CASAT Podcast Network

Welcome to season five of CASAT Conversations.

A holistic look at mental health.

Join us for a series of thought provoking Conversations that delve into the vast dimensions of mental well being.

From the intricate link between physical, emotional and spiritual aspects of well being to the latest scientific research practises and therapies, we navigate the multifaceted landscape of mental health.

Together.

We hope you enjoy today's conversation.

Welcome to CASAT Conversations today.

We are so happy to welcome Dr. Ted Dinan.

Dr. Dinan is professor of psychiatry at University College Cork.

Welcome, Dr. Dinan.

Thank you very much indeed.

It's a pleasure to be here.

Please tell us a little bit about yourself and why you do the work that you do, right?

Well, I'm a psychiatrist.

Clinically.

Um, I've been involved in kind of clinical and basic science research, really.

Since I left med school.

Um, about slightly over 20 years ago, I was involved in setting up a PC microbiome Ireland, which is based here in Cork.

And the segment that John Cry and my colleague and I have ran over that period of time largely focuses on how gut microbes influence brain function So we work on the brain gut microbiota axis.

Now, when I started off in or after I left med school and when I begun research in this area, people spoke about the brain gut axis.

And at the time, of course, the microbes within the gut were largely ignored.

We regarded them as commenced, so they didn't do us any harm but didn't do us any good, either.

And it's really, I suppose, only over the last 20 years that the Microbiota has become such an important part of the brain.

Got access.

And, um and that's really what I've been focusing in on.

I mean, from a clinical point of view, I I've published quite a bit in the area of depression and particularly treatment.

Refractory depression, difficult to treat depression and clinically, that's what I've tended to focus on.

Awesome.

Well, I'd love for you to share with us a little bit more about your research findings on the connection between our gut microbiota and its impact on mental health.

Right?

Well, gut microbes undoubtedly influence how the brain operates.

And, um you know, I suppose that's most starkly illustrated, um, in in a series of studies we did in germ free animals.

Uh, we have a germ free facility here in Cork where we can breed animals, mice without any gut microbiota.

And what we find essentially is that if an animal doesn't have a gut, microbiota has no microbes in its intestine.

Its brain does not develop normally.

Um, we find that myelination, which is the sheet myelin sheets, you know, are the sheets that cover the neurons.

The myelination patterns are abnormal in animals who are germ free.

Um, neurogenesis, which is the formation of new neurons in the brain, doesn't take place normally in animals who are germ free.

And overall, the connections between the neurons in the brain are abnormal.

We've largely focused on serotonin because, well, I suppose, an important neurotransmitter in the human brain, and we find that the serotonin system does not develop normally in these germ free animals.

So I I think that's the most.

I suppose basic evidence that in fact, we need a microbiota in order for our brains to develop normally.

And not only do we find a anatomical differences in these animals, but behaviorally, they're far different as well.

Um, if you, um mice or like us.

They're They're quite sociable creatures.

And if you give a mouse the opportunity to interact with another mouse or with an inanimate object, like a hen or whatever, it will interact with the other mouse.

But not these animals who are devoid of a gut microbiota.

They basically, if you give them the opportunity to interact with a pen or or another mouse, they're as likely to interact with the pen as with the other mouse.

So there, I.

I don't like the term autism because it's too peny to both.

These days, it's very loosely defined.

But I suppose in lay parlance these animals do show autistic patterns basically, so they're anatomically different, and their behaviour is abnormal as well.

It's so fascinating.

Yeah, now I mean, you know, I suppose the question then is you know, I mean, how do gut microbes talk to the brain?

Because if they're as important as I'm claiming that they are, you know, how do they actually talk with the brain?

And that's something that we've certainly been exploring, you know, over the past 20 years.

Um, there are a few roots, important routes of communication.

The vagus nerve is that long, meandering nerve that connects the brain and the gut, and it it it really.

It connects the brain and most internal organs, not just the gut.

But we find that certain microbes could only communicate with the brain when the vagus nerve is intact.

And we showed, for instance, that certain strains of bacteria cannot communicate with the brain if the vagus nerve is for any reason severed.

So the vagus nerve is it's bidirectional.

I mean, it does send signals from brain to gut and from gut to brain, so it is a bidirectional communication route.

But undoubtedly it's a route that some microbes used to talk to the brain.

Now, other routes of communication would include, um, for example, the production of short chain fatty acids like Butera and propionate, and they're produced by the metabolic activity of, uh, microbes acting on on fibres in the gut.

We can't generally produce short chain fatty acids like butyrate or propionate, and they influence organs throughout the body, including the brain.

Now we're not.

You know, there was a lot of emphasis on how these short chain fatty acids acted through what are termed G protein, coupled receptors in the brain.

