[Intro]: Welcome to The Healthy Rebellion Radio. This is an episode of Salty Talk, a deep dive into popular and relevant health and performance news pieces mixed with the occasional salty conversation with movers and shakers in the world of research, performance, health, and longevity. Healthy Rebellion Radio Salty Talk episodes are brought to you by Drink LMNT, the only electrolyte drink mix that's salty enough to make a difference in how you look, feel, and perform. We co-founded this company to fill a void in the hydration space. We needed an electrolyte drink that actually met the sodium needs of active people, low-carb, keto, and carnivore adherence, without any of the sugar, colors, and fillers found in popular commercial products.

[Intro]: Health rebels, this is Salty Talk. And now the thing our attorney advises, the contents of this show are for entertainment and educational purposes only. Nothing in this podcast should be considered medical advice. Please consult your licensed and credentialed functional medicine practitioner before embarking on any health, dietary or fitness change. And given that this is Salty Talk, you should expect the occasional expletive.

Robb: Top of the morning, wife.

Nicki: How are you feeling this morning, hubs?

Robb: Better than yesterday.

Nicki: Better than yesterday, you've been a little under the weather...

Robb: Kind of cold. Our jiu-jitsu coach, John Frankel, is in town hanging with us for about a month, which is awesome, but he was patient zero with a cold. And I got it. So we got it. Sagan has it a little bit.

Nicki: Yeah, she's got a little bit of a runny nose,

Robb: Runny nose. And you've dodged it. But yesterday I've been taking some Sudafed to deal with things. And then I've been on decaf and doing pretty good with that. For whatever reason, decided to do a super coffee yesterday with the Sudafed. I was so jittery that I couldn't even record-

Nicki: Yeah. We started, we started this episode yesterday and then scrapped it or like-

Robb: Flamed out.

Nicki: I cannot, cannot continue-

Robb: Yeah, I looked like I was having a seizure. So...

Nicki: Yeah. So anyway, I'm glad you're on the mend. You had to skip jujitsu for a couple of days. So that was a bummer, but I think you're on the mend, which is good. We did have a live chat yesterday in The Rebellion. We're recording this on Thursday when, with this episode to release tomorrow, Friday, June 21st, 18th, where are we at? June 18th. So, had a fun live chat yesterday as always. They always take twists and turns and explore various topics and-

Robb: Probably shouldn't be discussed, but we do anyway.

Nicki: Yeah. That's the nature of those. They're quite fun. I did want to share a little bit of good stuff coming up inside the Healthy Rebellion. As I mentioned last episode, we just started our new book club. We're reading "The Natural Navigator", by Tristan Gooley. Our rebel, Colin Walkie is leading us through that one. Next week on the 24th of June, one of our Healthy Rebellion moderators and fabulous Rebels, Sybil Cooper, is interviewing Katie Bowman about her latest book, so there's a lot of excitement about that interview coming up, which again, will be exclusive to the Healthy Rebellion community. And then coming up in early July where it'll be graced with- graced with grace, graced with the amazing talents of Sarah and Grayson Strange of Basis, New York for another summer strength program. So lots of good stuff coming up this summer.

Nicki: And then I just wanted to say that we weren't planning on this episode being a Salty Talk. We had prepared a regular episode for this week and as Rob was working his way through the questions, the very first question that I had in this episode, he said, gosh, I have so much to say on this; this could be an episode of its own. So we decided to just do this as a Salty Talk so we could kind of go, Rob could share all the thoughts on today's topic,

Robb: Speak, Rob, speak!

Nicki: Exactly. Which is again, why yesterday wasn't- you were coughing a little bit more yesterday, so it would have been a little bit more of an interrupted episode. So another good reason to punt till today. Okay, so we got a listener submitted question from Kelly about the new prescription requirement for N-acetylcysteine. She says, "Hi, Robb and Nikki! First, longtime listener, first time question asker. I recently read an article by Dr. Nicole Mercola," and she links to that article regarding the requirement that one may soon need a prescription for the amino acid trifecta, N-acetylcysteine. "I've been taking this for a while, just for general wellness, but now I'm pretty bummed that I have to get a prescription filled at the pharmacy and probably pay more for it. I'd love to hear your thoughts on whether the juice is worth the squeeze." That's a favorite expression of yours. Isn't it?

Robb: That's an interesting history in our lives. So, yeah,

Nicki: "And of course, I always love hearing some Salty Talk about why this is happening now when it was available over the counter for almost 60 years. I guess those pharma guys and gals need more money. Thank you both for your level-headed realistic applicable to real life people, health guidance, and your work is appreciated."

