The Second Brain: Gut Health and You with Dr. Gerard Mullin

It's been called "the second brain," but our stomachs get nowhere near the respect they deserve. Only now are we beginning to realize the vast implications of a healthy gut. The latest research shows that the composition of bacteria in our gut have an enormous influence on everything from brain health to weight. Together with our guest **Dr. Gerry Mullin** we'll discuss how gut microflora influences our health and what we can do to improve it.

Full Transcript:

Priya Menon : Good evening, everyone! Hello and welcome to Cure Talk. I am Priya Menon, Scientific Media Editor at Cure Talk, joining you from India; and I welcome all of you this evening to a discussion on how our gut health can influence our well being. This is our 89th episode. Nutrition and diet are popular topics on CureTalks , and today we are going to attempt to tackle the question of whether gut health has an influence on our health. To do so, we have with us a very distinguished expert, Dr. Gerry Mullin. Dr. Mullin is a gastroenterologist, nutritionist, and associate professor of medicine at Johns Hopkins University, where he also directs Integrative GI Nutrition Services. My co-host of the evening is Julie Dulude. Julie is a professional writer. She has been writing professionally for over 15 years, both as a journalist and as an advertising copywriter. As someone who has experimented with veganism, raw fruit juice, and water fasting as well as GAPS and Paleo diet, she..., she is well versed to be moderating the discussion today. Towards the end of the discussion, we will be answering questions sent in via email by our listeners. If you want to ask a question live, please press 1 on your keypads to let us know and we will bring you on air to ask them. With that, I will now hand over to Julie to begin with the discussion. Julie, you are on air.

Julie Dulude : – Okay. Thank you, Priya, and thank you, Dr. Mullin, for being here today. Can you hear me okay?

Dr.Gerry Mullin : – Uh…. Not…, not too well, unfortunately, no. I heard Priya very well.

Julie Dulude : Let me try again. How's this?

Dr.Gerry Mullin : Its a little better. Thanks.

Julie Dulude : Okay. I'll do my best. I need to call back and let you know or shall I just do that now?

Dr.Gerry Mullin : Maybe it…, it… Yeah, maybe. Well, let's give it a go. Let's give it a go.

Julie Dulude : Okay. Fifteen years ago when the human genome project was launched, people thought that it would lead to the creation of gene-based therapies that would cure modern disease. That never happened because as it turns out, genes only influence about 10% of all disease. The remaining 90% are influenced by environmental factors, one of which is your microbiome. Only now are we beginning to realize the vast implications of a healthy gut. The latest research shows that composition of bacteria in our gut has an enormous influence on everything from brain health to weight. So, Dr. Mullin, the word "gut" is not a sexy word, is it?

Dr.Gerry Mullin : Well, to a lot of people, it…, it represents a number of things, right? It represents a digestive tract, to other people its a matter of intelligence and intuition, fortitude. I mean it has a lot of different implications, but you are right. Its…, its…, as Rodney Dangerfield was saying, in all respect, people really, you know, by and large have a variety of connotations and some of them are negative.

Julie Dulude : So, what's the difference between gut and microbiome, can you divide those for us?

Dr.Gerry Mullin : Well, you know, the microbiome is the…, is the collection of microbes within our gut and we are talking about trillions and trillions of microbes that we harbor within our digestive tract.

Julie Dulude : And the gut is the place where they live?

Dr.Gerry Mullin : Yeah. They live all over us. They… They are in our skin. They are in our, you know, our respiratory lining, our urogenital tracts. We are surrounded by them.

Julie Dulude : And the microbiome is referring not just to the bacteria themselves but to their specific genetic material. Is that right?

Dr.Gerry Mullin : You know, that's very interesting, that technically by definition the gut microbiome is the collection of genetic material. There are really codes for the functions of those bacteria. In fact, you know, ultimately a lot of them control how our genes are expressed, but it is really the…, the technical term does refer to their genetic material. That's correct.

Julie Dulude : Yeah, I felt that was kind of interesting. Let's cover a few other basics. What is a healthy gut and how do you know if your gut is healthy or not?