I'm not sure that that's an important, uh, route of communication.

But what I do believe is that butyrate has the capacity to influence the way genes function in the brain.

But rate in particular is a powerful HV inhibitor, so it actually is a nippy genetic regulator.

It regulates the way in which certain genes in our brain actually operate.

Um, another route of communication is, and this is a route that many listeners would be familiar with.

Um, it's tryptophan is the building block of serotonin.

And when I was a medical student, and indeed, when I was a resident in psychiatry, we were thought that all of the tryptophan came from the diet.

And undoubtedly there is an important dietary source of tryptophan.

But what is clear is that certain microbes, particularly bifida bacteria, can actually synthesise tryptophan, so microbes are another important source of tryptophan, and the human brain has very limited storage capacity for dripped film.

We don't store it in any quantities, so we need a constant supply of it, crossing the blood brain barrier and being converted into serotonin.

Now, serotonin, as many listeners will know, is involved in regulating mood and regulating appetite and sleep.

It's involved in a variety of of of physiological processes.

And, um, we believe that gut microbes, certain gut microbes can influence that.

Of course, in relation to stress, the Goth Microbiota plays a very key role in regulating, um, the hypothalamic pituitary adrenal lax.

So the release of cortisol cortisol, the main stress hormone in humans.

Its release is regulated by a number of things but is undoubtedly regulated by microbes in the gut.

It was pseudo and and his group, who were the first to so 20 years ago and well, almost 20 years ago now showed that in the absence of a gut microbiota in in mice, you got big increases in corticosterone.

Now, corticosterone is the rodent equivalent of cortisol.

And basically, if if an animal doesn't have a gut microbiota, the corticosterone levels are much, much higher.

Um, and and we've certainly found, you know, a relationship between the gut microbiota and cortisol levels in humans as well.

So there there are some of the ways they're not all of the ways, but there are some of the ways in which gut microbes actually talk to the brain and in that same kind of thought, Or, you know, there's this connection between the cortisol and the brain or the Microbiota, and I'm going to mess up the how I want to ask this question.

But I'm curious like what that relationship is like, Is it bidirectional?

Um, like you get stressed and then increase in cortisol.

Or if you're the microbiota, do you have less tolerance for stress?

I guess that's my question.

Yes.

The answer is it is bidirectional because undoubtedly, if we're stressed, the gut microbiota becomes altered.

We show that in, in in animals, and we've shown it in humans as well.

In, in, in depressed patients, if people are stressed, their gut microbiota alters.

But in turn, the gut Microbiota has the capacity to suppress cortisol output.

So there is a There's a loop there.

Um, you know, we've shown that, for instance, certain psychotic or probiotic bacteria which, when ingested, will suppress cortisol levels.

Um, uh, so so you know, the gut microbes are important.

They're an important regulator of the hypothalamic pituitary.

Like I remember a few years back, it might be 10 years ago now, writing a paper on how the gut Micro Biota was ignored by endocrinologists as an important regulator of the hypothalamic pituitary axis.

Because at the time, you know, there were many factors that were identified as regulating cortisol release.

And I was just pointing out in this paper that, in fact, it was, uh uh, you know, a very narrow, um, perspective on cortisol release and that, in fact, uh, certain microbes most definitely were important in regulating the release of cortisol and that and that if we were going to look at it and take a holistic view of the hypothalamic pituitary relaxes that we had to really incorporate the microbiota within that regulatory system or framework Extent, I'm curious.

How does all of the research that you do, um, as well as colleagues How does that impact your own clinical practise?

Well, I think in my own case, what it has done is, you know, I suppose you know, patients have been very generous with their time, and they've enabled me to do studies, You know that.

I mean, we were one of the first groups to show that the gut microbiota and people were depressed.

There were clinically depressed patients attending my clinic had a less diverse gut.

Microbiota, Um so, um, III I think that that, you know, is an important observation.

We also found at that time that if we transplanted the microbiota of a depressed patient into a rodent into a rat, and that's fairly easy in rodents because they eat faeces all the time.

So it's not a particularly difficult thing to do, um, that the rodent who had the transplant from a depressed patient as opposed to a healthy subject showed very significant changes that if the animal had a microbiome a normal, healthy subject, there was no change in their behaviour or their endocrinology or immunology.

But if they had a transplant from a depressed patient, certain inflammatory markers increased, their alteration of tryptophan was altered and their behaviour became more depression like so I think you know that we didn't expect that.

That was very counterintuitive.

But But, you know, it certainly is a solid, uh, observation.

Um, how is my clinical practise changed in terms of what I do?

Well, I think what I do now that I wouldn't have been doing 15 years ago or 20 years ago certainly is.

I'm inclined to look at patients, nutrition and their exercise patterns in a way I didn't previously.

