



## Mind & Life Podcast Transcript

### Elissa Epel – Mind, Body, and Stress

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**Opening Quote – Elissa Epel (00:00:03):** *For me, stress science is both informed by the worldview of Buddhism, as well as validating so much of what we already know from wisdom teachings. And it centers around control and uncertainty. So when we think about trying to understand dependent rising, causes and conditions, and the interdependence—the network of complexity that we live in—it's very humbling to realize how much we don't control. And contemplative wisdom, Mindfulness-Based Stress Reduction, helps people, helps them understand what they can and can't control, including their own response.*

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**Intro – Wendy Hasenkamp (00:00:45):** Welcome to Mind & Life. I'm Wendy Hasenkamp. Today, I'm speaking with contemplative health psychologist and stress researcher Elissa Epel. Elissa is Professor and Vice Chair of Adult Psychology at the University of California San Francisco. She studies how mindfulness, meditation retreats, and breathing techniques can help buffer stress and biological aging to promote both physical and mental health.

(00:01:13) Elissa and I get into some interesting territory in this one. We start with the early roots of her interest in the mind-body connection, and how she's come to study stress through the lenses of both the mind and the body, and also how she's brought contemplation into the research. Then, we get into the central role of uncertainty in stress—how we can learn to deal with it and how it shows up in our bodies. Elissa describes the acute versus chronic stress responses in our body, and why we might want to intentionally induce acute stress to boost our health. We talk about cell aging systems, specifically telomeres, which Elissa has done some fantastic research on. And then we get into contemplative practices as a way to reduce stress. We talk about how our minds influence our very cells, and the concept of cellular safety. Along the way, Elissa shares some of her research on rest, retreat, and vacation, and also how contemplative benefits can transfer to the next generation. She also reflects on what it means to have a sensitive nervous system, and the importance of focusing on joy and gratitude.

(00:02:27) As always, if you're interested in Elissa's work, there's more information in the show notes, including a link to her latest book, *The Stress Prescription*, which I definitely recommend checking out. It's super accessible, yet at the same time cutting-edge science, and it's full of useful tips and practices to help you manage stress in your life. Stress is something we all deal with, like it or not, and I'm so grateful to Elissa for her rigorous and broad ranging work in this domain, and for putting this wisdom into the world in a way that can reach so many. And Elissa is not only full of knowledge, but also warmth and heart, as I think you'll hear in this conversation. All right. With that, it's my great pleasure to share with you, Elissa Epel.

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**Wendy Hasenkamp** ([00:03:14](#)): It is such a pleasure to be joined today by Elissa Epel. Elissa, thank you so much for being here.

**Elissa Epel** ([00:03:20](#)): It's such an honor to be on your podcast, Wendy. Thank you.

**Wendy Hasenkamp** ([00:03:24](#)): I'd love to start with a little bit of your own personal story and how you ended up doing all of this amazing work that you do. So how did you get interested, what drove you towards medical research, stress research, and then where did the contemplative side come in?

**Elissa Epel** ([00:03:40](#)): It's really easy to see the roots of my interest from an early age, partly the home I grew up in, the place I grew up in. At home, meditation and self-growth were common, respected, dinner topics. My parents were both trying TM meditation, and then they got very into EST, and they always shared this with me and my sisters. They just mixed that in with their Judaism. And they really just loved spirituality... they were very open-minded. I would say that a family characteristic was "openness to new experience." My father was a biologist and we spent most childhood summers in science camp.

**Wendy Hasenkamp** ([00:04:32](#)): Oh, fun!

**Elissa Epel** ([00:04:33](#)): It was marine biology, so usually we're in an ocean at a beach, looking at animals, and pondering how different organisms live and survive and thrive. And then my mother was a therapist when she was working. And so I really did just combine interests of the mind with interest in how biology works, and how our body works.

**Wendy Hasenkamp** ([00:04:59](#)): That's awesome. And so, did you always have a contemplative practice, or when did that come into your research space?

**Elissa Epel** ([00:05:07](#)): I always was curious about the mind. As a young child, my older sister, who is someone I'll call a seeker, who was really trying many different traditions and practices, brought me to some different classes that were movement classes, like Tai Chi. And I remember feeling the tingling in my hands strongly and quickly and just saying, "Wow, there's mystery in this body." And really wanting to understand the mind body connection. So that came very early.

([00:05:43](#)) I went to college thinking, of course I'll become a doctor, focused on healing and the healing relationship. And in college, in addition to pre-med classes, I fell in love with psychology and the science of the mind. One of my influences was a class by Robert Sapolsky, who just showed us example after example of how we are really monkeys in clothes. Not just how much our beliefs shape biology, which led me to this interest, but how biology is so powerful in shaping the mind. And how limited our free will is, something I still struggle with. So it was a humble view of humans that really filled me with awe and curiosity. So I just have great respect for biology and the mind and how they're intertwined. And I would say out of every scientific paper I've written over 25 years, it's always about both. It's always the link.

([00:06:47](#)) So I chose health psychology and I have shaped my path toward what I'll call contemplative health psychology. And that has been so heavily influenced by my deep exposure to both contemplative practitioners, contemplative scientists, mostly through Mind & Life, actually. In the early 1990s when I was in graduate school at Yale, Jon Kabat-Zinn came to speak. It was just such a landmark moment to have meditation validated at this medical school and have a huge, packed room and all the excitement

that comes with hearing Jon Kabat-Zinn. And I took my first MBSR class way back then, and that is really the beginning of studying this.