Dr.Gerry Mullin : Although its a very good question, a healthy gut is…, really is a collection of…, of…, jeez…, I mean its a number of different organs that come together to provide a number of vital functions. Right? One is to digest our food which we think, some of us, that that's the…, the only function but not only to do with that, but its to really harbor this collection of intelligence that really controls many of our physiological functions. So, its a combination of digestive functions in harboring the microbiome which really interacts with the rest of our body.

Julie Dulude : And what are some personal key signs that would tip you off if you either have a healthy gut or an unhealthy one?

Dr.Gerry Mullin : Well, you know, for some people, its the…, its actually having different digestive complaints like indigestion, gas and bloating and…, and altered bowel movements. For others, it could be having migraines and different symptoms outside the body. When we say outside the body, outside of the digestive tract.

Julie Dulude : Right. So many of these things, we would just, you know, say, "Ah, that's just the way it is." I mean people are kind of used to living with all those symptoms, most of them.

Dr.Gerry Mullin : Yes. Well, I guess…, I guess people become conditioned like with back pain or rather conditioned…, they…, it becomes part of their life. It takes over their life as well.

Julie Dulude : The focus of your book "Gut Balance Revolution" is on the link between gut bacteria and obesity. What do the studies show about gut composition of obesity as compared to those of normal weight?

Dr.Gerry Mullin : Well, what's interesting is that the people who are overweight, unfortunately they harbor a very narrow spectrum of different bacteria and microbes and some of those microbes tend to really hold on to calories more. They absorb more calories. They actually process foods more, hate to use the word "thoroughly," but…, but they are more efficient at fermenting certain carbohydrates which ultimately means they are going to hold on to more calories. So, you know, the…, the bacteria are different in, you know, people who are overweight versus people who are more lean.

Julie Dulude : So, certain kinds of bacteria help you lose weight and other kinds actually make you retain it.

Dr.Gerry Mullin : Yes. I would say that's fair.

Julie Dulude : What kind of bacteria are in our gut and what kind of bacteria should be in our gut? Is there… Is there kind of an average or does that vary a lot from person to person? Is there an ideal, I should say?

Dr.Gerry Mullin : No. They say about 90% of the bacteria we all share, its about that 10% that really makes a difference. You know, it all depends on the number of antibiotics we are exposed to and the kind of foods we… That's… That's where really… That's where it really counts and, you know, it will…, it will change with aging, you know, being in the hospital, all those things will really change the bacterial composition, but by and large, a lot of us have very similar, let's say, spectrums and species of bacteria.

Julie Dulude : These are the things like being in the…, in the hospital, do they change your gut bacteria irreversibly or can you, in fact, reverse the process back to the health you enjoyed when you were…, you were young?

Dr.Gerry Mullin : Well, you know, with…, with, you know, when you are young, you know, the microbiome just gets really laid down in the…, your early years and, you know, when you are in the hospital, depending on what age that, you know, you are in the hospital at, you are getting antibiotics, the food isn't as good, there are illnesses involved, things that you catch from other patients including C. difficile and those things will change the…, your own colonies when you leave and it depends, you know, you can rebound. Question is how long and I think that how long really depends on what happened to you in the process, you know, were you on a lot of antibiotics, did you get sick in the hospital, so on and so forth, but even just being on the course of antibiotics, that…, that…, that can take a while and there have been studies showing up to two years after getting a…, a course of clindamycin, so, you know, it all depends, but there…, there is…, it does require some…, you know, some recuperation.

Julie Dulude : Well, that was my next question. I think you pretty much answered it, which was how hard it is to change our microbiome and how long it takes. It sounds like it really varies from person to person and what their individual health history has been, but what kind of program, just on a general level, do you put people on who want to lose weight or…, or improve their health?

Dr.Gerry Mullin : Well, I mean, what I talk about in the book is really a way of looking at health through the lens of the…, the gut and its really by treating your gut better, which is by eating correctly and also evaluating the…, the biome in terms of, you know, one's health history, which we do want to move on in and suggesting that people kind of hit the reset button, like I talk about in the book, and really we cultivate a…, a garden that really can grow a good biodiverse inner ecosystem.

