of sleep aids.

Dr. Allison Brager
Alcohol or-- Yeah.

Dr. Andy Galpin
Just break that cycle.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Let's talk about sleep extension.

Dr. Allison Brager
Sure.

Dr. Andy Galpin
Sleep banking. What's the proper way to think about this? Why do I even care about it? When is the best way to use it? Who should be thinking about it? Obviously, all of us want to extend our sleep, right?

Dr. Allison Brager
Right, yeah.

Dr. Andy Galpin
You have parents. It's like, "Yes, I would love to sleep more." Not going to happen.

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Dr. Allison Brager
Exactly.

Dr. Andy Galpin
So make your most convincing argument for how much do I need here, and what are the best principles around sleep extension?

Dr. Allison Brager
So again, it's that 20 to 30-minute rule, right? Because if you're extending sleep within a 20 to 30-minute period-

Dr. Andy Galpin
Yep

Dr. Allison Brager
... then it's not providing additional physiological stress to the circadian system, right? Because-

Dr. Andy Galpin
Got it

Dr. Allison Brager
... that's a delicate balance of maintaining or satisfying the sleep homeostatic system, which is sleep amount, and then circadian system, which obviously influences sleep quality.

Dr. Andy Galpin
Yep.

Dr. Allison Brager
So that's the one way to start. Now, sleep extension, we use it in many different forms. So napping serves as a form of sleep extension, right?

Dr. Andy Galpin
Yep.

Dr. Allison Brager
You use napping essentially to repay off sleep debt. So if you're in a insufficient sleep state, typically we'd start with, okay, take a 20 to 30-minute nap. Now, if you can't nap because you aren't that person, then that's when we go to, okay, let's either put you to bed 30 minutes earlier or extend your sleep by 30 minutes earlier.

Dr. Andy Galpin
Mm-hmm

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Dr. Allison Brager
Or later in the morning. Again, that's done in a 30-minute interval. So typically what's practiced, and folks who do cognitive behavioral therapy for insomnia who are trying to extend somebody's sleep is they'll have that individual go to bed earlier 30 minutes or wake up later 30 minutes for a period of a week or two, and then after that period of time, they extend it by 30 minutes here and there. I know you've talked about this before-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... on the protocol. It's physiologically impossible because the circadian timing system will not let you go from five hours to eight hours. It is not that simple. I see this a lot with soldiers who I've commanded and stuff who are now out of the Army, and that's the question they usually hit me up the most about is like, "Hey, ma'am. I'm trying to get eight or nine hours. I know I need that. And why can't I just get eight or nine hours?" And so I have to explain to them this whole gradual process, and they're there now, but it took months, six, seven months for them to get there.

Dr. Andy Galpin
So usually, is it fair to say 30 minutes per four weeks or 30 minutes per week? Like how-

Dr. Allison Brager
30 minutes per week. Yep

Dr. Andy Galpin
... is someone going to take that?

Dr. Allison Brager
Yeah. But even to that, that's going to have a ceiling effect where at most you're probably looking at extending sleep by two hours at most.

Dr. Andy Galpin
Yep.

Dr. Allison Brager
The other form of sleep extension, and this is something that we've studied in the lab, again, we do lab studies to mimic what-

Dr. Andy Galpin
Yep

Dr. Allison Brager
... possibly could happen in combat situations, is letting people sleep in for as long as they want

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past their normal bedtime. So usually we find that most people, if they have a two-week period to be on their own or essentially say they're on vacation or the equivalent of being in a scientific study on vacation they'll sleep for about anywhere from 45 minutes to an hour past their normal bedtime.

Dr. Allison Brager
And then when you put those individuals through a period of full-on sleep deprivation, so we're talking about 40 hours of wakefulness all the way up to 62 hours of wakefulness-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... sustained. The rate of decline in their cognitive performance, even their physical performance the rate of decline is less because they had that sleep on the front end to help offset the sleep pressure.

Dr. Andy Galpin
How long do they have to bank that for? Is that a two-week?

Dr. Allison Brager
It's a 10-day protocol we are using. Yep.

