

WEBVTT Hello and welcome to another episode of the Yale Journal Biology Medicine podcast by YJBM is a pub med quarterly Journal edited by Yale medical graduate and professional students in peer reviewed by experts in the field of biology and medicine. Each issue of the Journal is devoted to a focused topic and through the YJBM podcast we would take you through the past, present and future of the issues subject matter. This episode is part of our series devoted to the June issue on medicinal plants. I'm your cohost Kelsie Cassell, a third-year graduate student in the Epidemiology Microbial Diseases Department, Co-host Felicia Hung a second-year graduate student in Environmental Health Sciences. Today, we're talking with somebody. Authors included in this issue, Tyler Ramsey, Kevin Chambers, Tibor Nagy, and Carrie Shropshire are co-authors of a review titled Essential oils and health, which drives into the complex, and both positive and negative effects. Essential oils can have on our human house. Would you like to go around and introduce yourselves? Give us some background and why you were interested in participating in this review. I'm Tyler Ramsey. I'm actually a or a former post Baccalaureate IRTA fellow at the National Institute of Environmental Health Sciences, and now I'm a third-year medical student at Campbell University, and I actually started getting interested in essential oils when I started at in IHS. And basically, we started with an original article. It primarily focused on adolescent girls with lavender oil products. And they were actually seeing symptoms of breast growth, and so that's kind of how I started with the essential oils and becoming a little bit of an expert in that field. And so then I kind of started with that and then was actually asked to do a Reddit Conference on essential oils with a couple of colleagues at other NIH institutes and the American Botanical Society. And now I was invited by Yale Journal Biology Medicine to submit a review article basically summarizing. All the health benefits of essential oils. Hello everyone, my name is Kevin Chambers. I'm a fourth-year medical student at Campbell University, so I'm going into emergency medicine for my specialty, but I've always had an interest in public health and also in psychology. So Tyler asked me to be a part of this manuscript, an eye kind of focused on the psychological aspects of essential oils. Obviously, essential oils are involved in a lot of different topics, so I kind of homed in on that and I hope you. Enjoy the manuscript. Everyone, my name is Tibor Nagy. I'm also one of the Coauthors with the paper with Tyler Ramsey. I'm a MS- at Campbell University as well. Interested in going to emergency medicine. I've been following Tyler's kind of Journey with central oils since the beginning of his time. At the NIH, we were colleagues back from undergraduate and Apple action state, and over the years I've been following what he's doing and kind of getting more interested in the research that he was doing and how it was affecting. For example, the endocrine systems. That he was studying, and, uh, you know the opportunity presented itself and Tyler asked us, not just me us to help him, kind of. You know, look at the literature and see the benefits of central oils and some of the claims that they were there are being made out there with essential oils and my part of the paper I focus a lot on the anti-microbial properties of the essential oils and that's kind of where my interested begin to grow. A lot. My name is Carrie

Shropshire. I am a third-year medical student at Campbell University with Tyler. I actually met Tyler my first year of medical school because we're in the same graduating class together. And we served in the student government together as president and vice president. So we formed a really close relationship with one another and became like the best of friends. And I learned a lot about all of Tyler's previous research with the NIH Justin discussions with him off and on, and was really impressed honestly, with all of his experience in research, and he asked me when they if I wanted to write this paper with him. And that's how I got involved in. It was just a really exciting opportunity for me and I was Really Looking forward to the opportunity with Tyler and thankful that he asked me to do it and so that's how got involved with this paper and focused on the anti-inflammatory and antioxidant parts of the paper as well as the insect repellent parts. That's amazing that you managed to suck all your friends into helping you, Tyler. Well, I felt pretty special with, you know, being recognized every time, apthas a goal and Researches. You are, you're right. I know cause when you're writing a review, it can be daunting with that many references. So uhm, as every reference you had previously worked at that and Is and are now in medical student, what was your experience transitioning from working then? I address and studying essentialist. Now being a medical student and then doing the Reddit AMA you get a different perspective as you move through these different worlds? So . I've had quite a bit of experience and you know, I think it's been pretty unique actually, because I came in as an undergraduate student of essentially Going straight up into NIH, that is a pristine Research Institute in so it was a big learning curve at the beginning where I was fortunate enough to have a pee that gave me a lot of free will to do what I wanted. Actually got my own project and got a first paper out of it, and so it was It was really interesting to start in that field with essential oils, but then transitioning a little bit I learned so much about it because I ended up doing An oral presentation and a press release on the essential oils with the endocrine society at their th annual conference in Chicago. Instead of that really kind of blew up with media. And so I really kind of had to respond a little bit and I got to see Kind of all different sides of the perspective of essential oils from the industry's point of view. To, you know, just the actual clear-cut science, and now transitioning from an original article to a review Been kinda doing a summary of everything It's kind of giving me a broad spectrum and so I think a lot of the times when you do see essential oils being portrayed in society, there always seemed in a positive view more than a negative, which they do. But I mean I definitely think that they should both be examined equally. Oh yeah, at least into my next question. So I was going to say that sometimes in the US, and maybe if you spent some time on Reddit after your AMA, essential oils are occasionally linked to multi-level marketing schemes which are also pyramid schemes. And sometimes I get sucked into like a negative connotation because of this, particularly in social media, and I wasn't sure what your thoughts were on using social media to like you just said shifting the understanding so that it is just a clearcut science and you are Accurately describing both the positives, but if it's an potential negative benefits linked to certain essential oils and you