Julie Dulude : Can you go into what eating correctly means a little bit more for our listeners, maybe just sort of top three things that you could do to improve your gut and the top three things that can…, are harmful to it?

Dr.Gerry Mullin : I mean, certainly to me, drinking sodas that are really, you know, high-sugary sodas that are very high in sweeteners that will spike your blood sugar and also really harm your gut bacterias is…, is probably one of the leading things. Second leading thing would be the indiscriminate use of antibiotics, which unfortunately happens very commonly in the pediatric population that they over prescribe. So, I think that would be #2 and, you know #3, just a very standard western diet of eating fast food. I would say those are the three top things that come to mind that are hurtful. Things that are helpful I would say are, you know, fiber-filled fruits and vegetables, fibrous whole foods certainly are…, are at the top of the list and also having foods that are rich in live bacteria like fermented foods, like kefir and yogurts that are not loaded with sugar and all your fermented foods like pickles and sauerkraut. Those are things that are really, you know, good for the gut in…, in many respects and the third thing, I would say is that we should be, you know, thinking about lean sources of protein that are not raised with antibiotics. That way we…, we don't, you know, continue to add antibiotics, let's say, in red meats because they have detectable antibiotics in them. I think those are kind of like the top three ways I look at this.

Julie Dulude : Yeah, back to your comments about the standard western diet, I remember a…, a statistic in your…, in your book which really jumped out at me that said, 75% of the food we eat in life has limited or no benefit to the microflora in the gut and I just thought, wow, that's really astounding. So, you know, what are we eating that actually is helping us?

Dr.Gerry Mullin : Yeah, that was Dr. Ben Bark who made that comment and I guess that… that there is when you look at the western diet, its very high in, you know, refined foods which are really not good for the, you know, for our gut.

Julie Dulude : Yeah. Something…, something that surprised me because I think a lot of people are starting to learn about antibiotics and that they can really disrupt the bacteria of the gut, but something that I read about recently that really surprised me was that emulsifiers like carrageenan can really cause dystyosis as well and, you know, that and many things including boxes of…, boxes of coconut milk, you know, that you might find at Trader Joe's or whole foods that everyone thinks is so healthy. What do you think about emulsifiers and?

Dr.Gerry Mullin : There was a study that came out, it must have been about four months ago at this point, which showed that the emulsifiers had an adverse effect on the microbiome, just like Aspartame and artificial sweeteners disrupt the microbiome. In fact, the studies show that these substitutes that people eat that they use to sweeten their beverages, you know, actually are making people diabetic, which is what you are, you know, you are looking to avoid by giving, you know, you are avoiding giving sugar and…, and high-fructose products and you are giving instead these artificial sweeteners which themselves are given to diabetes that you are concerned with, which I…, I found to be quite interesting.

Julie Dulude : Yeah, so, you mentioned fermented foods, let's talk about that a…, a little bit more. You know, probiotics are fermented foods, is one better than the other? Do you even need to take a probiotic if you are eating fermented food?

Dr.Gerry Mullin : That's a good question. The…, the fermented foods depend on what you are getting. I mean if you are going in the…, the middle of your aisle and you are getting, I don't want to pick on Heinz, but if you are getting Heinz pickles that are sweetened with high-fructose corn syrup, I don't know how helpful that's going to be versus if you get something that's really at the farmer's market that's freshly made, let's say, or kefir. If you get organic kefir that's freshly made, that's going to be really much better for you than you get something that's doused in high-fructose corn syrup. So, again, source is really important and composition is important, but yeah, there is…, there is like yogurts too, same thing, I mean the best yogurts available are the ones you make at home. Those are the ones that have the most live cultures versus the ones you get in the stores, that are heat killed.

Julie Dulude : I was going to ask you about that. So, I mean, are there… Is it… Is it about the sugar that's in them or is it about the pasteurization? What is it that, you know, makes…, makes cultured foods that you make at home so much more potent than ones you buy in the store?

