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| Mark: | Welcome to The Health Edge, translating the science of self-care. Great to be with you as always. I'm Mark Pettus with my friend and colleague, John Bagnulo. John, good morning, buddy. |
| John: | Good morning, Mark. Great to see you. |
| Mark: | Great to see you as well. We get to have some fun this morning talking about our favorite beverage or my favorite beverage, anyway. Coffee. It's one of those beverages that has had a lot of research attached to it. Virtually all of it is pretty positive, so be some fun to explore that. |
| John: | Yeah. Definitely. I think it'll surprise people who maybe have not heard this before that there's enough evidence now that suggest that having coffee daily is much more protective than a lot of us would have ever really appreciated. It's probably something that [inaudible 00:01:17] unique adverse reaction that has someone has to coffee. Maybe their nervous system just can't handle that little extra stimuli but other than that, Mark, the numbers really boat in favor of having a cup or two cups of coffee a day. |
| Mark: | We'll look at a lot of that research, John. It is impressive when you look at the magnitude of risk reduction from many common complex diseases. A lot of these researches will focus on, is observational epidemiologic. We always emphasize that these are correlations, but I do think there are so many mechanisms. The coffee bean as a plant product, has a lot of interesting molecules and phytonutrients in it, many of which we are understanding to have profound effects on gene expression. It will be fun to look at that. |
|  | This, I think, will probably make the coffee drinker pretty happy. Of course, there's always what you put into coffee which can take a pretty amazing plant-based product and sometimes take away from some of that. We talked in our last podcast about artificial sweeteners and occasionally, John, I'll see somebody with a nice cup of black coffee that will end up having two Sweet'n Lows or Equals put in it. A lot of these flavored creamers and ... |
| John: | It becomes a milkshake. |
| Mark: | It becomes a milkshake. You take a product only nature could produce and do all you can to lower its impact. I think as we get into this, John, making the distinction between caffeine and coffee and some of the effects that are attributed to caffeine as distinct from many of these phytonutrients and Polyphenols and other molecules in coffee that exert a wide array of biologic effects. One of the things that I think most people that drink coffee noticed, John, was just the impact on sort of energy, alertness, and in-cognition. Indeed, there's a lot of research there linking coffee consumption specifically with improvements in mental performance, and energy, and attention. |
|  | One of the mechanisms that is well-understood there is that caffeine will inhibit Adenosine. Adenosine is a transmitter throughout the human body, human biology that has a bit of a relaxing dampening effect in the human brain. When you inhibit that as caffeine does, you get more of a Epinephrine, what we call Adrenergic or Catecholamine, dopamine. Caffeine has had well-established effects on dampening that Adenosine response which is probably one of the reasons why we tend to perk up, and feel more alert, and feel more attentive, and have our cognition and performance improved, physical performance as well. |
|  | I think those are well-known effects of caffeine that contrary to what conventional wisdom has been I think for many years, John, concerns about caffeine's effect on blood pressure and cardiovascular risk have really not been at all born out by the research that's out there. |
| John: | Yeah. Absolutely. Lesser-known pathways that are involved, Mark, are caffeine is also an mTOR inhibitor, that's were caffeine's anti-cancer properties. [Their 00:05:25] starts to be some overlap there. Another area of physiology is caffeine stimulates greater fat-burning process. This is more beta-oxidation within our muscle cells. Whether you're looking at this from sports nutrition or you were looking at this from a cancer perspective, caffeine really has so many attributes that really lend themselves to particular areas of our cellular physiology. |
|  | I think that that's really well-established now in all of the scientific journals that when you take a look at caffeine and you look at these different pathways within the body, and for many people, it helps them bring that pathway back to balance. Whether that's because of other lifestyle factors or genetic influences, but yeah, it's really well-established. The areas I think that many people are less familiar with, Mark, are the substances like Chlorogenic acid, Kaempferol, and some of the ... what we call "caffeine intermediaries." These are when the coffee bean is in the process of producing caffeine as a type of phytonutrient, it produces these intermediaries like Cafestol and Caffeic acid. |
|  | When you start to look at the health effects of those intermediaries that ultimately eventually become caffeine within that coffee bean or you look at some of the other phytonutrients, it's really the sky's the limit in terms of this little bean or in the case of ... The true definition of a coffee bean is actually a berry. It's very similar for anyone who's seen a coffee plant or coffee bush growing. These little red berries as they call them are very similar to in appearance anyway, it's cranberries and berries along those line. It's full of phytonutrients. I think that's where in the last decade or so researchers really started to shed light. In addition to the caffeine, you've got all these other substances that have anti-inflammatory, high antioxidant value, anti-Angiogenesis property. It's an amazing array of phytonutrients, as you said. |
