Dave Asprey: You're listening to Bulletproof Radio with Dave Asprey. Today's cool fact of the day is that 3D printers are starting to help us grow tissues and create replacement body parts. You might have heard about that, but researchers at The Pelling Lab are starting with existing 3D structures as a scaffold for cells, like an apple slice. So they'll wash them in soap and water and sterilize it and leave a fine mesh of cellulose, and then they inject human stem cells into it, or human cells, and then they grow. So basically, if you ever wanted an apple slice of yourself, apparently you could make that. Right now, of course, an apple slice is shaped like an ear, but imagine the possibilities. Only half of them are gross.

If you haven't had a chance to check out Bulletproof Sleep Mode, you owe it to yourself to give this a shot. I've looked at all of the different herbs and different techniques for sleep hacking, and, in fact, most of the stuff you'll see written on the internet today about blacking out your room at night and about, say, taking collagen before bedtime came from some original posts about increasing sleep efficiency that I wrote. I created a new supplement called Sleep Mode so you can power down effectively at night using substances and techniques that aren't commonly known and aren't commonly available. It's kind of easy to drug yourself with herbs, but you wake up feeling groggy.

Instead, there's ways to go through your biochemical pathways, so you can target efficient sleep. I think you want to check that out. It's called Sleep Mode. It's on the Bulletproof website, and it's a very interesting way to sleep. I do this whenever I travel. In fact, I do it every night, along with the special glasses and things like that called True Dark, blacking out the room, and all the other stuff at HeadStrong but Sleep Mode is new on the block, and it's a powerful and affordable way to go to sleep. Hit it up on bulletproof.com.

All right. Today's guest is a world-renowned breathing expert who spent the last 15 years helping thousands of people around the world with things like breathing disorders, sleep disordered breathing, high stress levels, poor concentration and anxiety. He's written eight best-selling books on this subject, including something called “The Oxygen Advantage”, that are full of different types of breathing to help athletes improve their performance. This is a guy who hacked his own asthma through this breathing technique and has been asthma free for many years since. He travels around the world, and we're talking to him today from Galway, Ireland, and I'm talking about none other than Patrick McKeown. Patrick, welcome to Bulletproof Radio.

Patrick McKeown: Thanks very much, Dave. Great to be here.

Dave Asprey: Now you are a huge fan of a relatively old breathing technique that, for our listeners, is not the Wim Hof breathing technique, although I am a big fan of Wim Hof, as well. This is, obviously, unrelated to Wim's stuff. It's called Buteyko. Can you tell me about this?

Patrick McKeown: Sure, basically in the 1950s and 1960s there was a Russian doctor his name was Constantine, Dr. Constantine Buteyko and part of his research was working with

astronauts during the Soviet space race. So his work was to try to find what was the ideal composition of oxygen for rockets for travel up into space. So a lot of research in terms of oxygen, breathing, etc., and he also turned to Eastern medicine. He took a lot from yoga. Then, at one point, he was observing a sick patient, and he observed that the sicker the patient the heavier they breathed. So he wondered, he said, "Was it their sickness that was causing them to breathe harder, or was their hard breathing feeding into their sickness?" He had very high blood pressure at the time. He started slowing down the breath and really quieting his breathing, and he was finding that his blood pressure was coming down. So he put that link together.

It came out of Russia in 1990 because of Communism. With the fall of Communism it came out in 1990, and I was mainly used as a method for helping people with asthma. But then, of course, the basic principles are breathe through your nose and breathe lightly. Don't breathe hard. So breathe through your nose, breathe using the diaphragm, and have gentle quiet breathing. That's the principles that are espoused and any breathing technique ... and by the way we're not so far away from the Wim Hof methods. We do a lot of breath-holds too, but we don't do the hyperventilation beforehand. So we're breath-holding and strong breath-holding, but not the heavy breathing. I think short-term hyperventilation is fine. It's bringing on that stress, you know, that stress in the body? But what we want to do is I want to look at breathing 24/7. So if somebody is doing the Wim Hof method, and they're taking big breaths over 30 breaths that's fine, but how are they breathing for the other 24 hours? That's where I come in.

Dave Asprey: Got it. This is one of those things where you would have heard almost no one talk about this 10 years ago. The Russian space program has provided so many amazing technologies for bio-hacking that most people don't even know are Russian. The cerebral electrical stimulation that I use at 40 Years of Zen that I've used for almost 20 years to improve my sleep, these breathing exercises, weird martial arts, like I absolutely adore Russian space human hacking technology. Even intermittent hypoxic training from HeadStrong derived there, which I think we're gonna get into. But why did you zoom in on Buteyko's method, given that these Russian hackers do all sorts of cool stuff? By the way, I'm not talking about the Russian hackers who hack American servers, and then we hack theirs back. That's my old business. I'm talking about human hackers, just so we're all clear.

Patrick McKeown: Sure.

Dave Asprey: But why Buteyko?

Patrick McKeown: I came across it by accident. So I had asthma for 20 years, and I didn't realize at the time but basically I was constantly tired in school. My nose was constantly stuffed up, and I was a mouth breather. So you're having asthma. You're tired, and you don't always put these things together. Now I'd been to doctors. I was in and out of hospital a few times. I graduated with a completely different discipline. I read an article in an Irish newspaper, and it talked about the work of

the Russian doctor. I went in online, and the internet was in its infancy. There was an exercise to open up the nose, so I practiced it. It's basically breathe in, breathe out through your nose, pinch your nose, and gently hold your breath, and nod your head up and down for as long as you can. I was able to free my nose.

I then made a determined effort to switch to nose breathing, and I kept my mouth closed. I was feeling very suffocated, but I kept on doing it, and I remember going to sleep on the second night. It was the first night I woke up feeling alert. Now, oftentimes we hear of asthma, but we don't put the connection with rhinitis. Rhinitis is a stuffy or blocked nose because whatever is happening in the lower lungs travels up to the upper, and whatever is happening in the nose will travel down to the lower. But also we don't put the connection with sleep, and it literally transformed my life. I was in the corporate world, but I was one of these characters, and it was probably part of my breathing. I was very stressed, mouth breathing, etc., and I made then a decision to change careers. So I went to Russia. I trained in Russia. I was accredited by Dr. Buteyko. I came back, and the rest is history.

Dave Asprey: Now, when I was a kid I had asthma. I remember one night I woke up, and going upstairs, kinda like crawling to my parent's bedroom, and being like, "I can't breathe." And they're like, "What?"

Patrick McKeown: Yes.

Dave Asprey: You know, the freaking out sort-of situation, but that was only after it got to the point where I thought I was gonna pass out. I don't know, when you're 10 you do dumb stuff. It turns out I was living in a basement that had toxic mold in it.

Patrick McKeown: Yes.

Dave Asprey: Which always causes rhinitis. I've had strep throat or sinus infections like every month. So a lot of people ... in fact, I was days away from having sinus surgery in my early 20s, when I figured out some ways to fix my sinuses that actually weren't breathing related. They were more just around getting the crap out, and now it's rare for me to have a sinus problem at all, and I can breathe through my nose. But I'm guessing that half of people listening right now really don't breathe through their nose because it's inflamed.

Patrick McKeown: Yep.

Dave Asprey: How do you use your breathing techniques if your nose is clogged?

Patrick McKeown: It was discovered back in 1923 if you hold your breath, and by holding your breath you're building up carbon dioxide in the blood-

Dave Asprey: Yep.

Patrick McKeown: -and the theory behind it was that the buildup of CO2 opened up, or decongested, the nose. Now there might be other things going on. As you hold your breath you activate the stress response. As you hold your breath there could be a buildup of heat inside the nasal cavity, and also a buildup of nitric oxide. So there could be any number of factors there, but literally I've used breath-holding to decongest noses in about 7,000 individuals. And it's a really, really wonderful and easy way to do it.