Dr.Gerry Mullin : Yeah, I mean the ones… You are right. The ones in the store are heat killed and they add the cultures back and they are just… They are not as… What's the word? They are not as hardy than what you can make on your own, let's say and, you know, in a kefir, you make that… Actually in the store you can get, you know, billions of live bacteria from the right brands of cultures. With kefir, yogurts is more variable and you are right, if you have, you know, a good-cultured, fermented product, you don't need to pick the probiotics in supplement form.

Julie Dulude : Okay. So, maybe it is worse, although…, although we are extra worked that people are going for, although like you said making kefir is pretty simple. Its just kambucha and stuff that's harder. One thing I was surprised about in your book is that you tell people its okay to drink coffee and I am sure that comes as good news to many people. Not only do you tell them to drink it, you recommend four cups a day and I…, I just thought, I question that because I guess my understanding is that coffee promotes biosis of the gut

because it creates an acidic environment and could you explain that a little bit?

Dr.Gerry Mullin : I am not sure about that statement, you know, in terms of whether it causes…, I mean I know coffee can be acidic, you are right. Some people tend to balance it out with whether its dairy or some type of milk. So, I…, I really haven't followed the…, the acid-base status, let's say, of…, of…, of coffee and/or the beverages that are added to it, but in terms of metabolism and in terms of the polyphenols and the antioxidants and their health benefits, yeah, its what I talk about in the book that its considered by some in a beverage form to be a super food, but everybody, you know, there…, there are certain amount of limits that should be imposed, particularly since its caffeinated and, you know, some people are quite sensitive to caffeine.

Julie Dulude : Moving right along, how does gut bacteria influence your immune response? What's the relationship there?

Dr.Gerry Mullin : Well, they…, they really teach our immune system and educate them from early on and they continue to really regulate the immune response. So the healthier our gut bacteria are from earlier on in life, that the more sophisticated, the more trained the immune system becomes and that's why probiotics by and large help people or probiotic foods because that acts on our immune system and makes it healthier.

Julie Dulude : Would it be fair to say that your microbiome is a switch you can use to influence the genetic expression of desirable or undesirable traits?

Dr.Gerry Mullin : Yeah, I mean, you know, if the bacteria are that spark, you know, to know what's desirable and undesirable, but they do really control the expression of so many of our genes. In fact, that's ultimately probably how also they determine leanness versus, you know, being overweight. Is that through metabolism? Right? They…, they switch on and switch off our metabolism and so many other vital functions throughout our body, but, you know, the most fascinating to me also was immunity because we have so much of autoimmune disease out there and, you know, lot of its the genes we carry but also how the genes interact with the environment and its interesting how the probiotics can actually help correct that to some extent in certain conditions and help re-regulate our immunity.

Julie Dulude : Can you talk a little about what the research says about specific diseases and what bacteria, the people with those diseases are lacking? For example, I read that kids with autism show lower than normal levels of bacterium, I am sorry, Bifidobacterium and the food allergies can be reversed with Clostridia. I don't know if…, if that corresponds with what you read, but what…, what links are being investigated that you can talk about?

Dr.Gerry Mullin : Well, I mean ulcerative colitis, for example, is one and irritable bowel certainly are two things that jump out at me that, you know, with…, with… and the third thing in the book talks about diabetes and obesity, right, is that clearly with diabetes and obesity, they are finding lack of the same Bifidobacteria that…, that you had mentioned previously and…, and with…, with…, with the other two conditions, ulcerative colitis and irritable bowel, there is meta-analysis looking at probiotics and their efficacy for those conditions and the net average of those meta-analysis together even though the date is not very strong, is strong enough to say that there is the recommendation one can make to use probiotics to…, to help improve the condition, I mean just like any other, you know, analysis, meta-analysis is going to be a variation, so there is not like an absolute rule and there is confusion with probiotics about what species to use because we are all individuals and its hard at this point in time to say which probiotics is going to work best for any condition or any person, but just the fact that by enhancing the…, the diversity of the microbiome, there is some type of improved outcome, I think, really speaks volumes that once we really manipulate the microbiome, improve the inner ecology, that you can actually influence disease outcome.

Julie Dulude : Maybe its a good time to…, to…, to mention any tips you have to people about how to choose a good Probiotic. In fact, one thing, you know, corresponding to what you said that I heard, that I heard is that its good to rotate them.