Robb: So, it's always interesting every once in a while, the FDA, the powers that be, just get a bee in their bonnet about, we have to take this thing away or that it's usually within these supplement realms. Generally it's kind of under the guise of safety. Like there was a deal with... A long time ago, back in the mid-90's I guess when tryptophan, there was a contaminated batch of tryptophan and tryptophan 5-hydroxytryptophan and things like that went off the market. People use those frequently as sleep aids because trip to fan is upstream of serotonin and melatonin and whatnot. But it was also, as I recall, I'm really, this is not really the topic of this thing today, but as I recall, tryptophan disappeared, just as some... antidepressants were going off patent or getting released or

something, but they work within the selective serotonin re-uptake inhibitor pathway deal.

Robb: And so there was some potentially nefarious stuff like that, but the n-acetylcysteine, its been on my radar a long time. It helps us to produce glutathione, which is one of the most important antioxidants in our body. There's kind of this interplay between glutathione, vitamin E, vitamin C, and other, antioxidants in the body to deal with oxidative stress. And so I've got a number of articles here. In trying to answer this question both... Is the juice worth the squeeze, I guess the question there is, if this thing is more important, if this thing is more expensive, is it still worth it to get it? And so I was trying to dig in and look at how valuable it was and then also like why would the FDA go after it? So I was assuming, or figured out, I need to look at two things.

Robb: One, what does it actually do, and then what's the toxicology around it. Clearly, there has to be a danger here cause everything is done for our safety. It's always for your safety.

Nicki: Always for your safety.

Robb: Always for your safety. One article, "N-acetylcysteine and Natural Products so Powerful it's Used in Hospitals," and it's from a site called "Pharmacy Times", which I don't think is an English-as-a-first-language website. It's great information lead, don't judge it on its grammatical errors. Don't judge me on my grammatical errors, I'm barely awake.

Nicki: Or your typos...

Robb: My typos, but it's interesting, it makes this case at it. It's got all these different uses and I mean, goodness, if it's used in hospitals, then clearly it must be very powerful and potentially very dangerous. The dangerous part is where it gets kind of interesting.

Robb: That's kind of a dubious thing, but I was trying to do a little bit of a compare and contrast before I dug into the toxicology of n-acetylcysteine I was like wow, what are some other things out there that have gotten the scrutiny of the FDA and were banned for our safety and whatnot. And so another paper from the New England Journal of Medicine, "Reduction in Ephedra Poisonings after FDA Ban" the number of calls to poison centers related to ephedra poisonings peaked at 10,000 and some change in 2002, and steadily declined to 180 by the end of 2013. Exposures resulting in major effects also peaked in 2002 numbering 108. Beginning in 2008, there have been three or fewer reports of exposures with major effects per year. The number of deaths peaked at seven in 2004. And then there have been no reported ephedra-related deaths since 2008.

Robb: So there was quite a brouha within the media, the FDA, et cetera, around a peak of seven deaths per year around ephedra use this within the United States. Seven people dying sucks, there's no two ways about it, and people were using this in kind of a knuckle headed way. But just as a compare and contrast on this and my co-pilot is not co-piloting particularly well today but this one is from, I'm not sure the journal, but it's, I'm pulling it from PubMed, but the title is, "Acetaminophen and the U.S. Acute Liver Failure Study Group Lowering the Risks of Hepatic Failure." Acetaminophen overdose is the leading cause for calls

to Poison Control centers, more than a 100,000 a year and accounts for more than 56,000 emergency room visits, 2,600 hospitalizations and an estimated 458 deaths due to acute liver failure every year. By enabling self-diagnosis and the treatment of minor aches and pains its benefits are said by the Food and Drug Administration to outweigh its risks. It still must be asked as the amount of injury and death really acceptable for an over-the-counter pain reliever. So the FDA lost its fucking mind over ephedra and had to ban it over seven deaths. A peak of seven deaths in one year, and it was fewer deaths than that prior to that. However, with acetaminophen, Tylenol, we've had just a year after year after year. So, a 100,000 calls to Poison Control through some amount of resources, dedicated to that.

Nicki: 56,000 emergency room visits.

Robb: And those emergency room visits would probably amount to far more deaths and far more illness were it not for n-acetylcysteine, which it's used in actually recovering people from liver damage caused by acetaminophen poisoning, which is something that we're going to get to in a minute. But this thing is downplayed and it's even within the FDA circles, it's kind of like oh, people can self diagnose their aches and pains and take care of themselves, and apparently they poison themselves in the droves. But why, and even in this paper, it's like is the juice worth the squeeze on Tylenol and acetaminophen? Well, if we scroll down to the next one, "Over-The-Counter Pain Medication Market will Exhibit a Steady 4%," What's the customer...