(00:07:37) Then, when I went off to my internship, my clinical psychology internship, I was just so excited to test meditation with health problems. So I got to develop a MBSR-type class for veterans with diabetes. It was some support, some goal setting, but a lot of meditations, warm meditations with kindness and teaching them breathing. And it was so different than what they got at the VA at that time. They just felt so grateful. Many of them really appreciate it. And many of them really got better. One of them, I'll always remember, had an ER episode during the class because he was using the same amount of insulin he always had—he had Type 1 diabetes—yet it became too much, and he had a crisis and went to the ER. And that was just such a dramatic example of, well, what else was happening? He was managing stress better, and that means he was managing glucose better, and he needed less insulin. So an example of possible benefit from the class.

(00:08:48) And so from that, just seeing the tangible benefits for some of these people, I went on to spend probably the next 15 years working on trials, applying mindfulness skills—mindful attention, mindful stress reduction, mindful eating—for weight loss, for diabetes, for improving metabolic control. So we've done a lot of NIH trials and have learned a lot since then.

**Wendy Hasenkamp** (00:09:19): Yeah, I definitely want to come back to that because I think those are some really amazing findings, because now you have some longitudinal work coming out of that too. But first, I'd love to dive into just stress in general. So much of your work has focused on stress, and so I thought it might be helpful—even though that's a concept that I think most people are familiar with colloquially, and we talk about stress, and how we're feeling it—but I'm wondering how you define it from a research perspective, or how the field defines it. I think people can have different perspectives about whether or not they're actually feeling stress, so it is a little bit of a slippery concept. So can you talk a little bit about it, and then how that manifests in our bodies?

**Elissa Epel** (00:10:04): Yes. Stress is definitely worth defining. Stress just holds a lot of mystery because stress pretty much is an umbrella term for everything. Anything that perturbs us, challenges us in a threatened way or positive way, and how we respond, what emotions we have, how we regulate them, how our body responds. It's really quite a rich area to study, and it means different things to different people.

(00:10:32) The way that I think about stress is very simple. First, we have our judgment of whether we are going to be stressed. And I'm going to say not just our mental judgment, but our body judges. So we have this what we call primary appraisal, a first triggered stress response. This can be unconscious. The nervous system in the body is fast and automatic and conditioned to triggers. So we are getting signals from our body all the time that can be stress signals. Then, of course, there's the explicit conscious stress response, which we think of as... The primary appraisal is: Am I in danger? Is something wrong? Do I need to do something differently? Then, there's the second response, and that's where things get interesting, which is: Can I cope? Do I have what it takes? Do I have the resources that I need for the level of demand? And it's that secondary appraisal that keeps us so busy. Because what that means is, whatever is happening externally, whatever conditions, whatever adversity, it's what we make of it. It's how we are interpreting it, how we are assigning meaning to it that determines how big of a stress response we'll have, and if we have one at all.

(00:11:54) And this I like to compare to understanding stress from a Buddhist perspective, because we have, of course, the first noble truth of dukkha, the adversity inherent in life. That can be thought of as the first arrow. We all suffer from the first arrows. And then there's the second arrow, which is, how much do we stress about stress? How much do we suffer from the adversity? So how we manage that second arrow is really what stress management is about—how we manage our relationship with stress.

(00:12:27) So for me, stress science is both informed by the worldview of Buddhism, as well as validating so much of it, so much of what we already know from wisdom teachings. And it centers around control and uncertainty. So when we think about trying to understand dependent rising, causes and conditions, and the interdependence, the network of complexity that we live in, it's very humbling to realize how much we don't control. And that's been one of the most important things in how contemplative wisdom, Mindfulness-Based Stress Reduction helps people, helps them understand what they can and can't control, including their own response. So we can influence the small things around us. We can set fertile conditions for outcomes, but we never control outcomes. We don't control what we think we do. And that is unbelievably helpful to remind ourselves of that at any moment, because so much of stress, it's like pulling on... There are conditions that we don't want in our life, and we work on them. Even unconsciously, they're taking up mental real estate. When we're trying to problem-solve them, I like to think of it as pulling on a rope—but the rope is attached to a boulder. And so it's taking all this energy. Our hands get chafed. We're spending mental energy, but we can't move the rope. So if we can just remember to drop the rope—that it's not the rope that we can change, it's our response.

(00:14:11) So one thing that has absolutely fascinated me is how much our individual differences matter about how we view the future. Our worldview about how much we control the future is tied into how much we believe, truly believe, that the future is inherently uncertain. Uncertainty was such a buzzword during the pandemic, everything felt uncertain and it was tangible. So in the West, our worldview of how things work is that we should control things. We love certainty. We love control. And when we really fixate around that, and want control and want certainty, that leaves us absolutely vulnerable and open to anxiety, and even depression.

(00:15:01) So I've started measuring the tolerance of uncertainty that individuals have. And during the pandemic, people who felt intolerant of uncertainty—so really, for example, felt very uncomfortable when they didn't know what tomorrow would hold, when they couldn't predict the near future—that predicted much more fear of COVID/pandemic, PTSD symptoms, and even climate distress. So we do know that the more we can relax around uncertainty and embrace it, that is part of the ability to live with adversity, live with not knowing. And that for me, I've really learned through meditation, through dharma teachings, not through reading psychology papers. But they do validate it. They do really support, wow, we can actually measure this. How much are we tightening up around that feeling of not knowing?

**Wendy Hasenkamp** (00:16:00): What are some ways that you like to help retrain ourselves to become comfortable with uncertainty? Because yeah, I hear you, that's such a core skill, and it does come oftentimes out of the meditative process.

**Elissa Epel** (00:16:16): One practice that I think is helpful is simply checking in with the body, because the body is storing up intolerance of uncertainty. The body is tensing, holding, feeling vigilant. And so we might not be aware that we're worrying, or that we're bracing, or what we're carrying. So much of it is unconscious, but the body knows. And so checking in with the body's energy, with where we're holding

tension in our physical body, and then trying to name that, breathe into it, release it, that simple practice to me is really important.