clearly have a lot of experience being on Reddit and then you did I went through your Twitter, not night creepy way, but in like a nice way and you obviously answer a lot of questions on Twitter as well regarding essentials, and it seems like you made the most of social media to handle those questions Yeah, Reddit was definitely interesting. I do you think social media can be a little dangerous as well because what you say sometimes can be really misconstrued and you know be talking with the media lot Now you really have to be careful about what you say and so I do think that social media can be a good platform for educating the public about certain products. However, there are some that the ones that actively sell the essential oils as you think there's more biased towards it in that might be part of the problem with portraying. All the benefits and you know that pyramid scheme that you're talking about as far as sucking people in and believing this certain way away. To get around that is having more reviews such as what we did with summarizing the literature with all of the benefits and the risks. However, it might, we really might need to move towards more something like. A layman's terms because our article does do that with summarizing everything. But it's not for the general public because it's pretty complex stuff. I don't know if anybody else has anything to say about that as well I was just going to say that, uhm, you know It's important to engage everyone in the conversation about these oils and what they can do and what they can't do. You know, especially 'cause you want to take out stigmas and make sure that you explain people are aware of what they're walking into. So and I think social media plays a huge part in kind of engaging those people who necessarily won't Pick up a scientific article and read it from top, from beginning to end so you know kind of chopping it up into pieces so people can understand it makes it really, you know, easier for the information to be understood, so I think that's why it's important to engage as many people as possible because they know that it is a growing topic. There's more and more research in money being poured into essential oil, so that's how you can engage the General Society into you know, kind of making them part of the conversation. So as the Oak and it's a deal committed students is studying essential oils. Part of your education. Uhm, I can answer that and then someone can follow up if they want to, but I think a common misconception about dio students is that they practice holistic medicine in the sense that that means we study things such as essential oils and that is not true. We actually haven't that I can remember because we go over so much information so quickly touch on essential oils at all. Holistic means in terms of video student approaching the patient in. Every aspect of a disease and that comes with their mental health, their physical health. Um, including what may be wrong with him medically, such as various illnesses, including diabetes or hypertension, but really approaching the situation from thousand set back and taking this person and everything that can affect them in terms of disease. All the way down to what's going on at home and in evaluating them. In that sense, and wow That doesn't mean that it can't include essential oils because it definitely could come if you take a look at this article. There are potential risks, risks and benefits and they could be using essential oils in a way that could harm them or help them. That's how we learn to evaluate patients we