Dr. Andy Galpin
So sleep an extra hour or so for 10 days.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
And then if you were then to go into a situation when you are literally awake for 40 or 50 or 60 straight hours, that sleep deprivation is going to have consequences. But what you're saying is that sleep extension prior to-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... means you won't drop as far.

Dr. Allison Brager
Exactly. Now, if you're chronically insufficiently slept before that point-

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Dr. Andy Galpin
Yep

Dr. Allison Brager
... you're definitely going to drop. I can tell you that from when I was deployed. So we did a... The longest I was awake was, it was almost three days. But yeah, we were outside the wire with some people-

Dr. Andy Galpin
Mm-hmm

Dr. Allison Brager
... and I was awake for legitimately two days. But that's where I used the strategic caffeine dosing strategy-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... for the most part. I still felt like I was completely drunk-

Dr. Andy Galpin
Right

Dr. Allison Brager
... the last 24 hours of being awake. But I used caffeine gum and-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... even tried dipping for the first time, which- ... is disgusting. I hate that habit.

Dr. Andy Galpin
I remember hearing old stories of people, pilots-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... I think this was in World War II, where they would take tobacco and put it in their eyes.

Dr. Allison Brager
Oh, wow. But you know what? I'm not going to lie, I felt slightly ill after I dipped for the first time.

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Dr. Andy Galpin
Sure.

Dr. Allison Brager
And I felt I had a little buzz, but then that sleep deprivation kicked in.

Dr. Andy Galpin
Yeah. How does the military handle it in situations like that? It's just get through it. Just do whatever.

Dr. Allison Brager
It is just get through it. They are getting smarter about it. I think that's great about the team of individuals I've worked with over the years is that knowledge has now been taken out to the field and there's commanders out there who are now using all these evidence-based, science-based, DoD-backed science principles to be more effective in combat. So it's been really cool.

Dr. Andy Galpin
When it comes to sleep extension, do people typically have an easier time sleeping in or going to bed earlier?

Dr. Allison Brager
So that's actually where I think chronotype comes into play, right? So for me, my sleep extension would be sleeping later.

Dr. Andy Galpin
Mm.

Dr. Allison Brager
For you, you might want to go to bed early.

Dr. Andy Galpin
That's-

Dr. Allison Brager
That's where I think-

Dr. Andy Galpin
I would pick that 1,000 times over 1,000.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Every time.

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Dr. Allison Brager
Yep.

Dr. Andy Galpin
Sleeping in is a struggle to me. Now, albeit one of the things you just mentioned earlier is something we hear consistently, which is when people say, "Oh, I can't sleep in"-

Dr. Allison Brager
Mm-hmm

Dr. Andy Galpin
... it's usually because they think that that's going to happen tomorrow.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Right? It's just like, "Oh, this thing happened. I'm on vacation," then like, "I woke up early." Well, of course you did.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Because you've been waking up at that time for 400 consecutive days.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
It's going to take a few weeks for you to really consistently be able to sleep in, right?

Dr. Allison Brager
Right. Yeah.

Dr. Andy Galpin
So sleep extension protocol is unlikely to be, again, sleep in tomorrow.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
When we've worked with people and we're trying to truly extend their baseline sleep, so say they're getting an average of six and a half hours-

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Dr. Allison Brager
Yeah

Dr. Andy Galpin
... we want to get them to an average of seven. That is at least a two-week thing-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... that it takes to get to that baseline average.

Dr. Allison Brager
Of discipline, right?

Dr. Andy Galpin
Totally.

Dr. Allison Brager
Night after night. As soon as you get off that schedule, you've got to restart.

Dr. Andy Galpin
We have yet to find anybody who couldn't do it if they zoom out on timeframe.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
It is usually, "I tried it, couldn't sleep in. Oh, I tried it again today. It didn't work at all. I just can't sleep in."

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
Like no, your physiology takes some time-

Dr. Allison Brager
Right. Yeah

Dr. Andy Galpin
... to adjust.

Dr. Allison Brager
That's the thing, right? A lot of people want the quick fix.

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Dr. Andy Galpin
Right.