Dave Asprey: So I'm gonna get on a plane ... and just full disclosure, I just got back from Burning Man, and I got dust in my eye. I got a little eye infection that irritated my sinuses, and I got a sinus thing going on for, like, the first time in a year I'd say. So I'm a little congested. I'm gonna be getting on an airplane.

Patrick McKeown: Okay-

Dave Asprey: What do I do? Real time hacking here.

Patrick McKeown: Okay, well do this for me now. Just block one nostril, and take a big breath through it.

Dave Asprey: Through the one that's blocked?

Patrick McKeown: Any one. Okay, and now try the other one. Try the other nostril then whenever [crosstalk].

Dave Asprey: Oh, you want me to let the other breath out? Okay.

Patrick McKeown: Yeah, no of course.

Dave Asprey: Like breathe out too? Okay.

Patrick McKeown: All I'm doing is listening.

Dave Asprey: Okay.

Patrick McKeown: Okay, from what I'm picking up now—and it's not going to be perfect—but I'm picking up that the right seems to be freer than the left. There seems to be more restriction on the left.

Dave Asprey: I put ozone gas up the right nostril right before the show. I didn't have time to do the left nostril, which is my normal hack for this.

Patrick McKeown: Okay, so your left nostril is a little bit more congested. So we always do that first of all, and then literally it's about just keeping the mouth closed and take a normal breath in through your nose. A normal breath out through your nose. Only normal, but anyway I'll try it again.

Dave Asprey: Okay.

Patrick McKeown: Just a normal breath in through your nose. A normal breath out through your nose, and pinch your nose with your fingers.

Dave Asprey: With my lungs empty?

Patrick McKeown: Yeah, just after a normal exhalation, pinch your nose and sway holding your breath. Keep holding your breath until you feel a relatively strong air shortage. So keep holding your breath until you feel a fairly strong air shortage. So what you're doing there is just changing blood gasses, and as you hold your breath nitric oxide is going to be released from the paranasal sinuses into the nasal cavity. When it gets pretty tough let go, but breath in through your nose. So when it gets pretty tough let go, and then calm your breathing. Always quieten your breathing at the end of it, but breath in and out through your nose. Now, if you try that six times [crosstalk].

Dave Asprey: Actually that did something.

Patrick McKeown: It's very, very effective, and even with hay fever.

Dave Asprey: Holy crap.

Patrick McKeown: So it will tend to open up your nose pretty easy.

Dave Asprey: All right. If you want to see me rocking back and forth holding my nose, bulletproof.com/youtube. This is mostly ... most people are listening in their cars or at work right now, but if you're watching this on YouTube I did just look strange. My God, that actually made a difference in ... and you say do it six times?

Patrick McKeown: Yeah, so you do it once, and then wait a minute to recover. The minute is just to allow your carbon dioxide levels to go back to normal. You do it again. So you do it about six times, and the fifth or sixth times you start to feel it open up for you. Now, if somebody has a deviated septum or really bad structural issues we're not gonna help that, but most people though, most people it's reversible. Like, I've only had about 15 people that I've had to say, "I can't help you. You have to go back to your ENT." And that's out of thousands. That's working with people since 2002 using this.

Dave Asprey: That is remarkable. All right, so if you're listening to this and you missed the instructions you basically close your lips, breathe in normally through the nose, breathe out so your lungs are mostly empty, hold your nose and hold your breath until you're kinda desperate to breathe, and then breathe in normally through the nose.

Patrick McKeown: Yeah, and sway.

Dave Asprey: Oh, you have to sway… [crosstalk]. Okay.

Patrick McKeown: Or you could walk around. It's just to do some physical movement. So you're pushing yourself a little bit to build up that air hunger. When the air hunger gets pretty strong you have to let go, but you have to breathe in through your nose because nitric oxide will have been continuously released into the nasal cavity. And we want to carry that nitric oxide into the lungs, because there it's going to help open up the bronchioles. So you're not only opening up the nose, but you're also gonna help opening up the airways as well. The lower airways.

Dave Asprey: Now, for listeners who don't know about nitric oxide will you walk them through what it does in the body? I'm pretty sure you know about that, because some people don't even know what nitric oxide is, or how recently we discovered it. So kinda give us the education on that.

Patrick McKeown: Sure, so the background is for decades scientists thought nitric oxide ... they found it very hard to believe that a gas that was so toxic outside the human body could actually be helpful within in, because it's responsible for pollution. It was through researchers that discovered it, that nitric oxide has a relaxing effect on the blood vessels. So from a cardiovascular effect they put that connection there, and then the drug companies started putting a lot of research into the benefits, or the effects, or nitric oxide. And, of course, one tablet came out of that, and that was Viagra. So nitric oxide is one of those molecules, it was referred to as the mighty molecule. That they can unite all the major disciplines of medicine. It plays a role in neurotransmission, and that's in the brain cells communicating with each other. It plays a role in the signaling in the cardiovascular system. It plays a role in homeostasis, in keeping the body in balance. It opens up the airways. It sterilizes the incoming air. It reverses the build-up of plaque, reverses the build-up of cholesterol. It's a tremendous molecule.

Now, it is produced in various sites in the body, but if you breathe through your nose the particles per billion are 50 times as breathing through your nose, and if you breathe through your mouth it's 10. Now, one of the major benefits, from a breathing point of view of nitric oxide, is we're sitting upright. Most concentration of blood is in the lower lobes of the lungs and nitric oxide, when you bring air through your nose and you breathe slowly, you carry a high concentration of nitric oxide into the lungs. And nitric oxide shifts the blood from the lower lobes of the lungs to the upper. So you get a better ventilation profusion. Also, if, for instance, we're breathing through the mouth we're activating, generally, the upper chest because mouth breathing is fast breathing, and fast breathing is only ventilating, more so, the upper lobes of the lungs rather than the lower. When you breathe through your nose you'll naturally activate the diaphragm, so we're all about deep breathing. Sometimes people say that we're talking about shallow breathing. No, we’re not.

A deep breath means you’re using the diaphragm, and if you breathe through your nose, which we should do, we activate the diaphragm, both during our

sleep and also during wakefulness. So nitric oxide is one of those brilliant gasses, and I think the importance of nose breathing, David, we know that 50% studied children go around with their mouth open, 50%. These kids can have speech difficulties. They show that they have poorer academic performance. They're more likely to have ADHD in school. They're more likely to have sleep disruptions, sleep disordered breathing, and nobody's telling these kids to breathe through their noses. I think it's a car crash waiting to happen -- and that's not just kids. Of course, it's gonna translate into adults as well because most people with rhinitis, or with asthma, there is an increased tendency to mouth breathe. And with anxiety there's an increased tendency to fast breathe, and yet it's true, the breath that we can influence many functions of the body.

It's not about taking the normally but it's told that big breath ... I hear it so often, "Fill your lungs full of air. Take a deep breath. Take a big breath," and I absolutely cringe when I hear it. Because it's like somebody who's eating enough food to give them enough calories every day, it's like telling those people to eat even more. Air is good, but there must be a certain amount of it that we breathe. Not too much, not too little, just right.

Dave Asprey: There's definitely something going on with your mitochondria. They need some amount of oxygen, but a lot of people know this. You breathe in, and when you breathe out most of the oxygen you breathed in gets breathed out.

Patrick McKeown: Yes.