actually included in part of our training questions when we ask them about the drugs that they may or may not be taking and we have to go through the whole list and take their prescription medications. Over-the-counter medications and their vitamins. In supplements and this this article is a good way to show that you could honestly be asking patients. Do you use essential oils? Because there are risks and benefits associated with the use of them, so that's kind of how we learn throughout our education. Asedio students. And just to jump off that a little bit, you know the joke you always hear about medical school is. It's not like learning by drinking from a watering fountain It's more like learning by drinking from a fire hydrant. So kind of the approach medical schools take in our education is you want to learn the first line treatment or you know the most common things first, and then you know a side effect of that is some of these newer alternative treatments. Sometimes we don't get to. Focus on as much so you know sometimes it takes medical students like Tyler and those of us involved in this project to get a specific interest in order to further medical knowledge about that topic. But that's not to say that you know essential oils aren't worthy of being taught in medical school. It's just that you know, until their mechanism and their benefits are elucidated a little bit more. You know there are more sidelined at the moment, but not to say that that can't change in the future as more Americans University essential oils in their products and consider them more greatly. It sounds like you guys would be on the positive end of them, bringing that to their physician, like during their Wellness checks like mentioning. That they're using essential oils and then and then having discussion with their provider over the interaction effects and their age and their other risk factors that you guys point out in the article. Yeah, I mean, I absolutely think it's to the benefit of the patient for the health provider to know, you know, the possible effects in side effects that these essential oils of the patients are you using in specific when it comes to interactions with other drugs that they may be taken for their chronic condition or their acute conditions. You know, and it's a little bit difficult. As you know, future physician myself some a lot of the health claims are not scientifically validated in the literature and the side effects and interactions are not very clear, so it is harder for physician at the moment in time to really have a very detailed discussion about this specific essential that there taking and whether that is safe or not safe. And it does what it is being taken for. But there are growing studies and I think some of my colleagues you will talk a little bit more about some of the ways that they are studying these effects a little bit more. But you know, I think it's good for us to know, you know, to start kind of kind of uncovering, really how much people are actually using these things to know how big it is in terms of the usage in the communities that the physicians are practicing so they can kind of dig further and further understand what could be some of the benefits and effects of these essential rules. in going off of Tibor. I definitely think this is a good question because, uh, I definitely think this should be more incorporated with the position. Impatient an. I'll give you a good example of that. So something like St John's wort, which is a natural product is P- inducer. So basically what that means? Is it? Enhances the metabolism of some really

known drugs in South St John's wart's always been known to treat depression every bit, as well as some prescription medications, and so I definitely think that that's something that a position should be asking. Their patients because that's very powerful knowledge in guiding their treatment. How to prescribe a medication in a lot of things like that and so actually it's kind of funny. Also, that that um, questions come up as well because a lot of the pediatricians now are asking their population if they're on essential oils because it's become so well-known now that um, lavender and tea tree oil can cause breast growth in young males and young females. And so it was actually discovered by resident out in Colorado when he thought to ask that question. And that's kind of how all of this research began back in when it was published in the New England Journal of Medicine. That's fascinating. Going off of that, as he pointed out, essentials are extremely complex compounds and you start to get into it. In the review and which can make it challenging to study in Vivo, particularly if they are marketed as natural, so they don't have to go through certain regulations that, like Pharmaceuticals, have to go through. How I don't know if you came across this in this research, but how are scientists and clinicians and doctors designing trials to better understand essential oils and the pathways that they may affect in the body, and any positive and negative effects? Yeah, so I'll start with this topic and you guys can talk on it further, but you know essential oils. Their very different than traditional medicines and things that people study You know an essential oil comes from a plant An plants aren't just one compound, you know they've done studies and shown that some of these plants can have hundreds and hundreds of different compounds in there. So I think a lot of people have that conception of oh lavender. I can find some lavender and That's exactly what's going to end up in this essential oil compound, but it's not necessarily that simple. You know, you know. They've also shown that based on geographical location of the plant species, you know the timing of the harvest, the chemical composition of these plants can be very different, so even just narrowing down exactly which compounds they want to study is very challenging for researching these essential oils. Uhm, but I think in the past couple of years there's been an added emphasis on how do we standardize this process of collecting these essential oil samples just so that for future studies, the compound can be standardized across the board? And then you can do more legitimate research into effects of the essential oil and in terms of the psychological. Effects of essential oils. You know, a lot of the research has to be doubly blinded. You know the patient can't always be aware of what compound there being studied with because you know as a normal person you have knowledge of what a lot of these essential oils smell like. You know most people can . recognize the scent of lavender, lemon oil, so all of these substances already have a preconceived feeling or connotation for the patient. So that makes studying them a little bit more difficult because you know how much of it is the placebo effect bias and how much of it is the actual effect of the essential oil. But Luckily essential oils can be delivered, at least in In humans they can be delivered in a couple different ways. You know either the olfactory glands topically and they can even be ingested, so there's so many different routes for