(00:16:58) It's a way of naming the uncertainty. And we know that once we name different emotions and we improve our emotional granularity, that really changes... it changes everything. For one, instead of feeling this dark cloud of, I feel stress or I feel overwhelmed, that's an alarm signal to the body. That's saying something's wrong, but you don't quite know what. But once you start naming it and getting more granular or rich information, then I feel like it disempowers the stress response. It lets us feel ease.

**Wendy Hasenkamp** (00:17:34): I love that idea of, as you were just saying, the tension in our body is where we hold uncertainty. Is that what you were saying?

**Elissa Epel** (00:17:43): Mm-hmm. Because it's vague. What is uncertainty? *[laughter]*

**Wendy Hasenkamp** (00:17:46): Yeah, that's so interesting to me, because I always think about tension in the body... I equate that to stress. And maybe uncertainty can also be equated to stress somehow. But I think that's an interesting mental shift, to think about uncertainty in that physical form.

**Elissa Epel** (00:18:02): What you just pointed out is a really important difference and similarity between uncertainty and stress. So when we have stress, there is an object or a target, we know what we're stressed about. There's some identifiable threat, either a thought we have, or a situation. But uncertainty stress is much more vague, and so we can't often name exactly what's bothering us, what we're holding, what we're worrying about. But this practice of saying—what am I holding expectations about? What am I worrying about? What do I feel uncertain about?—helps us identify that more pervasive, loose anxiety that's harder to target, but that we carry around.

(00:18:51) When we think about stress reduction, we so over-focus on, there's an event, how are you going to cope with it? The event takes up just a little bit of time usually. And then we tend to recover. But the rest of the time is when we're carrying around our stress habits—rumination, unconscious stress, intolerance of an uncertain future. And so that's an important part of our day to target. So when we think we're relaxed, we're not as relaxed as we could be, or should be. And that's an important practice to then look inside and say, what's there right now, when nothing is really wrong, nothing is demanding my attention to cope.

(00:19:33) – *musical interlude* –

**Wendy Hasenkamp** (00:20:03): What you were just saying is reminding me of the difference between our body's acute stress response and chronic stress response. Could you maybe unpack that a little bit?

**Elissa Epel** (00:20:14): Yes. That is probably one of the most important distinctions in understanding stress and its effects on health. So, we know very well now that chronic toxic stress—when we have situations that are ongoing, that we don't have the resources to cope or we're just really wearing down from, because we're not doing self-care—that is what accelerates our biological aging. Whereas acute stress to an event in the moment is a beautiful biological event that we are exquisitely well-equipped to deal with. So we mount a stress response, and we recover. In the recovery, we actually turn on a lot of healing or salutary responses to clean up, clean up the mess from stress.

(00:21:07) So in the cell, that means autophagy—cleaning up all of the metabolic products of having dealt with stress. And we clean up better than we were in the first place. It turns out that when we expose ourselves to short-term acute stressors in the body, we're actually leaving our cells more fit. I like to call it stress fitness instead of aerobic fitness. And the cells respond to future stressors in a more resilient way. They're quickly reacting and quickly recovering, and in the meantime, cleaning up all the junk, like free radicals.

(00:21:43) So one of the important ways that we can use that to our advantage is really focusing on the beauty of stress, the positive stress response in our body, as well as how it helps us grow, how it challenges us and helps us make meaning, and really can lead to more post-traumatic growth, or more thriving in life. And when we focus on those benefits of stress, that actually has this kind of self-fulfilling prophecy where we have a better, more healthy stress response. We don't have this kind of threatened response where we overreact, but we have more of this challenge response, which energizes our body in a different way. Instead of vasoconstricting all of our vessels, preventing bleeding out and other things, we're actually having a tremendous amount of cardiac output to our brain. So blood is more efficiently going to our brain and oxygenating it. And in studies, when people induce more of a positive challenge response instead of a threat response, people actually perform better, and they feel more positive emotions, excitement, hope, enthusiasm, during the stress.

**Wendy Hasenkamp** (00:22:59): Yeah, and speaking about that—the way our bodies respond positively to that acute stress—I know you've done a lot of work on exercise as well, in terms of stress. So can you share how exercise and maybe some other methods can help us by intentionally inducing that acute stress?

**Elissa Epel** (00:23:22): Yes, that is a great question. Since we know that positive short-term stressors to a cell or to a mouse actually creates longevity, the question is, well, how do we harness that for humans? What is good for our body? So the best example is aerobic exercise. And in fact, rather than thinking endurance exercise is the gold standard and what we should all work toward, it turns out that short bursts of aerobic activity, like high intensity interval training, is a really good model of this type of positive stress or hormetic stress, where we turn on the stress response and then we turn on recovery and the cleanup crew afterward. So it helps with our mitochondria, and of course it helps with our cardiovascular fitness, but it also helps shape up our emotional stress response. So physiologically stressing out the body, repeatedly in a fitness way, can actually lead to more healthy emotional responses to stress and more quick recovery, and less rumination. We know that when we compare exercisers and non exercisers, but we also know that from fitness training studies that anyone who goes through, for example, an aerobic or high intensity interval training will end up coping with emotional stress in more of a healthy way.

**Wendy Hasenkamp** (00:24:47): That's fascinating.

**Elissa Epel** (00:24:48): Yeah. I mean, what's so fascinating is not everyone can exercise, some people have bodies with conditions or disabilities, and it turns out that any physiological stress that's safe can do something similar. So that includes hypothermia, sauna, or cold—cold exposure—or even extreme breathing. So there's a lot of contemplative practices that use the body in this way to change the mind. And so much of our nervous system is in the body.