| Mark: | Those are so many incredible biologic mechanisms, John that had become more and more clarified in recent years. It really began, as you look at the epidemiologic observational data showing risk reductions in many cancers. Those that had been most widely studied that I'm aware of would include colon cancer, liver cancer ... |
| John: | Bladder cancer, as well [crosstalk 00:07:55]. |
| Mark: | Bladder cancer. A whole host of large epidemiologic study showing dramatic risk reductions in type two diabetes. You mention fat oxidation and weight loss. There's some very compelling evidence there. Then this whole category, John, of neurodegenerative diseases like Parkinson's in particular. You start talking about some of these phytonutrients, and mTOR mechanisms, and modulation of inflammation and cell signaling, probably mitochondrial. A lot of the things that we've been talking about over the last several months. In the coffee bean, you can begin to connect the mechanisms with a lot of these large scale epidemiologic and observational findings. |
|  | It's more and more compelling. Sad, but true, for a lot of people that consumer standard American diet, coffee may be the healthiest thing that they consume on an average day. I guess there's a saving grace there for those who otherwise, you drink a lot of coffee but just tend not to eat that well. Those mechanisms I think are really so varied, John. |
| John: | Yeah. What you just said before that, Mark, in terms of for many Americans and this may be true for people around the world. A cup of black coffee maybe just handful of foods or beverages consumed over the course of the day and in the case of some individuals a week, that is a unadulterated plant product that contains a high antioxidant value. Because if someone's largely living on refined grained products, and sweetened foods, and heavily processed meats, that list as you know, covers so much of what people live on day-to-day. That cup of black coffee may be one of the saving graces within that menu for that individual. |
|  | As you mentioned earlier, sometimes people do all they can to take the good stuff out of foods. I think that's certainly the case with coffee as well, whether we're talking about decaffeinated coffee beans or we're talking about some of the ways that coffee is ultimately brewed and filtered. It seems as though in general, the system, is slanted heavily towards trying to get all the good stuff out of the coffee bean by the time it ends up in our cup. Right? |
| Mark: | Yeah. Absolutely. I thought maybe we could focus on just a few of the studies, John, and reviewing this topic. [It crosses 00:10:46] so much there. If you look at diabetes for example, again, these are mostly epidemiologic studies. Very large scale in meta-analysis that will include 400 plus thousand people, that the two things that jump out are not only the risk reduction and those that consume coffee in the instance of type two diabetes risk, but there's a dose response. Right, John? |
| John: | Uh-huh (affirmative). |
| Mark: | You see this sort of linear decline where two to three cups gives you greater risk reduction than one cup or no cup, three to four even further. Some of the data that I've looked at, you start getting up to around four cups a day. You're looking at what could be as much as a 40-50% reduction in the risk of acquiring type two diabetes which is we talk about all the time, approximately 10% of Americans have. I haven't seen much data on pre-diabetes, but we know that affects a far greater number of Americans, probably 35 plus percent. It would be safe to extrapolate risk reduction and diabetes to risk reduction in pre-diabetes as well. |
|  | What's striking to me when I look at a lot of these, John, is if you look at the diabetes prevention program, one of the most widely quoted studies of the last 10 years in people with pre-diabetes who walked 30 minutes a day, five days a week, and who are able to lose 5% of their body weight, those people had about maybe 30 to 40% risk reduction and going on from pre-diabetes to diabetes. Here, just from the observational data. It wasn't an experimental interventional trial, but the magnitude of a risk reduction is even greater which is pretty striking. |
| John: | The dose response that you refer to, Mark, is really important. For our listeners who might not understand some of the real important principles in taking these what we say "correlations" or these associations to the next step, is that you do demonstrate some kind of dose response. Meaning, that more of exposure to A or B produces either risk, greater risk, or greater risk reduction. Finding that with coffee, again, it will be critique obviously by whether it's epidemiologist or statisticians. It will be, again, critique to say, "Well, this is again, this is observational. These are correlations." |