Dave Asprey: One of the things I did for a while is I would breathe through oxygen scrubbers. This is from the Russian, not space program but the jet-fighter program. The Russians figured out that it costs a lot of money to pressurize a jet, but it doesn't cost a lot of money to teach a pilot to function in low oxygen environments. So they developed this technology to allow you to acclimate up to 15,000 feet. So they could have jets that would fly up to 15,000 feet with no pressurization that costs very little to build. In order to do that, I'd breathe through these chemical oxygen scrubbers to get my oxygen levels in my blood down to about 87, but it takes many breaths just to deplete the oxygen that already came out of my lungs, if you breathe the same air over and over.

Patrick McKeown: Yes.

Dave Asprey: Which isn't well-known, so for people who are thinking, after they just heard you say this, "Hey, you know, you can't do that. You'll die," or something like that. It's sort-of like saying, "If you try intermittent fasting you'll die." No, actually you won't.

Patrick McKeown: Yes.

Dave Asprey: Because there's plenty of oxygen in there, you just feel like you're going to die when you hold your lungs empty like that, but really you have a couple minutes before you die.

Patrick McKeown: Well, you know, when you feel the air hunger, the air hunger, under normal circumstances, is CO2. And the stimulus to breathe is to breathe out excessive CO2, so if we hold our breath, or reduce our breathing, and we're feeling that we're not getting enough air, it's carbon dioxide that's generating that feeling. It's not oxygen, so ... and the other thing is, I was talking about nose breathing. If you breathe through your nose arterial oxygen uptake increases by 10%, but also end-tidal CO2 is higher. What most people don't realize is that when oxygen transfers from the lungs into the blood it's picked up by hemoglobin, and most oxygen is carried in the blood by hemoglobin. In order for it to be released from the red blood cells to the cells it's necessary to have a partial pressure of carbon dioxide.

In other words, oxygen is released in the presence of carbon dioxide, but yet, most people talk about bringing oxygen and getting rid of carbon dioxide. Yes, it's true that we breathe to get rid of access CO2, but we need to retain a certain quotient to allow the oxygen that's in the blood to get released to the cells. So carbon dioxide is actually very important for the cells to receive oxygen.

Dave Asprey: That is absolutely true, and people talk about these alkaline diets and things like that, but the biggest thing that makes your tissues acidic would be carbon dioxide makes ... what is it carbonic or carbolic acid? I'm forgetting which one.

Patrick McKeown: Well, carbonic would be the preferred, but the hydrogen iron would be the ... so basically it's carbon dioxide in the blood, it'll form ... sorry, you're right, carbonic acids. Then it dissociates it-

Dave Asprey: So it is carbonic acid.

Patrick McKeown: -into hydrogen iron and bicarb, yep.

Dave Asprey: And so that's kinda funny, but if you're worried about this alkaline thing, well that would be controlled by breathing more than anything you put in your mouth that you swallow.

Patrick McKeown: Yes.

Dave Asprey: Well, I guess you can swallow air but that's not what I'm talking about. So it's a fascinating system. The way I first became aware of this—not Buteyko breathing specifically—but about 15 years ago a friend of mine said, "Hey Dave, I want you to try this device," and I had it for, maybe, a month, but it was too expensive for me to afford to have it at home. But it was a feedback system based on breath gas. So when you breathe out, it would monitor what was coming out through your nose, and you could consciously control the amount of carbon dioxide just

by thinking about it. It was the weirdest thing ever. I wish I would have had it for, like, a year and done it regularly, but I didn't ... just economics. Some of this bio-hacking can get very expensive very quickly. In fact, have you ever played with a system like that?

Patrick McKeown: I don't tend to because, like I said to you at the very ... I'm a total technophobic, and when I'm working with somebody I want to give them the skills to do it because I really feel in today's day and age, and like you call me old-fashioned. I'm only 43 but most things are taking our attention outwards, and I want to bring people, from their mind, I want to bring their attention inward. So I am teaching them to slow down their breathing and to soften the breaths. We can change body temperature in a few minutes from doing it, so I want the person to be their own biofeedback. So that's the way we do it.

Dave Asprey: I appreciate that very much, and certainly my own path has been that I've used technology to show me a state so I can learn how to get there faster, but if you need the technology all the time you're doing it wrong. You shouldn't be a cyborg but it's cool to just ... it's hard for you and me to tell someone, "Hey, change the exhaust gas coming out of your nose." We might be able to say, "Okay, breathe in this certain way," and it'll probably happen, but if I can get a beep when it says, "Okay, you just did it," and you're like, "Okay." For some reason, for me that increases my ability to learn more quickly what the same is.

Patrick McKeown: Sure, sure.

Dave Asprey: Same with brain states and advanced meditation and stuff. Then I first became aware of Buteyko breathing, not from the weird Russian stuff that I like to try and read only after it's translated, unfortunately. I don't speak any Russian. But, I think it was a post from Dr. Mercola, who was just up here. I interviewed him sitting right here a couple weeks ago. He posted about this, maybe five or six years ago. How he'd started going for long walks, only breathing through his nose, and that was based, probably, on a conversation with you. Is that accurate?

Patrick McKeown: Yes, in around the time, I think it was 2013.

Dave Asprey: Yeah.

Patrick McKeown: Dr. Mercola started investigating what was Buteyko about. He started looking at it, and it made sense to him, and it made sense for him to bring it into his physical exercise as well. So the very simple thing of breathing through the nose, it's so simple but yet, it's completely overlooked. Just even to give you a couple of points of it, if we have our mouth open during childhood it causes cranial facial changes, including setting backs of the jaws, narrow jaws, smaller airways, etc. That child, then, is at higher risk of obstructive sleep apnea for the rest of their life, and breathing through the mouth entering during adulthood, as I said earlier on, has got consequences. Buteyko is ... we need a certain

amount of food every day; not too much, not too little. We also need a certain amount of water to drink every day; not too much. We can over drink water, as people do sometimes in endurance events. [crosstalk].

Dave Asprey: Yes, and then they die.

Patrick McKeown: They die, yeah. Unfortunately. But air, nobody's talking about how much should we breathe? Yet, many things are changing our breathing patterns. Stress, processed foods actually do increase our breathing, lack of exercise, excessive talking, and these are factors that are changing our breathing patterns. If we breathe more than what the body needs over a certain period of time, we develop a habit of chronic over-breathing. But if we're in the state of breathing too much, and we're breathing using the mouth or the upper chest. So what I'm looking at is, when I'm looking at somebody breathing I'm looking at the aptitude of the breath. I'm look at, is there a natural pause between breaths? I'm looking at the regularity of the breath. We measure our breath all the time, so with all of that information we changed their breathing, and by changing their breathing we can change their life. And I don't mean to say that in just a crude, just put it out there sort-of ... no.

It's tremendous what we can do by changing the breathe, and again I want to make the emphasis there's so much information out there about taking big breaths, hard breaths, and it's the wrong thing to do. As I said, Buteyko did get a lot of his information from the Eastern world. There's a yoga teacher, a really good one, in the States, in Seattle. Her name is Robin Rothenberg, and she's a yoga teacher for about 30 years, and she's writing a book now. She's going back to the basics of yoga. She's going back to the sutras, and she's looking at how is breathing described two and a half thousand years ago?

Dave Asprey: Wow.

Patrick McKeown: She's going back as far back as she can go to find out how everything was described. Breathing was described as being subtle and light, not hard, and yet, the message has got distorted as it passed down the telephone wires. She will have a book out, I'm not sure when, but we're just in discussions on it at the moment. I think this is tremendous because I think we need to change the idea about breathing because with breathing less is more.

Dave Asprey: Interesting, Bulletproof headquarters is in Seattle, so maybe I'll hook-up with Robin when I'm down there to meet with the Bulletproof team.

Patrick McKeown: Yes.

Dave Asprey: That would be kinda cool.

Patrick McKeown: She's great.