(00:25:18) So it's just another whole tool. I think we prioritize, or we tend to focus on meditation and mind techniques as the only method or the predominant method for improving our mental health and our stress response. But using the body also is really powerful, and maybe even easier for many people.

**Wendy Hasenkamp** (00:25:42): Yeah, I love your focus on the body, and I think it's such a great example of embodied mind, right? The fact that it's just one system, and we can get at it from multiple input points. You were just talking about hypothermia, and it's reminding me of your meeting and interacting with Wim Hof, who is also known as The Iceman. And I was fortunate enough (I don't know when that was, maybe five years ago), we were at a meeting together, and a group of us, you led us in this breathing practice that I think you learned from him. Do you want to talk about any of those practices?

**Elissa Epel** (00:26:17): Yes. Meeting Wim Hof was very fortuitous because I had been looking for other techniques besides exercise to study in this way of increasing hormetic stress in the body. And when I heard him speak at a conference, he talked about the emotional benefits, and I knew that there were some research showing there were also some immune benefits of his method. So he has really pushed the limit in exposing his body to ice, ice water, for prolonged periods, as well as to extreme breathing, some hyperventilation and some breath retention and cycles of that. Something a bit like tummo breathing, but different. We know that Tibetan monks are able to control their autonomic nervous system with tummo breathing. They're able to increase their body temperature eight degrees with tummo breathing. That's just an example of what we can do with our mind, and our mind-body practices that we pretty much ignore.

(00:27:20) And so I was just so excited to see a practice that might turn down the "inflammaging," the chronic increase of inflammation that we get with aging, and we also get that with chronic stress and depression. So we've been testing it in different studies, and so far what we have found is that... Well, first of all, it's not that easy. Not many people choose cold showers, ice, or breath holding.

**Wendy Hasenkamp** (00:27:50): Yes, it sounds very unpleasant. *[laughter]*

**Elissa Epel** (00:27:51): But if people stick with it, they really do show benefits. It's been as powerful as exercise or meditation in our studies for depression. One thing unique about it, and this wouldn't be too surprising if you've done it, is that it really boosts positive emotions that day. And so in our daily diary studies, when we're comparing different methods like slow breathing, Wim Hof breathing, we find that the extreme breathing, the Wim Hof breathing, leads to more positive emotions at night for the whole experiment, the three-week experiment. So that's pretty exciting for people who feel like they really need that boost. It's energizing. It can make you feel elated.

**Wendy Hasenkamp** (00:28:40): I know you've also done some pretty incredible work on telomeres, which are a cellular marker of aging. Can you talk about some of that? Maybe first just explain what telomeres are. Then, I know you've had some interesting results with meditation.

**Elissa Epel** (00:28:58): Yes, that's been a very interesting chapter. When I was a postdoc here at UCSF, I got very interested in wanting to measure biological aging before we're old. Really looking into the cell and saying, "Well, what tracks age? What can change in children even?" And so that led me to Elizabeth Blackburn. She is a Nobel laureate who discovered telomeres and telomerase, this aging system. Telomeres are these caps that sit at the ends of chromosomes and protect them. And as we age, they shorten. But they're also very sensitive to the biochemical environment, to the stress chemicals in our blood.

(00:29:43) So this led me to conversations with her to ask, could it be that our mind state can influence our telomeres? That was a lot to ask of a basic biologist. And her answer was great, which was, "Wow, we don't even know what genetics control this telomere/telomerase system yet, but I am always convinced by data." So she opened the door to this exploration together, which lasted for about 15 years. And we still add it to some of our studies, but at the beginning, everything was new and exciting, and the question was, "Wow, do mind states affect telomeres and telomerase? Does depression, does acute stress? And can we reverse engineer that? Does meditation, yoga, breathing, can these influence the cell aging system?"

(00:30:33) So we and other people have done many studies by now, and we do have some questions and some things that we agree on, as a field. One thing about telomeres is that they change over years, and when they get too short, the cell dies, or becomes inflamed. So you want to protect them, and the way we protect them is through this enzyme telomerase—keeping telomerase high and inflammation low. And then also mitochondria are very connected to telomeres. They're right next to them in the cell, next to the nucleus, and they talk to each other through chemical signals. So when the mitochondria, the batteries in our cell, get old and worn out, they start leaking free radicals, or oxidative stress, and that wears down the telomeres. But the opposite happens too. When the telomeres go into distress, they send signals to the mitochondria that wears them down.

(00:31:31) So we have these interconnected cell aging systems that turn out to be very sensitive to our distress, our chronic stress. Depression and almost every other psychiatric disorder is associated with shorter telomeres. We've now also found that chronic stress is associated with dampened mitochondrial activity or enzymes. So no wonder we're so exhausted when we're under chronic stress.

**Wendy Hasenkamp** (00:31:59): I was going to ask, so the telomerase, you mentioned that enzyme, it repairs or it re-lengthens the telomeres, right?

**Elissa Epel** (00:32:06): Right.

**Wendy Hasenkamp** (00:32:07): Which then has these protective effects. Does the telomerase also—because you were just mentioning the interaction between the mitochondria and the telomeres and the DNA—does the telomerase have any effect on mitochondrial health or activity? Is that known?

**Elissa Epel** (00:32:22): That is great question. My colleague Jue Lin and I just published a paper and she went very deep on how part of this enzyme is also protecting the mitochondria. So they are definitely connected through telomerase. And telomerase turns out to be more interesting to study than telomeres, because it changes within a day. When we stress people out, their telomerase increases and it's saying, "Get your defenses up. There's trouble here, there's danger, let's protect the cell."

