

How Does Alcohol Impact Your Gut Microbiome & Leaky Gut? | Dr. Andrew Huberman

For those of you that enjoy alcohol I again I I really I'd like to say I feel guilty about telling you this because I know how much some people enjoy a good drink every once in a while And I say a good drink because some people do like the taste of alcohol I suppose I lucked out and that I don't really like the taste of alcohol and that just puts me to sleep But I know that people do enjoy it And I do want to point out that there is zero evidence that you know provided somebody is of drinking age Certainly not in the stage of brain development that having one drink or two drinks every now and again meaning every three or four weeks or once a month that is not going to cause major health concerns or major health issues for most people I suppose if you have zero or very little alcohol dehydrogenase it might make you feel sick But then you're not probably not the kind of person that's going to be drinking at all So again if you enjoy alcoholic drinks I'm not trying to um take them away from you uh by any means but you should know what drinking does if you're consuming it in this kind of typical chronic pattern as we can now refer to it which is that one or two a night or a few stacked up on Friday and maybe three or four on Saturday this kind of pattern of drinking which is quite common And one of the more serious effects that we should think about is the impact on the so-called gut brain axis Or for of today's discussion the gut liver brain axis I don't think the gut liver brain axis has ever been discussed on this podcast maybe any podcast Although at the moment I say that I'm gonna you know the the gut liver brain axis people are gonna come after me with I suppose gut liver brain and brains In any event you have a brain you have a gut that gut runs from your throat down to the end of your intestine your gut and your brain communicate by way of nerve cells neurons and nerve connections the vagus nerve in particular And by way of chemical signaling your gut also communicates by way of chemical signaling and believe it or not by way of neural signaling too to your liver And as we talked about earlier the liver is the first site in which alcohol is broken down and metabolized into its component parts The liver is also communicating with the brain through chemical signaling and neural signaling So we have the gut liver brain axis And what you find is that people who ingest alcohol at any amount are inducing a disruption in the so called gut microbiome The trillions of little micro bacteria that take resident

in your gut and that live inside you all the time and that help support your immune system And that literally signal by way of electrical signals and chemical signals to your brain to increase the release of things like serotonin and dopamine and regulate your mood generally in positive ways Well alcohol really disrupts those bacteria and this should come as no surprise I mean earlier we talked about this and it's well known if you want to you know and sterilize something you might kill the bacteria you pour alcohol on it And I can remember scraping my um myself or cutting myself I was always injuring myself when I was a kid And you know the moment they take out the peroxide you're like oh boy here it comes But if there's no peroxide around and you've got a wound there and you need to clean it out Yeah they they'll use alcohol which I do not recommend by the way And that's one of the harshest ways to clean a wound But for centuries thousands of years really alcohol has been used in order to clean things and kill bacteria So alcohol kills bacteria and it is indiscriminate with respect to which bacteria it kills So when we ingest alcohol and it goes into our gut it kills a lot of the healthy gut microbiota At the same time the metabolism of alcohol in the liver which you now understand that pathway involving n ad acetyl acetyl aldehyde and acetate that pathway is pro inflammatory So it's increasing the release of inflammatory cytokines things like il six et cetera tumor necrosis factor alpha If you'd like to learn more about the immune system we did an episode all about the immune system You can find it Huberman lab dot com It'll teach you all the basics of what are cytokines what our mast cells et cetera in any event all these pro inflammatory molecules those are being released You've now got disruption of the gut microbiota as a consequence The lining of the gut is disrupted and you develop at least transiently leaky gut That is bacteria that exist in the gut which are bad bacteria can now pass out of the gut into the bloodstream So you've got a two hit kind of model here in biology We talk about two hit models that is kind of a one plus one equals four And it's generally when you hear two hit it's not a good thing So you've got bad bacteria from partially broken down food moving out of the gut the good bacteria in the gut have been killed You might say why doesn't the alcohol kill the bad bacteria In the gut Well the bad bacteria that are from partially digested food oftentimes escape the gut before the alcohol can disrupt them And so now you've got leaks in the gut wall you've got the release of this bad bacteria You've got inflammatory cytokines and other things being released from the liver and they are able to get into the brain through neuro what's called a neuro iun