Dave Asprey: So I'll ask you for an intro afterwards. It's really interesting because there's anti-aging applications here too. One of the things that's shown to help you live longer is, not necessarily eating less calories, although there are some studies about that, but certainly eating less frequently. Where you deal with all the metabolic byproducts of that, and there are some, I would call it not very science based things, that say, "You have X number of heartbeats," or, "X number of breaths you can take." I think telomeres might be a little bit more relevant than that, but there are some limits. So if you reduce oxidative stress in the body-

Patrick McKeown: Yes.

Dave Asprey: -by breathing less, that could be good for you.

Patrick McKeown: Yes.

Dave Asprey: But also not enough oxidative stress is bad for you.

Patrick McKeown: Yes.

Dave Asprey: Have you seen any studies on people living longer from using Buteyko breathing?

Patrick McKeown: We've not studies on it, but I looked at that in terms of breath-holding in athletes, and I found it very, very interesting. An actual fact, triathletes they had them do three months [inaudible] breath-holding, which will be part of what we do anyway. They found out ... it said in quotes oxidative stress occurred no more. Now, there's been a few studies along those lines. In terms of high CO2 ... I'll give you an example. One is called a naked mole rat. It's a rat that's in East Africa.

Dave Asprey: I love those guys. That's my spirit animal.

Patrick McKeown: They're quite ugly looking creatures. They've no fur. They live underground, and they live for about 30. Their cousins, the normal rat or small creature, is gonna live maybe for about two years. Scientists were finding it like, "What's going on here?" So they even injected the naked mole rats with cancer, and they found that they were able to resist the cancer. The naked mole rats live in a very low oxygen environment because they're so deep underground, but the high carbon dioxide concentration. They're feeling that sometimes ... the scientists are feeling that it's the high concentration environment that's helping with oxidative stress, and again, there's a researcher called Ray Peat in Portland in Oregon, and he's looked at carbon dioxide for probably decades-

Dave Asprey: Yeah.

Patrick McKeown: -and produced tremendous stuff. In 2017 I noticed two papers coming out, and transcutaneous CO2 injected into a rat has repaired muscle injury so much quicker than controls. So there's something in carbon dioxide that we need to be investigating and teasing, and I know it's not absolutely perfect theory, but there's something there that I think will warrant further investigation. Breathing, of course, is going to be instrumental in determining arterial CO2.

Dave Asprey: You're right. There's a lot of stuff that hasn't been done. People are focused on VO2 max. It's almost like this bias towards oxygen, not recognizing that you cannot use oxygen without CO2.

Another question for you, and for listeners I apologize if we get a little technical here, I'll explain the question as I go, even though you may already know this. There's three kinds of nitric oxide. You go back 10 years no one knew nitric oxide mattered because it's a signaling molecule, but it's only present for a brief period of time.

Patrick McKeown: Yes.

Dave Asprey: By using Buteyko you're actually changing carbon dioxide, which also changes nitric oxide. But there's something called nNOS, which is neuronal nitric oxide, and that's stuff in the brain you want. There's something called eNOS, which is endothelial inside your circulating system. This is why you take nitroglycerin if you're about to have a heart attack. This is really good for you, but there's something called iNOS, which is inducible nitric oxide, and iNOS triggers inflammation and messes you up. I know about these things because I used to have a problem, probably from toxic mold. I don't know. It was a metabolic dysregulation where I would create too much inducible NOS that would cause weird headaches, all sorts of just bad stuff throughout the body. Do you know, does Buteyko breathing affect only the good nitric oxide, or are we getting bad nitric oxide from it?

Patrick McKeown: We don't know. In terms of-

Dave Asprey: Darn.

Patrick McKeown: -where I'm looking at information, it would have been primarily when it was my work with asthma.

Dave Asprey: Okay.

Patrick McKeown: Basically if, for instance, there was a lot of information in the lung tissue I'd say nitric oxide levels would be higher. One of the theories behind it was that the body was producing more NO to try and crowd the inflammation in the first place. So I haven't looked at it enough to give you a direct answer, and you know, even though Buteyko has been around for a long time, we've 70 in clinical trials, but they've all been named with asthma. I've been involved with a few of

them, I have one clinical trial I was involved with for rhinitis, but other than that we haven't really investigated. But if we look at the premise of slow breathing, and there was a study at Stanford Medical School done in March of this year. They found that we're all aware of pacemaker in the heart, but they said there's a pacemaker in the brain.

If you really, really slow down your breath, you change the mental state, and you can change it quite quickly. It was something that we were experiencing with our patients, because we had people coming in with say, panic disorders, and they'd be sighing a lot, and did a lot of upper chest breathing, and they have an aversion to suffocation. [inaudible] giving them a small dose of suffocation because I'm improving their body's tolerance to CO2. We would notice that they get calmer by literally changing their respiratory rate and their total volume. In other words, we're looking at the entire concept minute volume. So there's studies, which we can always relate to Buteyko, and even from the hypoxic training. I look at what's happening during breath-holding. Let's say you said that you could drop the SpO2 down to 87%, well we can do that very easily. We do it down to ... I don't want to go below 80%, but we'll try and get it down to 85% or thereabouts. Then another effect of what happens short-term breath-hold, when that happens in the blood, what's happening in the body?

So we can kind of extrapolate, based on what's already done and using something similar to what we're doing. So the information, there's more and more information. I think there's a tremendous wealth of information coming out most recently, especially in the last five years.

Dave Asprey: I think the internet is helping greatly with this, and just the ability to have cheap censors, so we can monitor and measure what would have cost a million dollars now for a lot less. It's really interesting, because when I started doing yoga almost 20 years ago, and some of these different altered states, breathing techniques, particularly holotropic breathing. Stan Grof, the inventor of that was just one Bulletproof radio, and he was at the Bulletproof personal development event called Be Unlimited. The guy's 90-something years old and still doing well. But it was fascinating to me, because I realized if I exhaled and held my breath empty, the way I just did, immediately I got this, "I'm going to die" sensation. I had the same thing. I used to think you had to eat six or eight times a day, or your metabolism will crash. This was when I weighed 300 pounds, and I was doing all that stupid stuff that doesn't work that they say works. And I realized that almost every time your body says you're going to die you're about 90% of the way away from dying.

So you have this incredible, innate, I believe it's a mitochondrial emergent phenomenon, but an incredibly innate thing that says, "Don't do anything, even a little bit, that might kill you." So you end up breathing the wrong way. You end up eating too often and too much.

Patrick McKeown: Yes.

Dave Asprey: You end up just doing everything wrong. "Oh, I can't get a little bit cold because I might freeze to death." It turns out that cold shower ... So if you're listening to this, and you breathe out, and hold your lungs empty, and if after five seconds you're like, "I'm gonna die," you need to do some breath work.

Patrick McKeown: Yes, yep.

Dave Asprey: It's really important.

Patrick McKeown: It's very interesting, your comment. We use breath-hold time as a measurement of relative breathing volume. So somebody [inaudible] sports, and they have a low breath-hold time, or somebody who's getting caught for air, they have a low breath-hold time. The measurement, it's called in Buteyko it's the CP, or in “The Oxygen Advantage” we call it BOLT. If I was taking a small in breath in through your nose, a small breath out through your nose, and you pinch your nose, and you continue holding your breath until you feel the first, distinct reaction of the body to breathe.

Dave Asprey: Mm-hmm (affirmative).