Nicki: C-A-G-R.

Robb: Which I forget what that is, but it's basically a significant growth through...

Nicki: 2008, 28...

Robb: 2028, future market insights. And this is from globenews.com. The over-the-counter pain medication markets are past, U.S dollars, of 18 billion in 2018-

Nicki: 18 billion dollars.

Robb: -with growth influenced by changing perceptions on generic pharmaceutical drugs, according to a recent study published by future market insights. The study opines that market revenue will rev up at an improved rate of 3.7%, blah, blah, blah. So it's basically, let's see here... As acetaminophen is considered as a safer pain medication than other pain relievers, its demand will continue to remain high in upcoming years, opines the FMI study. So now this market analysis is not just acetaminophen, it's like Neproxin and all these other... ibuprofen, lots of other things, but it's a big fucking market,

Nicki: 18 billion dollars in 2018

Robb: 18 billion dollar market in 2018. And yeah, this stuff is off patent and all that stuff, but it's an enormous market. So you start asking questions and this is, really try to keep my, my shit together here. But when people go on and on about safety, "we're doing this for your safety and that for your safety and you need to take these sacrifices for your safety." And then again looking at, when has the FDA intervened previously? Well, ephedra. We need to do something

about this. This thing is a dangerous substance. Yeah. Water is a dangerous substance.

Nicki: 10,000 calls to Poison Control versus 100,000 with acetaminophen.

Robb: Yeah, and that was 10,000 calls over the lifetime of the problem. Yeah, yeah. Versus a 100,000 a year and growing. Yeah. Okay. So we've got that. So I think in some ways it's kind of like smoking gun. So the question is around n-acetylcysteine and I'm kind of drawing this story around acetaminophen, but what's interesting is I had forgotten that n-acetylcysteine is used in, can you scroll up, in recovery of liver damage from overuse of acetaminophen. So, what I do on a ton of things, when I'm trying to figure out is this good or bad, or what's the risk-reward deal? I have certain questions I ask, if there's a disease, like Huntington's disease, something that I am always curious about is what is the evolutionary advantage of this thing?

Robb: And in certain circumstances like Celiac and Huntington's disease, or is a well-established evolutionary advantage to having it. There was also a trade off when we're talking about substances that we're consuming. And we're trying to think about, well, is this good or bad? I'm always interested in what the toxicology is. And the toxicology is a very imperfect science. Now that we understand some of the stuff that, that Brett has uncovered around, you know, telomere length in mice, it's even more suspect, but it's still it's a not bad place to go. But when, so what I wanted to know was how toxic is n-acetylcysteine. How dangerous is this stuff? I was trying to start instead of just searching "is n-acetylcysteine dangerous," start at somewhat first principles and then kind of work forward. What was interesting is when I would search for n-acetylcysteine toxicology, the only thing that popped up, the only shit that I could find, I still can't find an LD-50 on it.

Robb: Or I have one thing here in a little bit that that shows what can happen with overuse. And that's a whole interesting story in and of itself. But the everything you can find on the n-acetylcysteine as it relates to toxicology is its use in acetaminophen poisonings. So we have a link to this paper too, for the show notes, major use of n-acetylcysteine in clinical toxicology is in the treatment of acetaminophen overdose. The hepatorenal toxicity of acetaminophen is mediated by a reactive metabolite, normally detoxified by reduced glutathione. If glutathione is depleted, covalent binding to macromolecules and/or oxidation of bio-enzymes can lead to cell death. So it's remarkably effective. Can you scroll up a little bit... In dealing with liver issues? And that got me thinking, this stuff is really, really powerful works very, very well. And again, I'll circle back to where we might have... A problem with it, like where it can, there's a few clinical examples, clinical notes of where it's dangerous, but you have to super fuck up to make n-acetylcysteine dangerous. So...

Nicki: Rob's pissed at me cause I had to pause the recording temporarily to ask him a quick question and now I lost his train of thought.

Robb: You absolutely did. Okay, so where I'm going here is theoretical, it's a hypothesis, but basically why would the FDA suddenly jump on top of n-acetylcysteine? They also are looking at tryptophan and some serotonin, melatonin precursors of, melatonin's kind of in the cross hairs as well. And this stuff, it's all like super non-toxic, very beneficial if used properly. So I started noodling. Okay, I had forgotten a lot of the clinical utility around this stuff. And I

was like, huh. So this thing is used in recovery of damage to the liver. Well, that's interesting, because we're also in an epidemic of non-alcoholic fatty liver disease caused by metabolic disease. So I poked around a little bit on that, and there's a paper, "N-acetylcysteine Improves Liver Function in Patients with Non-Alcoholic Fatty Liver Disease."