signaling and what's really bizarre in terms of the way that this manifests in the brain I mean it's not the way I would have done it But then again as I always say I wasn't consulted at the design phase And anyone who says they did you should be very skeptical of them The net effect of this is actually to disrupt the neural circuits that control regulation of alcohol intake and the net effect of that is increased alcohol consumption So this is just terrible right I mean you take in something that disrupts two systems the gut microbiota and it disrupts in two ways it's killing the good gut microbiota and it's allowing the bad bacteria to move from the gut into the bloodstream You've also got pro inflammatory cytokines coming from the liver and those converge or arrive in the brain and create a system in which the neural circuits cause more drinking That's a bad situation And this is why people who drink regularly even if it's not a ton of alcohol Again of this sorts of patterns of drinking I talked about before And certainly for those that are chronic heavy drinkers what you end up with is a situation in which you have inflammation in multiple places in the brain and body and the desire to drink even more and to further exacerbate that inflammation and the gut leaky ness So this is basically a terrible scenario for the gut liver brain axis and it's especially prevalent in so called alcohol use disorder Again people they're ingesting somewhere between 12 and 24 drinks per week For those of you that are interested in learning more about the gut liver brain axis and in particular alcohol use disorder I'll provide a link in the show note captions and there's a wonderful review on this that details that but on the positive side it points to the possibility that at least some again at least some of the negative effects of alcohol consumption whether or not you're somebody who's currently ingesting alcohol or who used to ingest alcohol and is trying to so called repair these systems of the brain and body whether or not replenishing the gut microbiota is gonna be beneficial And we know that there are ways to do that and we know that there's at least some promise for the ability for the system to repair itself How does one do that Well I've talked before about this on the podcast but studies done by colleagues of mine at Stanford Justin Sonnenberg who's been on this podcast as a guest an amazing episode all about the gut microbiome and his collaborator Chris Garner also at Stanford School of Medicine have explored not alcoholism but what are ways to improve the gut microbiota in particular to reduce the production of inflammatory cytokines and to adjust what's called the inflamma You've heard of the genome and the proteome et cetera Well the inflamma is the total array or at least the near total array of genes and proteins that control

inflammation How can you reduce inflammation and make that inflamma to healthier Well they've shown that 2 to 4 servings of fermented foods per day And here I'm not referring to fermented alcohol I'm talking about low sugar fermented foods So things like Kimchi sauerkraut um NATO for the for those of you that like Japanese food Um There are others I know um things like Kiefer things like uh yogurts have a lot of active bacteria Again low sugar varieties of all these things Those are terrific at reducing inflammatory markers and at improving the gut microbiome one could imagine that either inoculating oneself from some of the effects of alcohol although I'd prefer that people just not drink alcohol chronically frankly or if somebody's trying to repair their gut microbiome because they ingested a lot of alcohol or because they had a lot of these inflammatory cytokines for many years or even a short period of time Regular ingestion of 2 to 4 servings of these fermented foods can be um quite beneficial I wanna make it clear that has not been examined specifically in the context of alcohol use disorder But because a huge component of the negative effects of alcohol use disorder are based in this gut liver brain axis and disruption of the gut microbiome in the inflammatory cytokines It stands to reason that things that are well established to improve inflammation status In other words reduce inflammation such as ingesting 2 to 4 servings of low sugar fermented foods per day Makes sense in terms of trying to repair or replenish the system One could also imagine taking probiotics or prebiotics Certainly that would work as well Although I've sort of favored the discussion around fermented foods and replenishment of the gut microbiome mostly because there are more studies that have examined that in humans and because of the direct relationship that's been established between doing that and reducing negative markers within the inflamma to