Dr. Allison Brager
Just like it takes dedicated time to build muscle-

Dr. Andy Galpin
Yep

Dr. Allison Brager
... you just You have to trust the process.

Dr. Andy Galpin
Right. Excellent. I got one more question for you if you'd be so kind.

Dr. Allison Brager
Sure.

Dr. Andy Galpin
Maurice Clarette.

Dr. Allison Brager
Oh, okay.

Dr. Andy Galpin
Boom Boom Mancini. I could go on and on. What the hell is in the water, in the air? What is it about Youngstown? You come from this place. You're still active. You still do the CrossFit-

Dr. Allison Brager
Yep

Dr. Andy Galpin
... competitions.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
First female pole vaulter-

Dr. Allison Brager
In the state of Ohio, yeah

Dr. Andy Galpin
... in the state of Ohio.

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Dr. Allison Brager
Yep.

Dr. Andy Galpin
I'm assuming then first to go compete collegiately.

Dr. Allison Brager
Mm-hmm.

Dr. Andy Galpin
Knocked on the door of the Olympics. What is it in that city? You guys just produce super athletes for this random little city in Ohio. What's going on there?

Dr. Allison Brager
It's so funny you say that. Well, because there's that "30 for 30" documentary, "Youngstown Boys," right?

Dr. Andy Galpin
Yeah, of course.

Dr. Allison Brager
With Jim Tressel.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
And I don't think I realized the community of athletics I grew up in until I went to college.

Dr. Andy Galpin
Outrageous.

Dr. Allison Brager
I thought I was an average athlete, right? But then, okay, let's unpack my high school. I went to a big football feeder school, Youngstown Boardman. Bernie Kosar went to my high school, right?

Dr. Andy Galpin
Bernie, yep. Quarterback.

Dr. Allison Brager
In our strength and conditioning room in high school, and we didn't have really phenomenal strength and conditioning equipment. In fact, I would say it was very bare bones equipment. But you go into that strength and conditioning room, and you'll see 50 people from my high school who played in the NFL.

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Dr. Andy Galpin
I believe it.

Dr. Allison Brager
My graduating class alone, I graduated with 711 kids. I would say 40 of them went on to play Division I sports, male and female. Actually, that's an underestimate. Probably 60 or 70.

Dr. Allison Brager
One almost made it to the Olympics in swimming. We had a WNBA player. And then, oh, we had three kids in my graduating class who did actually play in the NFL and won Super Bowl rings.

Dr. Andy Galpin
Yeah. It's outrageous.

Dr. Allison Brager
My brother's class had an NFL player.

Dr. Allison Brager
So my great uncle was a Golden Gloves boxer. He actually refed a Mike Tyson fight years ago.

Dr. Andy Galpin
Nice.

Dr. Allison Brager
My other great uncle, Lou Slaby, he was a linebacker for the Giants. But yeah, it's one of those things you don't realize until you go to college. You're like, "Shit, I actually, I guess I am an elite athlete."

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
But I always thought I was average because of growing up there. It's insane how what you think could be your baseline, you go out into the world, and you're like, "Wow, I guess, in this one capacity, I am better than other people," and I had no idea.

Dr. Andy Galpin
I'm demanding more answers here.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
My wife went to Long Beach Poly, right? Modern day. There's these schools in different areas in

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Florida, South Florida.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Oh yeah, they put out 40 or 50 Division I athletes every year. Great. Well, you're in LA.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Right? There's three million people in a 20-mile radius.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
Youngstown, Ohio. What in the world? How is it? Kelly Pavlik, the list goes on-

Dr. Allison Brager
Yep

Dr. Andy Galpin
... and on of just mega stars.

Dr. Allison Brager
So my dad is a butcher, and he used to sell meat to Kelly Pavlik. Kelly Pavlik got all his meat from my dad.

Dr. Andy Galpin
Oh, no. There you go. I want genetic tracing. I want some answers out of that city.

Dr. Allison Brager
You know what it is? It's the grit mentality, right?

Dr. Andy Galpin
No, it's not.

Dr. Allison Brager
Is it?