Patrick McKeown: The longer the breath-hold time, the better. It's a really good measurement. It's not perfect, but one author William [McKarn], he wrote a book. It's quite a well-known performance book in the States. He said that if an athlete exhale, they should be able to hold their breath for 40 seconds before the urge to breathe is initiated. We also look for a goal of 40 seconds. Now, I've worked with world-class athletes, even yesterday I worked with a professional MMA fighter. Now, he had a pretty good BOLT. It was 36 seconds, but I said to him, "Unfortunately, that's unusual." But in MMA these guys really have to be at the top of their game. But I had sprinters at 20 seconds. I had one Irish Olympian, 12 seconds. We really have to look at ... yes, I totally agree with you, if one of your listeners, if they breathe in, breathe out, and they hold their breath, if they've got a very short breath-hold time it's really worthwhile to look at their breathing because it would indicate that they're [inaudible] much.

There's gonna be more excessive breathing during rest, harder breathing during sleep, and harder breathing during exercise. Light breathing is good. If you went for a run with an elite athlete, that athlete should be breathing lightly for that run. And conversely if you can imagine somebody who's very unfit and overweight and they're walking down the sidewalk, their breathing is hard and heavy. If they try to get up the stairs they run out of air, it's not a good sign of health.

Dave Asprey: Now, we have a group of people listening to Bulletproof radio who are endurance athletes, ultra-endurance athletes some of them. I know because I end up getting to email and communicate with them, and we have others who do probably more of the stuff that I'm a fan of, interval, high-intensity interval training, sprints, lifting heavy stuff, just because you can get more signal into the

body in less time, and I'm lazy. Also, I'm probably not an endurance genetic type. So what's the difference for someone who does sprinting, and is focused on strength, say a power-lifter or something versus someone who wants to be relatively thin and run for long distances of time, like a tiger's chasing them. Any difference?

Patrick McKeown: Sure. [inaudible] training that I would change with that. To give an example, I was working with Notre Dame athletes, they were 400-meter sprinters, and their names ... I can give ... like Patrick Feeney and Chris Giesting because they made it public.

Dave Asprey: Big names, yeah.

Patrick McKeown: I looked at their 400-meter dash. An athlete is most fatigued at the last 20 to 30 meters, and I said, "Okay, how can I add an extra load onto their run in order to get the body to make adaptations?" And you touched on this earlier on. You said that we often shy away from things that are challenging from the body, but maybe some of these things that are challenging for the body are the best things because they cause the body make adaptations. Now, I'm not talking about over-training, but I'm talking about pushing the body into, maybe, that sympathetic response to get the body to make adaptations short-term, not long-term. So I looked at their 400-meter sprint. I would stand about 25 meters from the finish line of a 400-meter sprint. I had them nose breathe, max sprints for the entire 375 meters, and when they seen me they had to hold their breathe, because their fatigue levels will be most at the very, very end, and that's when I wanted to add the extra load onto it.

So, in terms of sprinting, I wanted to push them into a state to completely disturb the blood acid base balance. By lowering their oxygen saturation, but also by increasing their CO2 I would literally flood the blood with hydrogen iron. So we just flood the blood acid base balance in order to improve the [inaudible] capacity, so then when they are sprinting we can delay the onset of lactic acid and fatigue. So that would be with sprinting, or with boxing, or with MMA.

Then you've got your endurance guys. Diaphragmatic fatigue will affect about 50% of athletes. Athletes train, but they train every system in the body except their breathing, but yet it's the breath that often imposes the limits. Even if you give this example ... I'm sure some of your listeners were watching the Connor McGregor/Mayweather fight a couple of weeks ago. The commentator towards the end of round seven, he said, "McGregor is mouth breathing hard, and he's sucking in air through his mouth," and intuitively the commentator sensed there was something going on here. Now, it wasn't until the 10th round that his legs went jelly, and he stumbled a bit. So then we have to ask the question, McGregor was getting gassed out there. If, for instance, we overdo it to the point we have diaphragmatic fatigue what happens is that blood is stolen from the legs to feed the diaphragm, and with less blood flow going to the legs, the legs are going to ... you know, you're going to slow down. You're losing energy.

But it doesn't make sense to me why an athlete can train so hard but neglect the very system that is often setting the limits. Physical training doesn't train breathing. It doesn't train it. The only exception is swimming because in order to train a muscle you are talking about weights. You add an extra load onto the muscle. Swimming, your face is immersed underwater, breathing against resistance, especially front-crawl, and because you're breathing against resistance, you're going to train the diaphragm. So physical training doesn't do it, but we use the breath-holding. We use different exercises to train the diaphragm to improve diaphragmatic fatigue. That's what I think would be beneficial, in addition to having a high BOLT score for endurance athletes. There's a number of other systems, but the technique is the same.

Dave Asprey: Very interesting. You have me wondering, should I be duct taping my mouth closed while I sleep?

Patrick McKeown: We do, I do, and people would probably say, "Oh, he's being [inaudible]" I woke up ... 20 years ago I was always stuffed up, my nose was continuously. I had an operation in 1994 on my nose. The operation was successful, but I was never told to breathe through it. It's only if you breathe through your nose will the nose actually work. So if I was to say to somebody, "If you want to get your nose working start breathing through it, and the more you breathe through it the better it works for you." Now, of course you could use breathing exercises to help and quicken it up. We use paper tape, and when I first started my nose was so clogged up that I used what's based on the Cottle Maneuver. Cottle was a very famous ENT from the United States. Maurice Cottle was his name. It involves just prying your nostrils gently apart.

So I used Breathe Right strips, or there's other products that we often use when our clients are mute snoring. It's a nasal dilator that ... it's a plastic dilator you put up in the nose to open up the airway because if the individual has been mouth breathing for quite a period of time they lose nasal patency. So the muscles here weaken. So we use little products just to help, and the products are very cheap. You can buy them very easily, and we use, then, the paper tape. One product, now coming out of the US is called LipSeal tape. It's a paper tape specifically for ... so there is a product on the market specifically for taping the mouth closed. It was invented by a dentist from Colorado.

Dave Asprey: Wow.

Patrick McKeown: His name is Dr. Frank Seaman. Because dentists are very intrigued with mouth breathing because the people who come in with their mouth open have more dental health problems. Their gums have greater issues. They have greater dental carries, build up of plaque because saliva is very important for the maintenance of good dental health. Bad breath is also an issue associated with mouth breathing, and mouth breathing, too, if it changes the structures that the airways are smaller that there's not as good clearing of mucus. So anybody who's ... any of your listeners who's waking up tired, and waking up with a dry mouth, I will say to them, "Let's get your mouth closed." The difference can be

huge, and I mean remarkable change. Waking up alert. We should wake up alert in the morning. If you have good hours, and this has been studied.

They got eight individuals in one study, and they have them breathe through their nose on one night, and breathe through their mouth on the second night. When they breathed through the open mouth, objectively their sleep was more disturbed, and subjectively. So going through the test, for instance, one individual developed what's called obstructive sleep apnea, and here when one's coming into sleep. Dr. Christian Guilleminault is a Stanford medical doctor. He discovered obstructive sleep apnea back in the 1970s. He also developed what's called the apnea hypopnea index, which is a measurement of the amount of events you have per hour. Two years ago he came out writing papers. He even wrote a paper ... I've just seen a pre-publication. I've just seen it this week. The Importance of Nose Breathing During Sleep. I think it's huge. So there's the top sleep doctor in the world is getting behind this.

If you were to ask your listeners to take a poll, how many of you wake up with a dry mouth in the morning? I'd guess it's 50%. Well, there's 50%-

Dave Asprey: That high?

Patrick McKeown: I would say so, yeah. 50% of people who are more fatigued, and they don't need to be.

Dave Asprey: Wow. I used to wake up with a dry mouth all the time when I was younger, and since I've done all the changes I made, including changing my jaw alignment. There's an episode with Dr. Dwight Jennings where I've actually had my back molars raised so that my jaw could come down and forward, which helped my breathing a lot.