|  | When you start to find the type of linear dose response with a slope, the relationship between coffee and risk reduction for diabetes, that does exist from this research and it's not alone. There's more than one paper that have shown a very similar dose response. We start to approach something that is more cause and effect. I think that's really important that people understand even though this is going to often be dismissed by critics or people who are not in favor of humans drinking coffee for whatever reason. Once you have the dose response that does exist between coffee and diabetes, risk reduction, it's very similar as well for bladder cancer. That dose response is really important. It adds a lot of strength to this argument. |
| Mark: | Yeah. Definitely. To your point, John, so much of the data is consistent in that way regardless of which particular diseases risk you may be looking at. I know we're both really interested and have talked a fair amount on the podcast about neurodegenerative diseases, particularly cognitive decline, what clinicians might refer to as "moderate cognitive impairment," which is probably on an earlier part of the spectrum to Alzheimer's disease, Parkinson's disease. Which has become so prevalent throughout the world as a degenerative neurologic process where the brain stops making dopamine. |
|  | Again, when you look at risk reduction for Alzheimer's and Parkinson's, you see that similar dose response, John. Again, the magnitude of that risk reduction what studies published as these hazard ratios, are in the point five to point four range, which we translate into 40-50 plus percent risk reduction. It's so much easier now to make the case for those that like coffee and for those who don't, I would never discourage anyone from acquiring a taste for it as part of a really comprehensive lifestyle strategy to create more resilience as one gets older. Because many of these are age-related disease and it become more and more prevalent. This, I think is low hanging opportunity from a lifestyle perspective. |
| John: | Yeah. Absolutely. Just to go back to what you said about Alzheimer's. One of my favorite investigations was conducted around six or seven years ago. It looked at those areas in the Mediterranean region where people just ... statistically, just don't get Alzheimer's. The researchers were really curious as to what we some of the qualities of their lifestyle that may have landed to their incredibly low risk for this, as you know, an epidemic. Now, if you take a look at this in the western world or within western civilization, Alzheimer's is just every year, the numbers climb. |
|  | The research has found that there were just a few commonalities in these different pockets around the Mediterranean that it was unlikely to be a genetic factor. One of those common factors, Mark, was that these populations with the lowest risk for Alzheimer's drink coffee in a very, what we call "old school" or Turkish style coffee. The coffee beans were boiled for an intensive period of time and then were not filtered. Some people call this "cowboy coffee" if they use a percolator here in the United States. That Turkish coffee is an incredibly strong type of coffee. Again, the important part is that it's not filtered. |
|  | Researchers then found that when coffee beans were prepared this way, you get the maximum Cafestol extraction from the coffee bean in that boiling process. Because it wasn't filtered, you deliver in every cup of Turkish coffee. Again, this could be done at home here in the United States whether it's boiling it extensively using a percolator or it's using a French press and letting the coffee beans be immersed in that hot water for an extensive period of time. When you prepare coffee beans this way, you get the maximum Cafestol extraction, as well as also having much more caffeine than you would from a typical brew where it's passed through a paper filter. Now, that paper filter is a really important part of the discussion because not only does that type of process here in the States where you run it through a coffee machine and you basically have hot water passing over the coffee beans for a short period of time and then you filter it. Not only does that not extract as much of the Cafestol, but the paper filter really removes a lot of it before it ends up in the cup. |
|  | This really, I think these observations that were made in and around the Mediterranean, Mark, they really lend themselves to the discussion that this is about those phytonutrients. This is about the caffeine does that you get in a cup of coffee. When you start to take a look at the animal studies in light of that observation that was made around the Mediterranean, in the animal studies, it is the Cafestol, the Caffeic acid, the caffeine, that perfect mix of those ... Those substances are what produce the most favorable changes within the rodent's brain. I would put coffee right up there with turmeric and ketones as being your top three interventions for neurodegenerative disease. If you can get all three of those in place, if you have people that are drinking a strong cup of coffee as part of an [intermediate 00:18:59] and fasting regiment than they're cooking with turmeric or curry for that matter, they're really providing their brains and their neurons with the greatest chances of not only surviving but thriving as you know, within the food supply that offers a lot of curve balls and throws a lot of change [offset 00:19:17]. |