using these essential oils that you know. Basically the door is wide open for people that want to do these clinical trials and things. You know, and I think we're getting to that point. In the past it's been more in vitro and animal trials, but you know, the emphasis now is growing towards human trials, and I think that's a good thing. You know in some essential oils are now being available in pill form like there's selects in which is a version of lavender that you can take in a pill form so that you can avoid. People who have trouble with the inhalation. You know, maybe some type of allergic reaction to. You know strong sense like that. They now have other options, but I'll let my coauthors touch a little bit on that topic as well. Yeah, so um and I'm sure everyone is aware that essential oils are comprised of hundreds of components and actually, uhm, the International Organization for standardization is tried to standardize essential oils a little bit. And so there are Even though there are hundreds of compounds depending on the extract of the plant, they mandate that certain percentages of certain Chemicals in the product are have to be in the actual product to label it as lavender oil or tea tree oil and so and then the rest can kind of be whatever the plant has. So I mean, if you if you go take um adjustments on any of these, you'll get different percentages of all of them, and that's kind of how we started my first article on lavender oil. We kind of went through and picked out those. High percentage chemicals that could be causing the breast growth in those young males and females and it is difficult to study these and so and there's a lot of controversy around studying these because what are the effects with in vitro versus in vivo versus humans? And so the only way you can really even figure out there's any activity to begin with is to start with an in vitro project and a lot of the National Toxicology program. Same natural anti did environmental health St that that kind of what their main goal is in the 1st place they take all of these environmental substances and basically analyze all of them at one time and well plates and so to even see if there's activity to progress that too and in vitro trial in the earning Bebo trial before you can even look to see if there are human effects at all. And even then, you've got chemicals that could have synergistic effects, and you're not really sure exactly what could be causing that. I did try and answer that in that last paper a little bit to see if there was any synergistic effects. If you had one chemical plus this one, did it elicit a higher response or a lower response? But that is definitely a very difficult question to answer. Yeah, so television earlier about prescribing like medicine and having like essential oils in mind when prescribing ink. So in a world that's increasingly pharmaceutical prescribing kind of just becomes a standard of my name medical interactions. So how do you all believe or would hope essential oils fit into this paradigm? I just want to emphasize that on average it takes at least years for a new medicine to complete the journey from initial discovery to the marketplace. With clinical trials alone taking six to seven years on average, and that's for Pharmaceuticals, as in marketed drugs, there are four phases of drug development that are part of that process, so drug development is really intricate, and it's a lengthy endeavor that is highly, highly regulated. In order for essential oils to be marketed in produced as a pharmaceutical is they would have to be manufactured and studied in the same way in hell to

the same standards as drugs are an right now currently, they absolutely are not, and so we would have to see the same kind of trend for essential oils that you see for Pharmaceuticals in order to market them in the same way. Well, in it's interesting also that the US is one of is a country that doesn't regulate essential oils and that actually has become a little bit controversial after publishing my first paper because the FDA actually did reach out to me specifically. Basically the summary of my data in what it showed because they were interested to see if you know essential oils are concerning. And if they actually should regulate it because there are other countries that actually do regulate all of their central oils because they are aware of some of the ramifications in adverse effects that could be caused by that. And so I do think that that's something that could be changed or could be changing in the future as the FDA continues to monitor that a little bit more. That was something that I was surprised about, because in the review it says that citronella is banned in Europe and Canada due to potential carcinogenic properties. But here in the US we still market citronella candles. Is like a really effective way and like Safe way compared to DEET. I guess a lot of things are safe but a Safe way to keep mosquitoes away from you during the summer. So I don't that was interesting because you would never know, and you trust things that are generally in the store I think. Um reveals that the US might have a different process for that. OK, so, like Tyler was saying here in the United States, the Food and Drug Administration does not regulate essential oils and you can look at that in the same way that they do not regulate dietary supplements. They're just produced input straight to the market and that could be a huge problem. I think it's easy for people to visualize that in terms of dietary supplements and things that have gone wrong. With things like weight loss, dietary supplements that I just put out there and people being harmed by those um, specifically back to citronella in our paper, we mentioned the compound that is internal methyl eugenol, and it has been found to be a known carcinogen to Animals, and it has been mentioned in the United States to be anticipated as a carcinogen to humans, yet it's sold on the market in products such as diffusers, natural bug repellent. Um herbicides and candles. As you mentioned before, and something that most people learn, if they take science at any point in their life as if you smell it, you've been exposed to it. And so I think most people can think up about a time where they've let a citronella candle and smelled it, and so a lot of people have been exposed to methyl eugenol, which is has been found to be a carcinogen, so I think it presents problems, both dietary supplements. An essential oil should be regulated prior to being placed on the market and that we are lacking quality research overall in the field of essential oils, with it taking of- recently in the past few years so hopefully will be able to start develop readily available resources like previously mentioned, I think by Tibor that are in Layman's terms for consumers to have that clearly outline risks and benefits of the products they're using. Before they choose to purchase them. Laws we wrap up. I just wanted to comment that your manager was pretty unique in that. Uhm, it feels very clear and accessible. Explanations of essential oils, especially to people like me who don't really know that much about them, and you go through like very systematically. Both the