Dr.Gerry Mullin : Well, you know, the…, the thing is that just like anything else the body gets used to something, not to say that you can develop resistance to a Probiotic is that if you want to really enhance the benefit, I believe that you really should, you know, rotate your probiotics in general, but there is not a lot of data and looking at that, but a lot of clinicians that I know do that for their patients and…, and I as well.

Julie Dulude : Okay. What about exercise because, you know, your book isn't all about food. What role does exercise have on your gut?

Dr.Gerry Mullin : You know, its a…, its a good question. Its really great for motility and really for stress reduction and, you know, you want to have…, you want to be in a…, how shall I say, a really relaxed state, the parasympathetic state in the gut and have really proper, what they call, vagal tone so they would be in a relaxed state. Exercise really puts people ultimately in…, in that really better mode, releases the endorphins, really helps reset our nervous system to some extent and that's going to ultimately benefit the gut and that's why its really a part of, you know, the program because its not all about burning calories. Certainly, its really about maintaining overall health and well being.

Julie Dulude : So, this actually has a direct influence on your gut or is it more just about, you know, creating a sense of well being so that, you know, you can get healthy?

Dr.Gerry Mullin : Well, direct effects may be on movement and motility and also it may help biodiversify the flora itself as a result of exercise and certainly stress, kind of the opposite, that's been associated with more of a lower spectrum of biodiversity and even some pathogens. So, if you look at the polar opposite, is the…, you know, the stress state where they have got to moving well and certainly the blood flow is not as good to the gut under stress conditions and the bacteria that they colonize are…, are more or less less friendly than what you desire.

Julie Dulude : Okay. At the beginning of the show, I alluded to, you know, the human gene…, genome project and how much people put their hopes into that. Do you think that the…, that microbiome research will provide the cures that the human genome project didn't? Its certainly the hot topic right now, I mean everyone from, you know, Dr. Perlmutter to you to…, well, you name it. Its very promising area of research.

Dr.Gerry Mullin : Yeah, there is…, there is a lot that we are learning. I guess ultimately the question is what's going to be…, how's that going to help change the way we approach people in terms of therapy and some people will talk about fecal transplant, other people would talk about genetic engineering, but ultimately the more we learn about the way these microbes influenced our health and understand those mechanisms, the more we can understand how we can actually help people. I mean, I am more for natural medicine through food first than, but otherwise there is…, there is probably, you know, powerful ways to make…, give those effects once we learn how those bacteria control us.

Julie Dulude : Do you think that most modern disease originates in the gut or would that be an over simplification?

Dr.Gerry Mullin : Well, you know, in Ayurvedic medicine, that's…, that's been the belief for centuries, right, that all disease begins in the gut or begins as a breakdown in gut function and, yeah, I mean though if you look at functional medicine, naturopathic medicine, you know, they have similar tenets that they breakdown in the microflora and the barrier are ways to, let's say, that's where disease begins and I would have to say that given the systemic manifestations and effects of the gut and the microbiome on physiology, there is…, there is probably a lot of truth to that, but I think, you know, wellness and illness is a lot more complex and its clear that the microbiome is playing a role in both…, in both realms.

Julie Dulude : If people want to check their gut health, are there labs that you recommend? Have you…, have you heard of or do you recommend _____[00:28:37]____ like u biomes?

Dr.Gerry Mullin : You know, that's very interesting. The… As you are probably aware of, I don't know

maybe about five or so years ago, you know, there was a company that did testing with, you know, genomics, you know, bacterial genomics and unfortunately the…, the validity of the testing was…, did not bear out, although that I…, I…, I understand has been since corrected and so now we see there are some companies that…, that do that and look at, you know, different metrics like biodiversity, you know, more sophisticated metrics that have the validity. The question is is that what do we do with that data? You know, is it…, is it really FDA approved? Is it something that insurances are going to, you know, cover, so on and so forth and, you know, that's really hard to say. It will be nice to see outcome studies that…, you know, using a stool test and then taking the stool test and then, you know, you…, you do x, y, and z and that you have a clinical impact, that would be real interesting. I haven't seen that yet, but you are right, there is…, there are a few companies that…, they are offering bacterial genomics in the stool that provide you with a variety of different data points for people to consider.