| Mark: | What a great context, John, for putting that in perspective. Again, it speaks to the many growing understandings we have of the diverse biologic effects that these compounds like Caffeic acid, and you mention Chlorogenic acid have in human biology. When you think about sourcing, John, to sort of bring this back to sort of the origins of the coffee bean and how these beans are processed. I know you've thought a lot about these and have a really good understanding of it. I mean, not all coffee beans are the same, not all sources are obviously the same and like anything in the human food supply sourcing will have a lot to say about the medicinal effect that you're likely to get. How would guide someone, John, in this vast market of coffee availability to be thinking about sourcing and quality from that perspective. |
| John: | Mark, I think this is the part of the discussion that hopefully people really dial into and do what they can to navigate. Because it's every bit as important as it is with olive oil or any other food that you've heard good things about. We know that the olive oil industry is ripe with scam and with misrepresentation in terms of what's actually in the bottle. With coffee, I think the two or three most important variables are when you take a look at all the data that you and I have talked about, these correlations that have been shown, you have two things that are really important. One is, that the coffee beans be if possibly, they're grown at altitude. |
|  | Coffee beans where they're grown at 6,000, 7,000, 8,000 feet or higher tend to have much higher antioxidant value. This is really simple because the coffee bean as a type of fruit on that tree has to protect itself against ultraviolet light. The higher the altitude with which coffee beans are grown, the greater the antioxidant protection required by that small fruit or berry for those environmental pressure such as UV light. That's really important. The other thing is when coffee beans are also grown at altitude, they're tend to be less mold and less mold contamination in those berries. |
|  | If you can, you want to find coffee beans that are grown at altitude and you also want to get coffee beans that are water-washed. Sun-dried sounds great. It sounds really natural. It sounds like what you probably want intuitively, but you don't want sun-dried. I've spent a good amount of time in Panama and in other areas of Central America which are big hubs for coffee production. When coffee beans are sun-dried, they're spread out on a big cement pad. In some cases, not even a cement pad and they're just left out in the open and in the sun. There's a lot of things that happen when coffee beans are dried in that passion that lend itself to mold contamination. Basically, those coffee beans are just roasted and most of that mold and the toxins produced by that mold, most of that gets put into your cup of brew at home. |
|  | They don't remove the mold from these contaminated coffee beans, they're just thrown in a roaster. You really want to get coffee beans if you can that are grown at altitude, that are water-washed. I think it's important to get organic coffee beans if a person has that room in their budget because again, coffee beans are, from time-to-time, sprayed and they're treated with a variety of chemicals depending on the environment and the farmer's particular philosophy on farming. I think those are things that are really important and those details add up. When you start to take a look at how some people responds to coffee, I believe strongly, Mark, and I think you do as well that caffeine receives most of the blame when people have some kind of adverse reaction, either they just don't feel quite right mentally or they're jittery. |
|  | I always wonder, "What else is in that cup of coffee?" If you put Aspertame in with a cup of coffee and you blame everything on the caffeine, that's really unfortunate. I think it's the same with contaminants that can be in coffee. A lot of your fast food coffee has, everything from salt mixed with it, to other substances, either to stretch the actual coffee that the restaurant or that the place is using. I think getting really high quality coffee beans is an important part of this process if someone really is going to make this a more integral part of their life. |
| Mark: | Those are such great points, John. Yeah, so many times out here, people reference symptoms, these very non-specific symptoms to the caffeine in their coffee. That becomes a reason for them to switch to decaf. We can talk about decaf and whether some of these health benefits are same with decaf and the same way that they are with caffeinated coffee. It's very easy to under-appreciate to all the points that you made, John. Coffee as an any food product, the number of contaminants along the way that can insert themselves. |
|  | We do know that there are a small percentage of people who may not metabolize caffeine as quickly. We talked about the snips, the Single Nucleotide Polymorphisms. There had been some identified with liver metabolism. Some people might be more sensitive and probably a very small percentage to ... They're just slow metabolizers, so they don't need to drink a lot to experience some of those caffeine-related effects. A lot of those effects are probably totally unrelated and that's where the sourcing become so important, John. Those are really great points. |
| John: | Yeah. The other thing, Mark, is we can get into this if we have time, but then, you have to think about not only the way the coffee beans were grown, the way they're processed. The other thing we've talked about, what it is that people end up adding to their cup of coffee whether it's as you mention, some type of nondairy creamer and those are horrific when you start to take a look at the ingredients of those things or the artificial sweetener. Then what makes matters worse is people will often put a cup of this hot boiling coffee that has a mild acid content as well. They'll put that in that Styrofoam cup and now, you've got Styrene in your coffee. Styrene, basically, it's a breakdown product of Styrofoam. |