Patrick McKeown: Yes.

Dave Asprey: But, unless I'm really sick or something I will never do that. But you've convinced me. I'm gonna go get some LipSeal tape. I've never tried that, and the little nasal dilators? I always thought Breathe Right strips seem like a total scam, but they probably aren't.

Patrick McKeown: Well, no-

Dave Asprey: Well, there's a little thing ... Yeah, they're not.

Patrick McKeown: Okay, but you see athletes wear them, but the athletes are going around with the mouth open. There's no point in wearing the nasal dilator if you're breathing through your mouth. For some people, I think it's really important to have a nasal dilator, because as soon as they have the mouth closed they may feel a bit suffocated. See mine, I have very narrow nostrils, and that's from mouth breathing during childhood.

Dave Asprey: Yeah.

Patrick McKeown: 60% of the face is grown by the age of four years of age, and 90% of the face is grown by the age of 12. We are leaving these kids ... and these are the next generation. I was at a conference, a sleep conference in Bordeaux two years ago, and Dr. Christian Guilleminault was speaking at it, and he was talking about, he says, "We need lawyers," he said. He said, "We need accountants. We need engineers. We need all of the professions." But he said, "These kids," he said, and I quote. "Their brains are getting fried." Even these kids who are getting tonsillectomy and adenoidectomy, who is telling them to breathe through the nose? Nobody. It's the most simplest thing that's been totally overlooked, and yet it could help these kids the most.

Dave Asprey: It's easy to tell a kid to breathe through the nose, but I'll tell you living in a house with toxic mold it was not physically possible for me to breathe through my nose most of my childhood.

Patrick McKeown: Yes.

Dave Asprey: And as you're describing this stuff, certainly a lot of that happened to me. So if you have an environmental problem that's causing chronic inflammation, which it's well documented ... by the way if you're listening to this and you haven't seen Moldy, the documentary that I filmed. It took a huge amount of time and just personal investment into the film because of this mold problem. If it means you have chronically inflamed sinuses, maybe this Buteyko breathing can help with that, but teaching a four-year-old to do that when they're every night getting exposed, they're gonna, almost be forced to mouth breathe. Then you get changes in facial structure. You get changes in brain function, and I think this is an important thing. And it could be seasonal allergies. It could be they're eating the wrong stuff, but if you can fix that ... I had my tonsils out at 16 and all that ... or maybe at 14, whatever it was. But it's kind of tragic-

Patrick McKeown: But David-

Dave Asprey: -when you think about something that simple.

Patrick McKeown: I totally agree with you, but you know what, if a parent is aware of the negative effects of mouth breathing, and they're watching their child go around with the mouth open, they may start then wondering, "Why does the child have the mouth open?" Is it that there's too much trigger? If there is ... if there's a trigger there, or even just a simple is it cats? A cat can be very potent, and a lot of houses will have cats inside. The cat licks its fur, the dander dries, and it floats in the air, and the child, their immune system takes a strong reaction to it. Now, if you breathe through your nose, your nose is an excellent filtration mechanism. There are cilia there, which are breathing at about a thousand times per minute. They're there to trap these particles to get rid of them from the body. If you breathe through your nose ...

Dr. Robert Fried is a hyperventilation specialist from New York. He wrote a book called Hyperventilation Syndrome. He said, "The nose will get rid of these particles in 15 minutes, but if these particles get down into the lungs, it takes 60-120 days for them to be removed." Now these particles can trigger the immune system to become inflamed, so even just by breathing through the nose you're gonna limit the amount of particles that you're taking into the body. Also, if we've got the anterior part of the nostrils, we should have little hairs there, and the hairs are designed as well. So, again, it's the using the mouth for eating and drinking.

Dave Asprey: That is so cool, and I'm still wondering with my kids. I can, probably, at 8 and 10 get them to focus on this. I think a four-year-old it'd be pretty tough, so it's more about changing the environment, and changing the relaxation response, and things like that. Well, this I think is gonna help a lot of parents who are listening to this, and I'm definitely a fan of this.

There's another fact that I've come across with hypoxic training that I do. If you get your blood oxygen low enough, your brain has a very ancient survival mechanism that you can trigger.

Patrick McKeown: Yes.

Dave Asprey: And what happens is it will flood the brain with oxygen. So when I get my blood oxygen levels down really low, I cut over to breathing pure oxygen. This is something we do at Bulletproof Labs in Santa Monica. We have the equipment to do this, but you can get 26 times more oxygen into the brain by inducing hypoxia, and then breathing, in this case, pure oxygen. It's like a derivative of something called Exercise with Oxygen Technique, called EWOT. Have you done any research, or are you aware of research with Buteyko and brain oxygen levels? Are there changes there?

Patrick McKeown: No, to be honest with you when we were doing Buteyko very little of the focus was on oxygen. It was when I writing the book “The Oxygen Advantage” that I spent four years then really going through the application of these exercises, to see what was happening in a hypoxic environment. You're correct in what you say. When we hold our breath, and our blood oxygen saturation drops, the body is intelligent and it's gonna hold and conserve blood flow for the heart and for the brain. So even though the oxygen saturation in the blood is reduced, it increases blood flow to the brain to make sure that the brain is getting sufficient oxygen, and it shuts down the peripheral circulation. For instance, you find that your arms go cold, and that's normal. So if somebody was a little bit tired, or even anxious before a talk, or an athlete pre-game.

So when I'm working with a fighter, they ask, "Well, how should I prepare?" What I say, "10 minutes before your fight, I want you to do strong breath-holds. I want your body to push you into that state." Maybe from aerobic point of view, we still haven't enough research on it, but you do get splenic contraction, so there's an increase of red blood cells into [inaudible]. If you hold your

breaths, your kidneys will synthesize the hormone EPO. When I'm taking about breath-holding I'm not talking about the breath-holding that [Counsil Mann], who was a very famous swimming coach during the 1980s. He was having his swimmers breathe in and hold. If you breathe in and hold you won't get a hypoxic response you get a hypercapnic response, which will have some training effects but not what we want.

So we do a normal breath in, a normal breath out, and hold. Then we have different ways of pushing the individual starting gently but building it up. Then when they resume breathing I have to minimize their breathing, and then with just a little pulse oximeter I have to monitor their blood oxygen saturation. So say 10 minutes before a race, or 10 minutes before a fight, or something I pushed them into that state, but then the last 10 minutes before they're due to compete, I have them spend a minute hyperventilating to get rid of the carbon dioxide that they've produced to allow everything to go back to normal. I use that technique to get their mind off the event, but also to provoke their body that it's more ... they're in that state of they want to go. They want to push it. So we're pushing them into sympathetic, into para-sympathetic etc. It prepares them for the race.

So, yeah breath-holding, I think it's phenomenal.

Dave Asprey: So 10 minutes before, for how many minutes do you do these mostly empty breath-holds?

Patrick McKeown: So, yes, so I finished them doing the breath-holds 10 minutes before. So maybe I start-

Dave Asprey: Okay, and then they hyperventilate.

Patrick McKeown: I have them do, say 15 minutes before the event I have them do breath-holding for five minutes. So it would be six strong repetitions. The mind stops, and it brings them into the zone because if you do a strong breath=hold your mind will stop because the body is more concerned with staying alive, even though it's challenging but it's not extreme. Then it's the 10 minutes before that I have them relax, and in the 10 minutes I have them do a minute or two of hyperventilation. Then the-

Dave Asprey: That is awesome. I have never come across that before, which is really cool. I think there are a lot of very strong athletes who listen to this, probably a quarter of a million people hear this episode, so the mix will be fascinating between doctors and athletes like that. I think a lot of people will be posting about what happens when they try this before a workout.