Julie Dulude : Yeah, you have briefly mentioned fecal matter transplants which are being studied in critical and not clinical trials right now for certain illnesses. What are your thoughts about that? Is it the same end goals that influence gut health?

Dr.Gerry Mullin : Well, you know, with C. difficile or Clostridium difficile, its had a tremendous impact because you are looking at an infection that's largely acquired in hospitals but not always, generally with antibiotics that changes the flora and the flora is disrupted and that more and more on occasions we are seeing people who are not amenable to the standard therapy which is other antimicrobials and, lo and behold, you know, over a period of years, people, you know, who thought it was very kooky to start transplanting fecal matter from other people, now it appears to be a 93 plus percent cure. To do that, once you screen out the stool, of course, for all kinds of possible infections and for those people who have received it, there…, many have been lifesaving and in fact they find that the flora that they acquire from the donor tends to take over and its…, its…, its a permanent change, but there is a lot of genetic material that's also being donated that I don't know if there is a way to screen or what is being donated and how that interacts with the new person's genes, the recipient genes, but Dr. Larry Brandt in the Europe who reported on this a few years ago, 89 cases of C. difficile found that for those people developed autoimmune disease who received the fecal transplant, now there is…, there is much larger reviews that are out there and I don't know if they share Dr. Brandt's experience, but, you know, its…, I guess that's…, that's where, you know, my concern would be is if that, you know, something that continues, you know, on a larger scale that has to be studies, but also there there is a case report and it was that of national meeting I think down in Washington a few months ago where a recipient from an overweight individual received the fecal transplant and that person was lean and subsequently became obese. Just like in these…, in the book I talk about these animals experiments where they start transplanting the feces from a lean person into a, you know, let's say a bigger rat and vice versa and you can start using up the microbiome to actually make another rat that was lean, now obese and so on and so forth, but its happened in the humans, so is it just one coincidence or does that have to be studied as well, so what I am saying is that, you know, before we start talking about that in large scale for all kinds of things, the FDA is very cautious about that and I think rightfully so that you got to see what the…, you know, more long-term effects are.

Julie Dulude : Yeah, most people probably wouldn't think beyond just, you know, being quietly grossed out to think about actual risks of that.

Dr.Gerry Mullin : Yeah, yeah, and…, and, you know, there's companies that are…, that are purifying as you…, as you are very well aware of, that they are looking at all kinds of ways of…, of doing that commercially, so its not all about, let's say, a donor who you are getting the poop, which is the…, the common way of doing it. Someone comes in, they donate after they have been screened and they…, they put it through a filter, they…, they prep that right there on site and they…, they do it right through the scope, I mean they are looking at all kinds of ways to do it. So, I think its a matter of, you know, looking at the technology and understanding better about what we are doing in the process and seeing if there is a better way to do it and I think that's part of what science is about.

Julie Dulude : For the people who are following your protocol, I mean can they achieve as…, as a optimal

result as a successful fecal matter transplant? I mean, do you…, do we really need…, should we just reserve that for extreme cases even after its, you know, gone through FDA approval?

Dr.Gerry Mullin : Well, C. difficile is…, is a life-threatening disease and if someone's refractory to standard therapy with either vancomycin, Flagyl, or a combination of that, they are going to…, they are going to need to consider the…, the fecal transplant. My…, my program is more about…, is more about prevention and for people who really are overweight and they are frustrated and they have done the counting-calorie things and it doesn't work, which it doesn't for a lot of people and ultimately 95% of these diets fail, then that's food is not for this sick person with C. difficile disease who really needs aggressive intervention.

Julie Dulude : Right. We are a very long way from, you know, using fecal matter transplants for weight management.

Dr.Gerry Mullin : Right. Exactly. Now, I… Believe me, there's…, there are people who are going to look to do that. And I won't be surprised if people are doing it actually, even though that's…, that's illegal, I mean who knows!