Robb: Non-alcoholic fatty liver change is a common disease of the liver in which oxidative stress plays a basic role. Studies are largely focused on protecting the liver by means of an antioxidative material. The aim of this study is to evaluate the role of n-acetylcysteine in the process of liver injury, NAC resulted in a significant decrease in serum alanine, amino transferase after three months compared to vitamin C, which didn't really show any effect. In fact, this effect was independent of the grade of steatosis in the initial diagnosis. So non-alcoholic fatty liver disease is this huge problem it's growing everywhere. It's growing at exponential rates. It is incredibly costly because at a 10 stage you need liver transplants. It's super nasty. There's a piece from health.military, "Non-alcoholic fatty liver disease, an active component of the U.S Armed Forces 2000 to 2017. During the period 2000-2017, a total of 19,000 active component service members received and incident diagnosis of non-alcoholic fatty liver disease.

Robb: And it goes on to describe all the like morbidity, mortality costs, lack of readiness for service and whatnot. And since non alcoholic fatty liver disease in children, which is just a paper from the journal Pediatrics and it's increasing at exponential rates. So I'm just kind of noodling here, n-acetylcysteine is absolutely an outstanding treatment option for non-alcoholic fatty liver disease. And I'm just kind of speculating that there's some linkage to the increase of that disease, which also is completely metabolically driven and from our industrial row crop food system and modern hyper-palatable sugar foods...

Robb: All the stuff. It also looks like it's at least a reasonable stop gap intervention in dealing with this stuff. I can't help, but wonder... Do they want to bring this in as an additional treatment in a more codified treatment in non alcoholic fatty liver disease. Make it a prescription at a minimum, or does somebody throw like a methyl group on it? And now they've got a patented drug that does exactly the same thing, but-

Nicki: And you can charge 10 times the amount. Yeah.

Robb: And you can charge 10 times the amount for it. So that's shit that I would keep eyes open for. Do we have some n-acetylcysteine spinoff that is slightly tweaked and patentable, or maybe it gets mixed in some formulaic deal with like arginine or something, and then it's it's patentable. But I guess part of my hypothesis here is I would keep eyes open for some sort of a patentable form of this stuff emerging and yeah...

Nicki: So the best way to make that new patentable thing profitable is to remove any existing competition from over the counter.

Robb: Yeah. Cause you do oftentimes need IV, intravenous levels of this stuff to get a fully therapeutic dose, but not always. There's a lot of stuff that folks could do. And then we finally do get to, I think the last piece that I had, which there is danger to N-acetylcysteine, but it literally has to be in the hospital setting, in

which somebody is giving you a massive intravenous infusion of n-acetylcysteine.

Nicki: And the reason they're giving you that massive fusion is because you already have acetaminophen poisoning, correct?

Robb: Yeah. So you're already fucked when you're going to probably die of liver or renal failure, there was a possibility of n-acetylcysteine saving you and recovering you, but this is a piece, "N-acetylcysteine overdose after acetaminophen poisoning". In the long and short of that paper is that the person preparing the IV for administration for this acetaminophen poisoning, they were supposed to mix up a solution with 10 grams in the given amount, I think a liter, and it ended up being a hundred grams. And still the person got very sick, so it causes hemolysis and a bunch of other problems that amount of n-acetylcysteine, but it completely fixed the liver and other problems. I wouldn't say completely fixed, but it mitigated that in such a remarkable way that that was no longer the primary concern. It was actually the downstream effects of taking a legitimately toxic dose that was 10 times the expected amount.

Nicki: So this paper was based on just an accident?

Robb: This was a case report of an accident. So somebody fucked up, they gave the patient 10 times more n-acetylcysteine in a hospital setting in which you're already getting a massive dose. Taking 10 grams of it for a therapeutic purpose is already a big dose, but it's very safe. The person did 10 times that and the individual, [**Nicki:** That's a big oopsie] it was a massive mistake. So I don't know if this is particularly helpful to anybody, I think n-acetylcysteine is another one of these supplements. It's kind of funny, anything that really does work, anything that's actually helpful; they ban. They being the FDA and it's pretty frustrating. And historically the United States has been much more liberal in its treatment of nutritional supplements. You go to Europe, you go to Canada, much more tightly regulated, much more difficult to get things as simple as like melatonin and stuff like that.