I have a different question though. There's also a huge number of executives, like me, who travel all the time.

Patrick McKeown: Yes.

Dave Asprey: And, in fact, right after we do this I'm flying to New York to go be on “The Dr. Oz Show,” which is super cool.

Patrick McKeown: That's cool.

Dave Asprey: Thank you Dr. Oz, and well, okay I'm gonna be in the air for whatever, four or five hours from Seattle to New York, however long that is. What should I be doing in mid-air in a crappy air environment with high CO2 levels, low oxygen, low pressure, all that sort-of stuff, what breathing hacks do you have for us travelers?

Patrick McKeown: I tell you a story. There's an orthodontist from California, and he won't mind me telling you his name is Dr. William Hang, and he's a great orthodontist. He flies a bit as well because he lectures internationally, and he brings a roll of tape with him. So when he's in the flight he'll actually tape up ... Now, I have not got the nerve to do that, but anyway-

Dave Asprey: My wife does that when we fly together, but that's for different reasons.

Patrick McKeown: He does it, and you know what? It's funny, but this ... and I'll come back to your question just when it's in my head, the Wallabies just did—the Australian National Rugby Team—and about a month ago they were doing some of their sessions all taped up as well. So the taping up can be pretty good during training because it's adding that extra load that you're forced to breathe through your nose. So I often find that when people ... especially respiratory, if they're any way respiratory, say asthma. They come off a long flight, and their lungs are very much affected. I have them slow down their breathing, really quieten their breath, really relax their breath, but I want them to slow down their breath to the point that they have air hunger. And to do that at various intervals throughout the flight. Now, what's happening there, I'm not sure, but it works, and I don't know how it's working. It's something amazing in the breath.

You were talking about the Wim Hoff method. You were probably aware of the paper by Cox. They did a study. They had the control group and the experimental group. The experimental group did hyperventilation and strong breath-holds, and he induces a hypocapnic hypoxic response.

Dave Asprey: Yeah.

Patrick McKeown: Then they injected endotoxins into both groups, and the experimental group who were doing the hyperventilation and the breath-holding were able to resist the flu, whereas the control group who were getting symptoms. There's something in the, but we don't know ... we really need more research. We need more research in terms of -- the very first thing I would say is anybody flying ... and watch the amount of passengers that are there with their mouths open.

They're sitting upright, their mouth is open, you'll hear them snoring, and then you hear them stop breathing. Listen to their rate, sometimes ... The best things I've found about breathing was, when I was on that aircraft—because I travel quite a bit as well—watching people around me, and you'll see how endemic it is. Count the people next to you with their mouths wide-open.

Dave Asprey: A while ago ... I used to commute from the Bay Area to Florida every month for weeks. So lots of cross country flights, and I started carrying a pulse oximeter, and would measure my pulse oximetry, and I'd ask other passengers, and even flight attendants ... So I was like the annoying guy on the airplane, "Hey, can I stick this on your finger?" The flight attendants were always at 99 because they're acclimated to these pressure changes, unless they were really sick. Like, some flight attendants were not doing well, and their oxygen wasn't good. Mine wasn't that good, but if I drank carbonated water my levels would go up, which makes sense because I'm getting more CO2 into the system. Then I was able to use more oxygen, at least that's my theory. To this day I drink carbonated water on airplanes, I feel better. What's up with that?

Patrick McKeown: I'm totally a fan of carbonated water. I think it's really, really good to drink. Now, I don't have an answer for you. It's very interesting. I've brought pulse oximeter as well. I've often seen that the SpO2 is about 92% when you're at about 35,000 feet. So ... because I think they only pressurize the cabin anyway to about 8 or 10,000 feet.

Dave Asprey: Yeah.

Patrick McKeown: I think it's very interesting that the air hostesses have acclimatized to it. It would be very interesting to see what their hemoglobin is that has their body ... because they are doing intermittent hypoxic there. They're only there for a short duration, and then they're back. Okay, difference for a long-haul flight. If, for instance, there's an increase of CO2, you could expect theoretically a drop in the SpO2 because what's happening is that the hemoglobin is going to release more oxygen in the presence of CO2. So I don't have an explanation for you. I don't know, but I think that's a great tip. That's one for me, so thanks.

Dave Asprey: I'm surprised I have anything about oxygen for you, because you know a lot about this than I do, but you're welcome. I have one other tip I wanted to offer you, that you may know about and also listeners. There's a post I wrote not too long ago called The Bulletproof Sinus Rinse, and this comes from a yoga technique, not a breathing technique. A lot of people have heard by now of a Neti Pot, where you put water in one nostril, it comes out the other.

It turns out, though, that what helped me be able to breathe through my nose more and just have clearer sinuses is you take a bowl of warm water, you add a liberal amount of sea salt, maybe xylitol if you want to, but most importantly a few drops of iodine. Then you bend forward like a dippy bird. You bend forward at the waist so your face is pointing towards the floor, and you blink a couple times to sterilize the eyes, but then you breathe in through the nose, like you're

drinking water with your nose as a straw. And you're thinking, "I'm going to die, this is disgusting." But it doesn't go down into your lungs, it drains into your mouth.

Patrick McKeown: Yes.

Dave Asprey: But because you're creating pressure through the suction, it does things the Neti Pot doesn't do, and then when your mouth is full of water you spit it out. You do it a couple times. That's absolutely helped me. Is that something you do or know about for people who have a hard time breathing through their nose?

Patrick McKeown: We use ... well first and foremost we get people breathing through the nose, and we do all the breath-hold exercise, which will help open it. Also, we breathe in and out through the nose. By the way, if you breathe in through the nose and out through the mouth ... a 2% greater water loss. Also, if you breathe in through the nose and out through the mouth you're losing heat. So the nose is there, it's designed to trap moisture and heat inside the body, and by trapping moisture and heat on the exhaled breath it keeps the nose open. So, again, I think it's a really good thing.

We have it in our books that I get people to get boiled water first, because sometimes people would get hot water from a hotel tap or something like that and I wouldn't be right. But to boil the water, and to get just a cup, and put in really good quality sea salt - Celtic sea salt - and xylitol as well, could be very good to put it, and just to cup your hand, and to pour the salt water into the hand, block the nostril, and snort that volume up. You know what it's great for is bad breath. So somebody who's experiencing bad breath ... because if the mucus isn't clearing, you need to be rinsing out the nose, especially the back. It sounds a bit disgusting, you know, you kinda hock it out, and you spit it out, and you do it a couple of times. But yes, you're right, your nose will be free. It's a good thing to do.

Dave Asprey: I love it that you said boil. A lot of people don't know this but water, even in the US, can have different parasites in it. If you breathe these right next to the brain, it's really bad. That's why, not only does iodine sterilize the nose, the iodine sterilizes the water if you're in a hotel room. It's something you'd do in a third world country to sterilize water. It's the same type of thing. I use Lugol's iodine, just one or two drops is all it takes. But yeah, breathing hotel warm water, or snorting it with some salt in it probably isn't a good idea. So thank you for mentioning the boiling, in fact I should update my post to mention that. If people don't use iodine in the water. So you are aware of that, and just for people listening Bulletproof sinus rinse or ... is this in “The Oxygen Advantage,” your new book? Do you talk about that technique? Which of your books has that?

Patrick McKeown: It's certainly in Close Your Mouth, and it could be in “The Oxygen Advantage.” The whole thing about drinking sparkling water is in “The Oxygen Advantage.” You know what-

Dave Asprey: Oh, it is?

Patrick McKeown: Yes.

Dave Asprey: I haven't read that part of it.