(00:32:55) So there've been many studies on meditation showing that telomerase can increase acutely over weeks or months from meditation studies. There's been small meta-analysis showing that mindfulness meditation boosts telomerase. And then there have been some null studies, and there's always a mix. But I would say that in general, there are more studies than not showing that mind-body practices can boost telomerase enzyme, as well as the gene expression related to telomeres and telomerase. We did a one-week study with TM meditation at one of Deepak Chopra's retreats, and telomerase boosted in the experienced meditators, but not the novice meditators. And that's something



that others have found, looking at other cell aging mechanisms, that if you're experienced and you're going into a day-long meditation or a retreat, you benefit more, the trained mind.

**Wendy Hasenkamp** (00:33:55): Yeah, is the idea that because you have the experience, you can more quickly get to those more beneficial states?

**Elissa Epel** (00:34:02): I think that's it. And when I think back to that retreat we studied, what you see with novices is, wow, tears, angst... I mean, it's the first time that they've stripped away all the stimulation of work and phone and really looked inward. So often for people with trauma especially, those first retreats can be hard.

**Wendy Hasenkamp** (00:34:22): Yeah, that makes sense. It's definitely worth remembering that a first retreat or a really deep dive into these practices is often really stressful. Because there's a lot that you aren't normally looking at, you're kind of keeping under the surface, that then is revealed.

**Elissa Epel** (00:34:38): Exactly. It's a process. And when we do something like breathing, we can immediately feel benefits and relax. But mind training, meditation, really is layers and layers, I think, of exploration and learning about the mind. And so it's not always pleasant right at first.

(00:34:59) But back to the telomeres... Now, we have focused on them a lot. They don't change quickly, so they're not the best marker for short-term studies, like contemplative practices. Although, cross-sectional studies have found meditators tend to have longer telomeres. Rather than just focus on telomeres these days, it's really this cell aging system that we like to think about. For example, epigenetic clocks, inflammation, telomeres and mitochondria, they are all associated with premature aging or worsening with chronic stress. But so far, in intervention studies, lifestyle or meditation, there is some malleability, there is some improvement. We're just not great at measuring these things in blood, because blood cells are mixed and they change and mixed types. And so it's not a very easy outcome to study.

(00:35:55) But the way I think about it is that the cell is agnostic to the type of practice. What it's detecting is a very rudimentary, evolutionarily-based chronic stress soup, or chronic stress state, and that could be produced by our mind, it could be produced by junk food. And similarly, or conversely, it's also detecting when the biochemical environment is telling the cell there is safety, when we're feeling support and love. That is a different biochemical soup. That is us turning off threat signals, possibly turning on other chemicals—more serotonin in the brain, possibly more oxytocin—the cell is able to move into more repair mode.

(00:36:45) So I have my own favorite contemplative practices, but as a researcher, I'm very agnostic to the practices that we study, because underlying most contemplative practices are similar changes. For example, almost all mind-body practices that are calming and relaxing are creating rhythmic, slower breathing, which leads to higher levels of vagal tone and the parasympathetic nervous system. And that just says so much right there. It's like, oh, find what you love, that you want to make a habit, because they're all helping our body in similar ways.

(00:37:27) – musical interlude –

**Wendy Hasenkamp** (00:37:53): I love your emphasis on safety, and I really do think that's such a core of our nervous system—it's what we're always detecting. And in a state of safety, we have access to

resources, I suppose is how it feels. And then, we can use those resources to repair, and do these other things that our bodies need to do to take care. I've never thought about the idea of "cellular safety." So I love that—thinking about what the cell is detecting are these chemical messengers of safety, or not. It's fascinating to think about food, or sugar and those kinds of things that cause inflammation in our bodies then get interpreted in the same way. It's just the final common path there, of is it safe/is it not safe.

**Elissa Epel** ([00:38:43](#)): Exactly. I love that, Wendy. Cellular safety. So some of the common path is the inflammation and oxidative stress. And psychological stress can really dysregulate the levels of cortisol that our cells see. So there are different stress signatures, but when it really comes down to it, there are really similar effects. And the idea of cell safety is really important, because the cell needs to know, when can I clean up? When can I restore? When is house cleaning time? And so sleep, sleep is one of our most precious and important restorative times. But sleep is not always restorative if we're going to bed with a ruminative mind, if we're still holding vigilance.

([00:39:32](#)) So I think that practices during the day, particularly before bed, can really help our quality of sleep. And there's certainly been studies showing that. And deep sleep, which is the deepest restorative state that we can have, when really the brain does its own cleaning—with slow wave sleep, with these pulses of cerebral spinal fluid that clean out amyloid. We want more of that deep sleep, and that's not going to come unless certain conditions are in place. We need to respect our circadian rhythm, but we also need to feel safe that we can go into deep sleep. So we're studying that now. We're studying that with Oura Rings, and we're really interested in, there's got to be predictors of deep sleep beyond sleep deprivation. And if you look at the literature, there aren't any known predictors of how much deep sleep we get, besides aging and sleep debt.

**Wendy Hasenkamp** ([00:40:26](#)): Right, and what about also, maybe not sleep itself, but ways that we can induce a deep restful state while we're still awake. That feels like it overlaps into the contemplative space as well.

**Elissa Epel** ([00:40:40](#)): I am really curious about how much of that deep rest people get. I mean, if you are a meditator, you usually get that, it depends on the sitting, but that could be a daily practice. But for other people, where do most people get deep states of rest while they're awake? What about for you, Wendy?