|  | The research on this by the Long Island Breast Cancer Association which has been really one of the vanguards here looking at the relationship between breast cancer and environmental chemicals and toxins for a lime and said, "Look, there's just no reason for us to be putting boiling substances or really acidic beverages in the Styrofoam cups. Because you're going to end up some of the Styrene in your beverage." Really, what I like about coffee and I know you do as well is that when you start talking about this, it opens up so many doors as to other areas of lifestyle, the way foods are processed and how much we take for granted. People just say, "What's a cup of coffee?" |
|  | A cup of black coffee from a fast food restaurant where it's produced as rapidly as possible. Most coffee beans are produced as cheaply as possible in massive quantities, most often grown unsustainably is so different than the cup of coffee you could brew at home or you could get at in establishment where they put a little more time into it and a little more quality. It becomes a really fascinating conversation and it's as we've mentioned, Mark, it's also true when you start talking about things like wine, or olive oil, or meat. I mean, the devil is in the details. Right? |
| Mark: | Uh-huh (affirmative). |
| John: | With coffee, I mean, yeah. For a lot of people who don't want to think it, maybe it helps them modestly to just get a cup of fast food type coffee in the morning. If they want to take it to the next level, you really want to get coffee where it's not filtered through a paper filter, when it's grown a certain way. That's what I love about so many of these topics. When you take food and medicine, you start to intertwine these stories. It becomes really intriguing. |
| Mark: | Beautiful. Beautiful, John. It is so nuance and interesting. I'll have conversations almost daily and frequently, they are around a cup of coffee. I think so much of what we talked about in self-care, John, is just this issue. It's this consciousness, mindfulness of every aspect of the sort of life cycle of that particular food, the way that it's being prepared. Because you often comment on and write down to the containers that you put them in and it become so much more interesting and nuance. Once that consciousness, once that light begins to go off, it is amazing how people begin to say, "Wow, after 50 years of drinking coffee everyday the same way, the same routine, this is the first time I've ever thought about all those nuances." |
|  | Because so much of this is happening beneath the radar screen of consciousness, John. Much in the same way that I think it's hard for people to appreciate how low-levels of environmental toxins like a micro-toxin or low-levels of toxins coming from non-dairy creamers. It's hard for people to appreciate when you can't necessarily case it or see it. Within five or 10 minutes, you're not noticing anything out of the ordinary ... It's hard to appreciate the magnitude of a effects that something like that can have. Again, I think in all the great examples you gave, John, of how the amazing benefits of a plant like coffee can be undone considerably by the time it reaches your lips if you're not really aware of that. Really great sort of news to use, but you're right. This is really awakens one to the consciousness of every aspect [crosstalk 00:30:01] of the experience. Yeah. |
| John: | Right. If we were to give people our checklist, Mark, of what to look for in coffee, I mean, we wanted to be A, grown in altitude preferably. There's some controversy around Arabica or other species of coffee. When I take a look at that, I think it really is very variable in terms of results they've got from looking at the two primary species of coffee bean. Nevertheless, it'd be good to have coffee beans not overly roasted to the point where they're charred. If you take a look at a French roast for instance, those coffee beans are charred and they start to end up with a really, really shiny, almost sheen-like surface. Now, when coffee beans are roasted that much, you start to produce ... you start to destroy some of the phytonutrients that we've been talking about. |
|  | You also start to generate a little bit more of a Chloromide which is produced when you take any food with a higher carbohydrate content up to really, really high temperature. I think you want to get coffee beans that are medium roasted. You want to, again, try to get them water-washed, not sun-dried. If possible, you don't run these things through a paper filter. You try to make them in a French press or you try to use a percolator or something where those coffee beans, you're going to get a greater window of time within that hot water for more of these phytonutrients to be extracted. I think when you start adding all these things up like you just said, it's synergistic. It can go synergistic in the wrong direction where you have microtoxins, Aspertame. Then that cup of coffee becomes a cocktail of hazards but at the same time, it can be synergistically in a good direction when you have low higher caffeine content. |