Patrick McKeown: Not on flights, but I found that with people who talk a lot, and they find that they're very tired, or they get wheezy, or they're coughing as a result of the talking. I've been teaching them the breathing exercise. They've been doing pretty well at it, but they're talking for six or eight hours a day. I say, "Okay, how can I help here?" So if they're doing a lot of talking I suggest that, yeah, during your talk drink a glass or two of carbonate water. Again, this points to the theory of carbon dioxide as a benefit. Now, there's probably other gasses there, nitric oxide, etc. But I think carbon dioxide is a wonderful gas for respiratory complaints.

Dave Asprey: All right. I am going to bring this up with Tony Robbins. I've had a chance to speak on his stage a couple times, and I don't know anyone on earth who speaks for longer or with more intensity than he does at one of his 14-hour day trainings. He's just ... so I don't know if he drinks sparkling water, but I'll ping him about that, because I think it would be, maybe, a gift for him. He does, at least as many bio-hacks as I do, and probably a lot more. I'm really impressed with just the level of intensity there. So, wow, this is incredibly cool stuff, and I'm bummed that we're coming up on the end of the episode. I'm really interested though to hear your thoughts. And there's a question I've asked every single guest on Bulletproof Radio, except that one time I forgot, that I still regret, around episode 70-something, and we're at episode, I think, about 420, at this point. Maybe I picked 420 because it's a good number, right? In the US 420 is the magic code.

Anyway, the question is, if someone came to you tomorrow and they said, "Patrick, based on everything you've experienced in your life, not just your profession, if I wanted to know your three most important pieces of advice that you'd offer me, if I wanted to perform better at everything I do as a human being, what are the three most important things? What would you offer?"

Patrick McKeown: Number one I'm gonna say is breathe through your nose for the benefits of mental state, activation of the para-sympathetic nervous system, better sleep, better arterial oxygen uptake, higher end-tidal CO2, better oxygen delivery to the cells, better ventilation profusion. Nose breathing is key.

The second thing that I'm gonna say is for people who bring in breath-holding. Once they're suited, once they're not pregnant. You don't have high blood pressure. You don't have any serious complaints, bring some breath-holding into your way of life. It challenges the body, it activates the sympathetic nervous system, and it will cause the body to make out some adaptations, which are beneficial for immunity, as well as sports performance.

The third thing would be is to bring your attention inwards, onto the breath, or into the inner body at regular times throughout the day. I don't meditate. I don't encourage ... I think mediation is absolutely brilliant, but I think a lot of people don't have the time to sit down and formally do a half-an-hour or an hour of meditation at one sitting. They'll try it, but they'll abandon it after a few weeks. I used to do it formally. I abandoned it. I really want to bring it into our way of life. We're talking here together, not to have all of our attention stuck in the head, but to disperse attention throughout the body. As you're going about your daily life to focus on the breath, and at least periodically, take attention out of the mind onto the breath.

In tandem with this I think we have a mental health problem on our hands in the next 10 ... not that we don't have it already, but I think it's going to increase. I will give you research. In Canada, Microsoft conducted research on 3,000 Canadians, and they said that the average attention span in 2002 was 12 seconds. They did the same research again in 2015, and they said that the average attention span is reduced to 8 seconds. There's a 25% drop.

Dave Asprey: Wait, what were you talking about? I'm sorry, I had to do that.

Patrick McKeown: They put the reason down to overuse of the internet, etc. Now, we are being trained, and youngsters are being trained to be distracted. They are getting distracted by emails, by Facebook, by all the various social media. Everything that's going on. Text messaging, etc. Their brain is trained to be distracted, and it's very important that we can reverse that, or at least that we can train the brain to hold attention on something, because concentration is your ability to hold your attention on something for a period of time without distraction. The more the mind gets distracted, the more thoughts we have, the less happy we are, and the more stress we have. So number three things I'm saying is breathe through your nose, breath-holding is very helpful too, don't ... not necessarily breathe in and hold the breath, but breathe out and hold the breath. There's various techniques, many of them, for many different people. Then the third one is bring your attention inwards. Don't just live in the head.

Dave Asprey: I love that advice, and I'm wondering what's going to happen. I don't know if I can get LipSeal tape before this flight out to New York, but I'll be sitting on the flight wearing the True Dark glasses that filter out all the light that tells my brain ... so these are red. They look like superhero glasses but they're optical filters that are going to allow me to go to sleep when I get to New York. So I can wake up, and film, and then fly home without being super jet-lagged. So I'm gonna have red glasses on, a baseball hat to block all the junk lighting, and something possibly tape over my thing. Maybe I need a hood and some fingerless gloves, to just complete the absolutely insane look. So we'll see if they cart me off like in a padded wagon or something when I land. Can I buy LipSeal tape at a drug store, or do I need to order it?

Patrick McKeown: I think you need to get it online. Yeah, I think you need to get it online, but what I was going to say is there is a tape that's also pretty good it's called 3M Micropore tape, and you'll-

Dave Asprey: Yeah, I know that tape. Okay.

Patrick McKeown: -that paper tape. So if it's paper tape and hypoallergenic start off with that. Put a little-

Dave Asprey: Okay, that's what I use for IVs. So, okay.

Patrick McKeown: Yeah, and once it's paper ... there's no long-term, and I can be testament to that. I even taped my mouth last night. People would say, "Surely after 20 years you've got into the habit of nose breathing." Yes, I have, but the one thing about it, once I put on the tape it's almost as if it sends a signal to my brain that it's sleep, and I fall asleep quick. It's amazing. I don't know what effect it is but ...

Dave Asprey: I can tell you, my wife is going to love this when she puts the tape on my lips. She'll be like, "Oh, finally I can go to sleep too. This is going to be wonderful." I'm truly amused. This has been a fascinating interview, Patrick. Your book is called “The Oxygen Advantage,” at least your latest one. Where can people find out more about you?

Patrick McKeown: We have websites, TED talk websites, and that books are all on Amazon as well, or different bookstores.

Dave Asprey: What's the top URL people should go to?

Patrick McKeown: Oxygenadvantage.com.

Dave Asprey: Awesome, well thank you so much for being on Bulletproof Radio. I learned a ton. You were able to answer all of my odd and unusual questions about oxygen, which is super cool. Thanks for your work helping people learn about breathing, and oxygen, and CO2, and the Buteyko method. I really appreciate just all the dedication you've put into this, it definitely shows.

Patrick McKeown: Sure. Thanks so much, David.

Dave Asprey: If you liked today's episode you know what to do. Head on over to iTunes and leave a review to tell people that you learned cool stuff on this show that you can use no matter whether you're a physician, someone who just wants to perform really well, or an athlete, or whatever else it is that you do in your life because these techniques are available for everyone. Also, if you haven't heard yet, you can go to bulletproof.com, and we have ready-to-drink Bulletproof coffee. We'll send it to you with free shipping.

This is a cold-brew coffee. It has butter, has Brain Octane, it's all good to go. We just launched this. It will be available nationally at Whole Foods. They're rolling it out, but I'd be more than pleased to send you a case of the stuff that you can keep in your desk drawer at your office and just toss one or two in the fridge with your name on them so no one will steal it. This saves you all the time of making Bulletproof coffee. You want that pick-me-up with all the Brain Octane Oil and its effects.

I can tell you absolutely 100% Brain Octane can help you raise your level of ketones. When your ketone levels are higher your ability to use oxygen is better because you, actually, are getting additional electrons into the cell. So you can use your oxygen to receive the "used electrons". So all this breathing stuff we just talked about is very compatible with being in ketosis, even if your using Brain Octane as your exogenous source of ketones, whether you're doing intermittent fasting, or anything like that. So that's kind of a cool thing you might want to try out in addition to this new Buteyko breathing technique, which is definitely worth your consideration.

Thanks for listening. I'll see you on the next episode.