**Wendy Hasenkamp** ([00:41:03](#)): Yeah, it's not a common experience. It definitely has to be intentional, and a fairly contrived situation, like resting at the end of a yoga class, or sitting practice, or... Yeah, you have to really make an effort.

**Elissa Epel** ([00:41:22](#)): Exactly. It's contrived, it doesn't just happen. We think of maybe leisure things—sitting, watching a movie or something—those are relaxation activities, but they're not the same. They're not setting the conditions for seclusion, really letting go. The body knows the difference. So it does seem like we don't value that type of restoration or deep rest during daily life; we certainly have trouble making time for it. But that's why I think mind-body practices are so special, because they will do that for us. And nature can do some of that, too, for us, when we're immersed in nature.

**Wendy Hasenkamp** ([00:42:00](#)): It's making me think of a study that you did comparing a retreat, like a meditation retreat, to a vacation at the same retreat center. Do you want to share those results?

**Elissa Epel** ([00:42:11](#)): Yeah, that study was full of surprises. That was a fun study. We were invited to a retreat center where people were randomized... Well, we put out an ad and said, "Spend a week at this San Diego retreat center, and you may be randomized to meditation or you may be randomized to vacation." And I got so many phone calls saying, "Is this a scam? Are you serious?" *[laughter]*

**Wendy Hasenkamp** ([00:42:38](#)): It does sound pretty funny...

**Elissa Epel** ([00:42:42](#)): Yeah, "If you're serious about this, I'm signing up!" So we had a lot of interest. And we included people who had never meditated, and we randomized them to either staying at the resort, but they had to leave their computer behind. They had to really promise not to work and to have a vacation. They had some health lectures, you know, something kind of boring, but took up their time. And then the other group was randomized into eight hours a day of self-reflection practices. This was the study led by Deepak Chopra and his colleagues.

([00:43:18](#)) And they had... Well, everyone was eating an Ayurvedic diet, so that was one factor—this was not a normal week. But by the end of the week, when we looked at their blood, we found literally dramatic differences in what their cells were creating, in the gene expression. And machine learning could identify with over 90% accuracy whether someone was on Day 1 or Day 7.

**Wendy Hasenkamp** ([00:43:40](#)): Wow, regardless of whether they were doing the meditation?

**Elissa Epel** ([00:43:43](#)): Well, that was the surprise finding. It was regardless. Like true vacation, restful vacation, is magical. We need it. It's really doing its job.

**Wendy Hasenkamp** ([00:43:55](#)): Yeah, that's fascinating because I think what this shows, such an important aspect of that is the unplugging. But often, we go on vacation and we're still with our phones, or we check email or whatever. And so it's not, I think like you were saying, a "real" or true vacation, where you really are disconnected. And that's also very rare. That's a very contrived situation.

**Elissa Epel** ([00:44:23](#)): Right. And people have different preferences. So like, I would love to go to a retreat or a spa for vacation, and my husband would love to go to an interesting city. *[laughter]* So it depends on what your goal is, really.

([00:44:38](#)) But in this retreat study, we did find the difference between those who meditated, and those who had a relaxing vacation. And the difference showed up in the long run. So we followed them, and 10 months later we again measured well-being, vitality, stress, depression. And those who had learned how to meditate maintained their benefits. So a week later, everyone felt fabulous. And they were high in mindfulness—it didn't matter which group they were in—they were high in vitality, they had dramatic decreases in depression. But the gains were maintained in those who had meditated. And so the question really is, what lasted? They weren't continuing to meditate every day, as a group. Some were, but there were some mental shifts, some insights about the mind that stayed with them. So that was the beautiful exciting finding. And this was especially prevalent in those who had early trauma, so they benefited even more.

**Wendy Hasenkamp** ([00:45:43](#)): Wow, that's amazing. Your work is so impressive and vast. It's reminding me of another study that we spoke about, your body of work on glucose. And you have a study, I think, that was from a while ago on low income pregnant women. And now it's been so long that you actually

have longitudinal data on that, as well as on the babies that those women were pregnant with at the time. Do you want to share some of those findings?

**Elissa Epel (00:46:10):** Yes, that was one of my favorite studies. We wanted to see if mindful stress reduction and also changing how we eat, mindful eating, and some nutrition education, could help both the moms and then their babies. So we invited moms who were already overweight—they were a very diverse sample, and a low income sample—and we gave them an eight-week class together. And we compared them to similar women who had treatment as usual, so there was no group of them. And what we found was after the eight weeks, the moms who had had the mindfulness group had, as expected, real improvements in their emotional well-being—so they had decreases in depression, increases in acceptance, vitality.

**(00:47:00)** Then, because we were following the babies, my colleague Nicki Bush, who kept assessing the babies every year, kept assessing the emotional well-being of the moms. And the benefits, that we thought would last till the class ended, or maybe till they gave birth, maintained every single year. And now, at eight years later, we still see this gap in depression. So the control moms have significantly higher depression than the moms who got the mindfulness training. And that has just blown us away, because to think that a short-term class would have lasting effects years later just emphasizes how critical it is to be sharing these skills.

**(00:47:48)** And I think the group was part of it, the support, but it also helped the babies. So we've been looking at the babies' health, the babies' nervous system regulation, and they had less medical visits, less adiposity rebound, or weight gain, in their early years. And so we're really excited that if we can help moms during pregnancy, this really sensitive and literally critical period, it's having positive benefits for two generations.

**Wendy Hasenkamp (00:48:15):** That is amazing. I'm thinking about... We were talking before about our nervous systems, and how they're so attuned to safety. And I think about that a lot with young children—when we come into the world, that's like the basic thing that we are sensing or not. I've just been thinking a lot more in this field, what is a "sensitive nervous system"? There's individual differences, and then there's all these factors that can play into that, right? Childhood diversity and all of that. I don't quite even know how to frame this question, but a friend asked me recently, what does that mean to have a sensitive nervous system? So can you reflect on that at all, how you think about that?