positives. An potential drawback to certain essential oils, so it made a great root for anybody who is interested in learning more about the chemical makeup. And since it's such a long review, people can go back through and read the actual site. References and links to the original materials. They're interested in learning more, like I always get this question every time. I yeah, get asked from the media. Do you suggest Americans get cut back on essential oils or my opinion towards it too? I don't know if you want to ask that controversial of a question though. I think it's a good question, I think. Yeah, I think that uhm Americans should give regulate their use of essential oils, especially given how many products that we use every day. It could be in. So typically the answer I give with this to stay more in the middle is that I think that Americans should be way more cognizant of what they use every day and it kind of goes to show that chronic use of essential oils. And for that matter, anything usually is the culprit for the adverse effects and so. Are most of the adverse effects that are ever seen are usually a chronic usage of essential oils, and so the health benefits as far as essential oils go. I mean, I mean there have been quite a few of them, but I do think that a lot of the times when you over use a product you can definitely get an adverse effect from it, and so I would probably caution. Them, or Americans in general about. You know doing their homework instead of, you know believing what someone else says about something. In the UM tea tree oil article that you mentioned, that was really what spurred a lot of this. How much tea tree oil were they using? Or did they suspect was being used to lead to negative effects? So most of these, most of the people using the lavender oil and tea tree oil were using it every day or multiple times today in multiple different products. Most of the time. So they were using lotions or Cologne. It was constantly being used every day. There are a few exceptions, such as like a TI um teachers diffusor where you did see breast growth. With that being removed from the classroom, the breast growth actually did regress, so there are a few exceptions where you know you can just have the inhalation of something. And it calls that kind of problem, and so that's where it's kind of Sparks an interest. If it's a genetic component, or is it an epidemiological one where you know you have certain groups that you do use them more often or are they more susceptible to it and it could be a combination of both and so that's where it's really interesting. And I definitely think that's where research should be taken a little bit more, because we don't know. We don't know that at all. I wanted to add one more thing like a rap up. I think at the end of the day it's about the safety of these essential oils. You know, it's how true are these health claims when one of the side effects where the active ingredients, right? And I think as scientists and future health care providers, it's our job to get those answers. So and I think you know these kinds of publications. They kind of open the doors for more. Scientists are pouring their time and dedication to us so we can have these answers so we can. No discover more and more about these oils, so I think that's kind of the point of all of this is really to look for those answers. I wanted to thank you all for being here and I'm it's really nice to interview fellow like students who are still in the middle of their study who taking the time out to write a review because it's just nice to showcase student work. So



thank you Tyler. Kevin Tibor and carry for joining us today. There are many people behind the scenes that you never get a chance to hear today. That was kind of Felicia because she had poor Wi-Fi. But thank you Yale medicine for being our home for YJBM in the podcast and thank you to the Yale Broadcast Center. Helping with editing and publishing our episodes and also like to thank the YJBM editorial board, especially their editors in chief Amelia Hallworth and Wei Ng also like to thank Kavita Israni-Winger and Nathan Bechtel ,who were the deputy editors for medicinal plants issue and they were the ones who originally reached out to Tyler to even write such an interesting review. Finally, thanks to you ,the audience for tuning into this episode of the YJBM podcast, we love to hear your feedback and questions of real free to tell us your thoughts by emailing us at yjbm@yale.edu. If you enjoyed our podcast, please sharing on SoundCloud or SoundCloud or Apple podcasts.