Robb: Some people will cry foul because there are shady characters that sell a dream in a bottle. And I get that, that sucks. But I'm personally much more comfortable with the notion that people are informed and make decisions. And it's the same thing in, I'm more comfortable with more freedom than less freedom. And whenever this stuff, like the fact that way back in the day, the tryptophan, 5-hydroxytryptophan that stuff was taken off the market. It did eventually make it back on the market, but it was 20+ years. And a lot of people pushing for it because there were studies showing that it just tryptophan supplementation helped sleep and helped with stress and depression. And again, very, very safe. SSRIs are not safe.

Robb: People fucking kill themselves after taking them not infrequently. There are other libido downsides and other health downsides. And so it took an enormous amount of effort and pressure to get the FDA to roll back the removal of tryptophan-related products there. So I can't, it just doesn't make any sense. Again, when we consider, and what's ironic about this, they're going to remove n-acetylcysteine, but we're not going to cut into their $18 billion a year-

Nicki: Pain medication...

Robb: Pain medication, business. It's just bullshit. It's bullshit coming and going. And again, this is always couched in, "we need it. It's for your safety. It's for the people's safety it's for whoever's safety." And this too is just more bullshit, and I'm just at my, we have our internal discussions around this very much, at my wit's end around the way that COVID has been handled. Some of the stuff that's emerging around that and all of it for our safety. The virtue signaling of colleagues in this scene, well every life matters and you know,

Nicki: One death, one...

Robb: One, not even one death. And it's like, this is idiocy, you know, everything is a trade off.

Nicki: But then not looking at other deaths that are occurring that are downstream of... Yeah.

Robb: And I guess some... Kelly, really appreciate the question. Hopefully this was a decent answer. I don't know that we got to a solid stop point, but I would be very, very interested to see where n-acetylcysteine goes, both at if it gets modified in such a way that it could be a patentable drug or there's if a patentable delivery system that is used in non-alcoholic fatty liver disease. That is my prediction around where n-acetylcysteine goes. And in the meantime, it's most likely going to become very difficult for the average mux like us to get it, to just use it in general health and wellness and maintenance and all that type of stuff.

Nicki: And a lot of health practitioners who, their clients really, really benefit from it. Now they're left scrambling because it is so effective for people.

Robb: Okay. You can read your stanky ad now. Yes.

Nicki: That's why I paused in the middle because we need to read the ad at some point. I don't want to interrupt your flow, but then I'd already interrupted his flow by doing it so...

Robb: Yeah. I'm sorry. I don't want to interrupt your flow, but I'm going to interrupt your flow.

Nicki: So you were saving the ad for now.

Robb: You guys can just fast forward through, or maybe there'll be something in it..

Nicki: Something interesting in here. All right. So this Salty Talk episode of the Healthy Rebellion radio is sponsored by our salty AF electrolyte company LMNT. Grapefruit salts, the newest LMNT flavor is officially out in the wild and we're getting really great response. Jessica, on our team, says it's now her new favorite. And one of our LMNT ambassadors sent in a message that said, "OMG please replace my entire athlete order with just grapefruit. It is amazing." And I also have to say inside the Healthy Rebellion, Kristin, one of our rebels shared that this flav... she hates everything grapefruit. "I loathe everything grapefruit. I can detect it and everything, and I absolutely love this flavor." I think she said it was light, airy and refreshing. Just like you with your new haircut that I gave you yesterday.

Nicki: So another really cool part of this grapefruit launch is if you're familiar with the acapella group Pentatonix, they did a special LMNT inspired song, and we'll link to that in the show notes. Grapefruit is our first limited-time only flavor. So there's just a fixed number of boxes and then it's gone. Selfishly. I'm really hoping that everyone...

Robb: Nikki is going to be stockpiling that stuff.

Nicki: It is my favorite. So I hope that everyone loves it more than our next favorite flavor, which I think is either watermelon or citrus at this point. So that we might be forced to bring it back as a consistent flavor. But as of right now, it is a limited flavor. So grab a box of grapefruit or build a value bundle. You can build a value bundle of your favorite LMNT flavors. Just buy three boxes, you'll get the fourth free. Just go to drinkLMNT.com/robb. That's drinkLMNT.com/robb. Robb, anything else you want to say?

Robb: Well, your notes say "now a quick word from our sponsors."

Nicki: Well that's cause this episode was a little bit...

Robb: I know, I'm just being a dick.

Nicki: You are being a dick.

Robb: Well, No, that's it. Thanks everybody for listening. Hope y'all are well...

Nicki: Have a good weekend and we'll be back next week with a regular Q and A.

[in unison]: Bye everybody.