**Elissa Epel (00:49:01):** Yes, I feel like that's a really important difference we need to respect. We really have different baselines, coming out of the womb, really. These are differences that are genetic, that are shaped by our prenatal experience. We know that. And then we have this childhood period where we're shaped by events in a more synergistic way. For example, early adversity we know is related to worse health and early mortality, but it's also related to early biological aging right then and there in childhood—greater inflammation, shorter telomeres. And that tracks throughout life.

**(00:49:40)** The beauty is that our biology is so elastic, and that whatever we do each day is protective. And so even if we start off life with short telomeres, we can lead a lifestyle that's promoting telomerase, and promoting that safety calibration—giving us all those safety messages, so that we're protecting our cells, and our cells are actually not being shaped from a life of adversity, even if they predicted a life of adversity.

(00:50:10) So there's a theory called life history theory, and that is that if we are exposed to early trauma, our biology says, "Uh-oh, we had better speed up development and aging, so that we can get to reproduction sooner, and we can reproduce and we can survive." So there's a lot of evidence that that happens. Early adversity leads to early puberty and early aging, including shorter telomeres. But yet, there's still plasticity, and we can interrupt that process at any moment. That's why so many people with early adversity benefit so much from finding contemplative practices, from having a meditation practice.

(00:50:50) So the way I think about it, Wendy, is that their brains have been extremely responsive to this threatening environment by creating exaggerated threat to sensitivity. So when normal stressful things happen, their alarm goes off twice as loud. And we find that in our studies, we use these daily diary studies, and we measure how much people feel threatened or challenged from their daily events. And people who have had more early trauma view typical stressful events as more threatening. They feel there's more at stake for them. And that's partly why I think that these practices of mindfulness, breathing, contemplative practices, whatever they are, yoga, they are like medicine for people with this hypersensitive threat sensitivity.

**Wendy Hasenkamp** (00:51:43): Yeah, thank you. That's so helpful to think about it that way. And I guess it also makes sense for these people who have experienced adversity or trauma, everyday stressors may well be—at least from their body's perspective, it would be advantageous for them to perceive those things as—perhaps more dangerous. Is that how you think about it?

**Elissa Epel** (00:52:03): Mm-hmm. Exactly. It's adaptive, and we know there's neuroplasticity, so we can tamp that down a bit. But I like to think of it as—there's primary appraisal, the body's going to have its automatic reaction, and then there's secondary appraisal, what do we do next? And that's where the respect of our differences comes in. We may never be able to get rid of that startle response, or that jolt that we have been wired for, yet there is so much comfort and self-care that we can find, so that we don't stab ourselves with that second arrow and let that threat response continue.

(00:52:47) When we think about threat stress and how that can be like a dark cloud living over us... I mean, stress is just so common. We all experience more stress than we want. And one thing that is a casualty, is that it rules out our full capacity to see joy, to see the miracles of life that are right in front of us. So while we focus so much on reducing stress, another way that we can focus our energy is on improving our emotional well-being, and really focusing our attention on gratitude, and on things that bring us joy. And that kind of circumvents the stress response. That's a newer way that research has really been capitalizing on joy science, or happiness science. And again, I feel like so much of that is already there right in front of us, in Buddhist wisdom. That true happiness is not from circumstances, from acquiring, from achieving, but really from noticing what we have, from the beauty of life, from the inherent goodness, if we can feel it in ourselves.

**Wendy Hasenkamp** (00:53:57): Yeah. Have you done some work recently on gratitude practices and those kinds of things, to help increase those positive emotional states?

**Elissa Epel** (00:54:06): We've had this really fun experiment. There is a film, *Mission Joy*, with the Dalai Lama and Desmond Tutu, that is about their struggles and is really about how they have created purpose, joy, and meaning through their adversity. And they wanted—the documentary maker, Peggy Callahan—to not just share their story but share happiness, find some way to spread happiness through science. And so she came to me and asked, "Could we launch a huge citizen science study where we share some of these joy practices?" So many of us got together, and with the UC Berkeley Greater Good

Science Center have developed a seven-day program where people can try gratitude, or awe, or reframing, some of these practices that we know we get a boost of positive affect. And if people then learn about their mind, and decide to try it again and again, it can be really meaningful.

(00:55:12) So I love gratitude. I will say that gratitude has been the most powerful practice in our study so far. It's like an antidote to stress. When we are having things happen that we don't want, it's so easy to focus on trying to change them and wishing things were different, whereas gratitude just shifts everything, where we're focusing on what is right, what we do have, what we feel appreciative for.

**Wendy Hasenkamp** (00:55:38): Yeah, it's almost like you can't process both of those things at the same time, right?

**Elissa Epel** (00:55:42): Yes. Yeah, exactly. And what about you? Do you have any practices for feeling gratitude or joy?

**Wendy Hasenkamp** (00:55:50): Oh, I love gratitude practices. I've done lots over the years of different gratitude journaling, or texting someone three things a day that you're grateful for. And it really... if you do it consistently, I've found that it really does shift your mindset to get used to being grateful. And you notice things more, yeah.

**Elissa Epel** (00:56:10): Yeah, it definitely can be a habit or a mindset. And I'm curious, if you don't mind me asking, Wendy, I know that you have been a deep explorer and a dedicated practitioner of many different types of meditation. And I'm just curious how you view stress, and if you view yourself as a high stress person, and what's helped you?