Dr. Andy Galpin
No, it's not.

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Dr. Allison Brager
So should I-

Dr. Andy Galpin
You're drugging kids. You're genetically CRISPRing them. You're doing something. I don't care what you say about-- I grew up in the country. My graduating class was, like, 70 kids, not 700.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
And we probably had, I don't know, three or four kids ever in my high school play college football.

Dr. Allison Brager
Oh, yeah.

Dr. Andy Galpin
I was probably the first or second person to ever do it-

Dr. Allison Brager
Yeah

Dr. Andy Galpin
... or, well, second or third. You got 50 NFL players every year at your school.

Dr. Allison Brager
Yeah.

Dr. Andy Galpin
It's unbelievable.

Dr. Allison Brager
Well, in the area, right?

Dr. Andy Galpin
It's ridiculous.

Dr. Allison Brager
Because that's just Youngstown Boardman, where I went. There's five other schools. Maurice Clarette, right?

Dr. Andy Galpin
Yeah.

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Dr. Allison Brager
There's Warren Harding. Cardinal Mooney also produced phenomenal athletes. That's what I think you're taught early on growing up there, probably still now. But back when I was in high school, we had the highest murder rate in the country.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
People never believe me.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
But when I was a sophomore in high school, we literally had the highest murder rate in the country. And my mother, she worked for welfare, so she was in the center of that on the east side of Youngstown.

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
In this plaza she worked in, that's where most of these murders happened. So I think you learn early on that your ticket out of-- Because really, too, that area, too, what is considered middle class in Youngstown is considered poverty everywhere else. So I-

Dr. Andy Galpin
Yeah

Dr. Allison Brager
... in all honesty, grew up lower middle class.

Dr. Allison Brager
And so you learn that your ticket out of town is being good at sports. Yes, I loved school, and so that helped. But at the end of the day, my goal in life was to be an astronaut or an athlete, right? And I was able to, at one point, accomplish that and be an athlete, but that's all you think about growing up there is, well, LeBron, too, right?

Dr. Andy Galpin
Yeah.

Dr. Allison Brager
It's just that whole, man, sports is king there.

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Dr. Andy Galpin
I get it. Well- ... next time when you tap in here from Mars or wherever else you come in, I want answers about Youngstown. I'm not letting you up out of this, so.

Dr. Allison Brager
Well, just ask, what's his name, Bruce Springsteen, since he has that song-

Dr. Andy Galpin
Of course. Yeah

Dr. Allison Brager
... about it.

Dr. Andy Galpin
Yeah. Thank you so much for coming out here. I know it was a long trek, and really appreciate it. I think it was-

Dr. Allison Brager
Of course

Dr. Andy Galpin
... fascinating stuff, and it's been a long time. We've known each other for many years.

Dr. Allison Brager
Oh, my gosh. Yeah. It's all through science, right?

Dr. Andy Galpin
Yep.

Dr. Allison Brager
And then we all went our separate ways in academia and then outside of academia, and-

Dr. Andy Galpin
Yep. And it's always nice to see another scientist who's a true meathead.

Dr. Allison Brager
Yeah, exactly. Oh, I embrace being a meathead, right?

Dr. Andy Galpin
Awesome.

Dr. Allison Brager
Hence my book.

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Dr. Andy Galpin
Thank you so much.

Dr. Allison Brager
Of course.

Dr. Andy Galpin
I hope you enjoyed that conversation today with Dr. Allison Brager. If you want to see more about Allison, read more of her work, grab her book, or follow along with any of her resources, please check out the show notes for direct links. Thank you for joining for today's episode. My goal, as always, is to share exciting scientific insights that help you perform at your best. If the show resonates with you and you want to help ensure this information remains free and accessible to anyone in the world, there are a few ways that you can support. First, you can subscribe to the show on YouTube, Spotify, and Apple. And on Apple and Spotify, you can leave us up to a five-star review. Subscribing and leaving a review really does help us a lot. Also, please check out our sponsors. The show would not exist without them and their exceptional products and services. Finally, you can share today's episode with a friend who you think would enjoy it.

Dr. Andy Galpin
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