Julie Dulude : Uhmm… I am sure that we have a number of parents tuning in tonight and so I would like to talk briefly about kids and, you know, in your book you mentioned the importance of…, well, you mentioned how, you know, a vaginal birth preps the child for the right kind of bacteria in their gut and…, and then after that the next thing would be breast feeding to ensure that the right kind of bacteria grow. How can we help our kids who are…, who are C-section babies or who weren't breastfed, how can we help them get their best into top shoot?

Dr.Gerry Mullin : You know, that's the challenge and you are right. There are times that you can't control, that the, you know, doctor says you definitely need a C-section to save you and the baby, that's what you have got to do. Those things are going to happen. The breastfeeding doesn't always happen for one reason or another and…, and I think its good to realize that in those situations that the…, the gut microbiome is going to be at a disadvantage. Right? And the first 6 months to 2 years are critical and I think at that point in time, its fair to say is that when…, when able I think that it would be a good time to start instituting no-fermented foods. Now, does that mean yogurt, does that mean kefir, you know early on, could very well be, but I think that's where, you know, you have to realize that the immune system is being educated and in both of those conditions, unfortunately if they…, especially they quote this, you know, C-section and no breast feeding is that I would, you know, I would think that those fermented products would be encouraged early on when able.

Julie Dulude : So, if there is…, if there…, if the kids…, these kids are given the right foods, I mean can they ever recover, catch up to the same amount of health, you know, that one would first…, suppose they would have if they had been born vaginally, are breastfed, or is that…, is that hard to catch up to that?

Dr.Gerry Mullin : It would…, it would be the… I think what you propose will make a very good study. I don't know that I have seen that in the literature, but it would make sense to do, to know how well you can match that in terms of the biodiversity and the variety of different bacteria, but you have got to realize anything you do with the Probiotic, whether its supplemental form or food, is that, you know, that you need to continue to do it throughout life.

Julie Dulude : For…, for people who are born with a compromised gut.

Dr.Gerry Mullin : This is the thing…, you know, where its, what we are born with, we can manipulate it and modulate it with food, but once we…, you know, once we sway away from that, we tend to continue to have what we have. So, if you are going to, you know, put a baby on, you know, a certain program early on in life, that is likely to…, that person would need support and would need to probably continue to take some type of probiotic, prebiotic type of combination in terms of food sources throughout life, but again it would be nice to see a study to…, especially with now today's technology to provide more guidance.

Julie Dulude : And why did you pick 2 years as part of the most…, the most critical time, I mean if we can restore the gut of adults who are coming in to see you as patients, you know, what's…, what's the reason for choosing that…, that time period?

Dr.Gerry Mullin : Well, this is just what the data shows in the literature, between 6 months and 2 years is when really the foundation is laid down for the microbiome initially from day 1, its what you are born with; and 2, you know, when you are breastfed, you are nurtured and with prebiotic and probiotic, but its really, that is the critical period that's…, that…, that's out in the literature.

Julie Dulude : Uhmm… I see. Well, it certainly makes you think differently about what constitutes a healthy diet because, you know, its not just about getting specific nutrients from your food anymore. Your…, your food also needs to support a healthy…, a healthy gut.

Dr.Gerry Mullin : Of course. I mean there are a lot of things, you know, what we eat. We…, we think of food as calories, but there is much more to it than that and certainly how those food constituents feed the bacteria is critical.

Julie Dulude : Yeah. Healthy means different things to different people, but…

Dr.Gerry Mullin : Definitely! Yeah. Right, right, right.

Julie Dulude : That's really fascinating. I am going to turn the discussion back to Priya now……for some audience questions. Thank you so much for being…..here today with us.

Priya Menon : Thank you, Julie. Dr. Mullin, this is very, very eye opening I should say, having…, listening to gut health which is something which most people tend to ignore. I am coming…, joining you from India, as I just mentioned, in India its still something which people don't actually think about and.. …this has been really very informative. Yes. Yes, but actually as you were saying, doctor, we do consume a lot of fermented products, products that we make at home, that's part of our daily routine, I should say. So, that…, that was also pretty interesting to listen to that what we are doing at home is so very healthy and so very helpful for our health. I have here a list of questions. I think we have covered many of them, but yes, there are some of them. These have all been sent in by our listeners and I will just go through them quickly, doctor, so maybe you could just, you know, maybe you might have to repeat a couple of things that you have already mentioned, but let's… I will try to keep it to the minimum. One or our listeners asks, if you have got the right level… How do you know if you have got the right level of diversity in your gut bacteria to actually help you.