**Wendy Hasenkamp** (00:56:33): That's a great question. I think as I've gotten older, I've either become more aware, maybe through practice and other things, or I'm becoming more sensitive. But at least I've become more aware of how sensitive my nervous system is, in a way that I... You know, I think in my younger years I had a pretty... I don't know if "tough" demeanor would be the word, but a little bit impervious. Yeah, I have just... the layers of the onion, like you were saying, realizing how much of that was actually my attempt to protect my sensitivities. So it's been a real journey coming to become familiar with that, and acceptance of that, and working with those.

(00:57:20) I think you've studied a lot also with Tsoknyi Rinpoche, who is one of my favorite teachers, and he has that wonderful handshake practice. It's basically just training you to approach your emotions or fears or whatever might arise with such a warm acceptance, and allowing those to be there, letting them share what their wisdom is, instead of pushing them away. That's been pretty transformative.

**Elissa Epel** (00:57:48): It is. It's absolutely profound. Just in that one practice, there's so much wisdom in it. And we could be doing that every day, to train ourselves away from that secondary stress response, to actually welcome and learn from our emotions, our unwanted emotions.

(00:58:07) – musical interlude –

**Wendy Hasenkamp** (00:58:35): Well, gosh, this has been so great, and our time is ticking away. I just wanted to touch on—I know you have a new book called *The Stress Prescription*. So I just wanted to give you an opportunity to chat a little bit about that. You were kind enough to send me an advanced copy, and I loved it, absolutely loved it. It covers so much actually of what we've spoken about today. Really



accessible synthesis of so much science and research in these areas, along with actionable practices that you can do, and integrate into your life—both mindset shift and working with the body and all of this. So kudos, and thank you so much for all of the work that went into that. I think it's an amazing resource.

**Elissa Epel** ([00:59:18](#)): Thank you, Wendy. That means so much to me, to hear that from you.

**Wendy Hasenkamp** ([00:59:21](#)): Do you want to share an overview of the book?

**Elissa Epel** ([00:59:25](#)): I would love to. I really, really hope that it helps people. There are strategies from the body, from the mind, from just changing our mindset, how we think about stress, that can really help. And for me, all of it involves mindfulness. Mindfulness is the flashlight we need to turn on first to say, what are we thinking, and can we look at that? Can we question that? Can we check in with our body and see what's there? It all takes metacognition.

([00:59:59](#)) So I've tried to bring that in in a secular gentle way, to help people both ask these questions of themselves and then try these practices that are, I would say, both contemplative as well as secular. I'm sure if we traced the roots, so many of them are probably ancient wisdom traditions. One of them is immersion in nature, and others are breathing and body-based strategies. And then some are really just about the mindset, of really understanding, what is your worldview? Do you expect control and certainty? Or, can you actually lean back and be comfortable with not knowing? So it's very much influenced by my teachers, by colleagues, people I've learned from in the Mind & Life community, and then some Western psychology experiments. So it's kind of a mix or an integration of all of those.

([01:00:57](#)) And I just hope that it can help people. I think we have such a crisis of poor mental health, especially among our youth. And we have such huge existential stressors, global stressors. So we talked about the uncertainty in life, but we also have volatile uncertainty—dramatic changes in the global world that we are seeing, that we know will come to us more and more frequently, like climate events. And we're just not that well-equipped to see all of that news and stay hopeful. So we need these practices. We need to work on our inner peace, and then we can help each other and work outward for social change.

([01:01:43](#)) I love the Dalai Lama's quote that inner peace, ease of mind, is the best medicine. And so just starting there, and realizing we can't do much when we're feeling really threatened, and we can't even see reality clearly or connect with people. So really just starting with, just the importance of my mental health really matters. I don't need to go through the next year feeling this blanket of stress every day. That's my hope.

**Wendy Hasenkamp** ([01:02:10](#)): And the best medicine, not only for us, but then it spreads, right? I think that if we can retune our own nervous systems, that there's a way that that's contagious, in a really good way.

**Elissa Epel** ([01:02:21](#)): Absolutely. Yes. And we know that from the lab, from dyadic studies—we're really influencing each other's nervous systems, non-verbally even. You're pointing us to probably the big shift we need to make in contemplative science. How do we transmit and share our wisdom, our love? Just even thinking of gratitude practices, we tend to study it as, make a list, think about it. But what about expressing it, publicly? So I'll take this opportunity to just say, Wendy, I have learned so much from you over so many years. And I'm so grateful to you, both our friendship and also the wisdom you've shared... and through this podcast. I've loved every one of them.

**Wendy Hasenkamp** ([01:03:12](#)): Oh, my gosh. Well, thank you so much, Elissa. The feeling is absolutely mutual. We met years ago on a retreat. We were randomly placed together as roommates, and it was such a lucky day for me. And I've just been amazed and inspired by all of your work, and I'm so grateful that you're in the world, and we've been able to cross paths in all these ways.

**Elissa Epel** ([01:03:34](#)): Me too. Thank you so much.

**Wendy Hasenkamp** ([01:03:36](#)): Thank you for all of your work, and thank you for taking the time today to chat with us.

**Elissa Epel** ([01:03:41](#)): It's been my pleasure and honor. Thank you.

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**Outro – Wendy Hasenkamp** ([01:03:48](#)): *This episode was edited and produced by me and Phil Walker, and music on the show is from Blue Dot Sessions and Universal. Show notes and resources for this and other episodes can be found at [podcast.mindandlife.org](http://podcast.mindandlife.org). If you enjoyed this episode, please rate and review us on Apple Podcasts, and share it with a friend. And if something in this conversation sparked insight for you, let us know. You can send an email or voice memo to [podcast@mindandlife.org](mailto:podcast@mindandlife.org).*

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