|  | Not only do you not have these toxins, but then, you have more of the phytonutrients, and they're not filtered out. You mentioned this earlier, Mark, when it comes to decaffeinating substances whether it's tea or it's coffee, you want to make sure that water is the only thing used in that caffeine extraction process. If someone does still after hearing and say, "You know what? I just don't like who I am or I can hold a pen without shaking when I have a caffeinated coffee," well, if that's the case, if someone does go with decaffeinated coffee or tea, make sure it's Swiss water treated or at least water extracted. You just don't want to drink these beverages if they're using chemical solvents to extract the caffeine. |
| Mark: | Great news to use there, John. We've touched on as we summarize, also a whole host of risk-reduction potential with daily consumption of coffee. I just want to review that, John. Again, while these are mostly observational trials, as you pointed out, the magnitude of the effect and the dose response that one sees certainly would suggest more causal mechanisms. So many of the mechanisms we discussed I think are being looked at very actively right now. I don't know that we touched on all of these, but a good place to start certainly is mortality. There does seem to be some mortality risk reduction. I mean, who wouldn't want to reduce their risk of dying, right? Most of the studies have looked at this over a 10 to 14-year period, John. |
|  | Some of these risks and just to summarize, once you get certainly to two to three or more cups a day, are in the range of five to 10% for men, women and some of the studies for reasons that aren't entirely clear, maybe even get a little bit more of a magnitude of mortality benefit. 10 to 15% risk reduction over 10 to 15 years. We've talked about diabetes and insulin resistance and the overwhelming amount of data suggesting risk reduction in people who drink coffee regularly. The same can probably be said for pre-diabetes though the research there hasn't looked at that specifically, but the mechanisms would probably be very, very similar along those lines, John. |
|  | We talked about weight and beta-oxidation, fat oxidation, and many of these trials. While the magnitude of weight loss is modest, 3%-5%, that can be substantial in someone who's looking to gain traction in their lives, to lose a little weight. It may be that some of that beta-oxidation of fat may connect with diabetes risk reduction as we understand visceral fat and abdominal fat to be an important contributor to inflammation and insulin resistance. We talked about a host of brain-related benefits from reducing the risk of cognitive decline and Alzheimer's, Parkinson's disease and even ... I don't know that we had a chance to touch on this, John, but in the behavioral health literature even mood, depression, suicide rates do tend to be lower in regular coffee drinkers. Cancer risk reduction. As we've mention, bladder, colon, liver. You see this whole host of very significant epidemiologic benefits, John. Again, it's not often you can look at something as commonly consumed by the average American and attribute such great health benefits from it. |
| John: | It's never. Yeah. |
| Mark: | It really stands alone that way, doesn't it? |
| John: | It does. I mean, almost never do you find this type of wide spread risk reduction for so many varying conditions and physiological mechanisms. It's really fascinating. You talked about a lot of great human observations. When you start to get into the animal studies, I know a lot of people don't want to talk animal studies for whatever reason, but I think that for numerous reasons, it's a really important part of the dialog. When you start to look at what happens with a rodent's brain when they're given the equivalent of one cup of coffee, they're probably having ... we're measuring this in milliliters when you take a look at the research. When you start to take a look at Amyloid plaque, changes with rodents who are exposed to coffee as opposed to those who are not it. Again, it just adds a whole another later of intrigue to this. |
|  | To me, it really supports the argument that it's highly protective against neurodegenerative diseases because you start to get into those mechanism. Whether you're talking about these human observations or you're taking a look at animal studies, Mark, there's a growing body of evidence here that this may be ... As you said at the beginning of this, this may be one of the healthiest things people consume throughout their day and they don't even know it. That's really the funny part. |
| Mark: | We'll get some of these references up in our website, John, thehealthedgepodcast.com. It's been a great dive into coffee and the health benefits. I know people are going to take away a lot of really good practical information here, John. It's been a lot of fun as always. We appreciate people listening to the podcast. We love doing this and encourage folks to share this with their friends and family if they find value in it. We're on iTunes. We're also getting these recordings up on YouTube, John. We'll make sure there are some show notes, as I know it can sometimes be hard to retain little tidbits of information. We'll make sure we get some show notes out for this and encourage people to check us out on those media sites. John, as always, it's been a great pleasure connecting. |
| John: | It has, buddy. Have a great day. |
| Mark: | You take care. I just want to encourage our listeners, John, if they could take a minute and give us a thumbs up on iTunes. We would appreciate that and thank you all for listening. Be well and stay well. (music) |