Dr.Gerry Mullin : Uhmm…. That's a very good question. Very good question and, in fact, I was part of the discussion we had, is that there are these laboratories that, you know, that do these tests, that looks at the biodiversity of the gut bacteria. When they look at the genetic material, they look at the number of different species and, you know, more is better is that the…, the larger number of species, over 500 or so, the…, the better the health of the microbiome which translates into better health for us, but without doing these specialized tests, how do you know. Its a very good question. Certainly, if you have diabetes and you are obese and…, and you have, you know, taken a lot of antibiotics through your life because that will minimize the biodiversity of those things and you eat a…, in this country, a junk food diet, those things will certainly limit your health and biodiversity. So, without even you having to go run and pay for a test, that is very likely.

Priya Menon : Okay. Thank you, doctor. The next question is, yeah…, its…, it says your focus on…, in your book on the…, is on the possible link between obesity and gut bacteria. So, the listener wants to know if there are studies that show that there is difference between gut bacteria of obese and normal weight people.

Dr.Gerry Mullin : You know that…, there is…, there are a lot of different data on that in both humans and also in…, in mice and, yes, there is a difference, is that in the individuals who are overweight, their bacteria are less robust, they are less diverse and there are more pathogens and those bacteria tend to hold on to more calories and, in fact, in animals and I mentioned that one case in the fecal transplant in human, you can

actually transplant those bacteria into a lean mice and make that.., that the mice hold on the weight. So, we know its transectable. So, we know its the microbes.

Priya Menon : Okay. Okay. Yeah. The next person wants to know what is your opinion about fat in the diet?

Dr.Gerry Mullin : You know, I mean its kind of…, its funny. Fat is back. Right? I mean its……it was thought to be such an evil thing like eggs, was evil in cholesterol, was evil, then all this time we find out that its not so bad after all. It depends on which fats. Right? If you are going to have a…, a lot of saturated fat, if you are going to have trans-fats, those are bad fats. Right? Like walnuts, and nut…, nut oils are good. It depends on the source of the fat. The fats that are high in saturated fats are really not so healthy for us. The ones that are more omega-3 fatty acids, that are anti-inflammatory, are much better for us. So, it depends on the source of the fat. We need fats.

Priya Menon : Okay. Yeah. We have been talking about bacteria throughout, good bacteria. So, one of our listeners wants to know, what about yeasts and viruses? Are they beneficial too?

Dr.Gerry Mullin : Yeah. You know, that's… You know its interesting is that there are……more viruses in our gut than bacteria. So, there is like a hundred trillion bacteria in our gut. There are ten times more viruses and there is a whole science that's being explored behind the virome, they call it the micro-virome and we don't know much about about it at this point, but its…, its like a new area of science that people are looking at. So, its an excellent question. Fungi, again just like with bacteria and viruses, there is a whole world of fungi and a lot of them are commensals, but a lot of us get, you know, concerned when there is "too many fungi," but, you know, fungi can also be commensals, that's something we need to learn more about as well.

Priya Menon : Okay. Thank you, doctor. I think we have like almost exhausted our list of questions sent in…..by the listeners and… Thank you so much for being so patient and answering each and every one of them for us. Its been an absolute pleasure to listen to you.

Dr.Gerry Mullin : Thank you. Thank you.

Priya Menon : Thank you, Julie. It was…wonderful co-hosting with you. Yes. Please join us again on the 12th of August as we talk with Dr. Colin Campbell on nutrition and the China study. Visit us at curetalk.com for details on our upcoming talks. The talk for today will be recorded and made available on Cure Talk's website. Thank you, everyone.

Dr.Gerry Mullin : Good night, Priya! Thank you, Julie!

Priya Menon : Good night!

Dr.Gerry Mullin : Good night! Thank you. Bye, bye! Thank you.

Julie Dulude : Thank you.