I never looked at nutrition previously, and most psychiatrists do not.

There are some exceptions, but as a general rule, we as a profession do not look at nutrition.

And, um, I certainly if a patient has depression and they have a diet that is rich in fast food or processed foods, I mean, I really advocate that they reduce the intake of processed foods.

I give them nutrition or their dietary advice.

I do think that exercise is absolutely fundamental in the management of depression.

It really is.

Um, if we could take whatever exercise does and put it, put it into a capsule, you know, it would be the best antidepressant we've got.

We can't do that at the moment.

But exercise and nutrition, I think, are fundamental to the management of depression, and I think that that has definitely changed my practise.

It isn't that I don't use drugs, I do use antidepressants.

It isn't that I don't use cognitive behaviour therapy.

I do.

But I do think that those psychological and physical therapies work best in an environment where somebody is on an optimal diet and exercising adequately.

And what are some of those nutritional recommendations?

Well, I think I've mentioned the things to be eliminated.

I do think that processed foods are really bad, you know, Um, and a diet that is resplendent in in fast food is really a diet that is leaving oneself open to to to mood disorder or stress related problems.

But in terms of the things that people should be taking in, I think that, um, fruit, fresh fruit vegetables are essential.

I think nuts are a good source of nutrients.

I think that fermented foods are excellent.

I think fish is important, and I think there are some of the more important things now.

There are problems with that.

I mean, now, on the positive side, there are far more fermented foods available in our shops now than were ever available in the past.

I mean, when I grew up in cork, I mean, there was yoghurt.

That was basically it.

There was no there were no other fermented foods that are.

I'm sure it's true as most cities and stuff not just here in Cork, but of course, now you go into any decent food store and you'll see things like Keir Kombucha, you know, various various, uh, fermented foods.

And, um, I.

I would advocate that if somebody is depressed or prone to depression, that they have A that they vary the fermented food that they're taking in.

You know, I wouldn't just say that just take yoghurt because that would be one.

I mean, there's usually only one probiotic bacteria in yoghurt, whereas, you know, I, I there, Um uh, there's a, um a a Gaff here, available here and may very well be available in many cities.

And it's actually produced in West Cork.

Um, and it has about it has 12 different probiotic bacteria in reasonable concentrations in it.

So that's a good source of varied probiotic bacteria.

So I think having a good, diverse range of fermented foods is is is very important.

Um, fish.

Now, this is a problem because the patients I have treated over the years 90% of them will not eat fish.

Now we live in an island here in Ireland.

You know, fish is readily available, and it doesn't have to be the most exotic or expensive fish.

There's plenty of relatively cheap fish around the place.

And when I say to my patients, most of them say, Oh my God, I can't stand the smell of that or I would never eat fish So this is a look.

It it is a problem in Ireland.

I think eating fish is very much a social class kind of a thing.

I think middle class people are more likely to eat fish than people who are from, you know, less well off backgrounds.

Um, and the oilier the fish, the better.

I mean, fishes are full of polyunsaturated fatty acids DH a EPA.

Um, and they are DH A is a very important structural component of our brain, and it's important in terms of neuronal membrane formation.

And the problem is, we can't produce it ourselves in any great quantity.

So we we we need it in our diet, and there are nutritional sources of it other than fish.

But really, fish is by far and away the best source of it now.

I mean, if people don't eat fish, I would recommend that they take, you know, a fish oil.

Um, but look, I'm a big believer that the best source of nutrients is good food, not supplements, not swallowing capsules, you know, Um, but, um, yeah, so So there are some of the things I mean, clearly, you know, when you're talking about fruit, fruit and vegetables, you know, there are many components to fruit and vegetables.

They can be a good source of protein if you're on a vegetarian diet or a vegan diet, and they can be a source of vitamins, obviously as well.

And, um, of course, what gives fruit and vegetables, Their colour is polyphenols.

And there are several 1000 polyphenols identified, and most of these we haven't studied at all.

There are no papers in literature on them at all.

Um, but what studies are out there?

I'm, um You know, listeners would be familiar with resveratrol in red wine, and that's a polyphenol that's been associated with, you know, good health outcomes.

And we've published on zento hum and some other polyphenol compounds as well.

But most polyphenols have not been studied.

Um uh, Curcumin is another polyphenol.

I suppose you know it.

Um a lot of claims are made for curcumin.

Um, I was always sceptical of some of these claims that they were antidepressant and they were good for arthritis and good for this and that and good for Alzheimer's disease and good for everything.

II, I You know what?

What slightly changed my mind about them is this.

My scepticism was largely due to the fact that in the case of Kirk you it is not absorbed from the gut and any concentration worth talking about.

So does it get to the brain?

I would suggest probably not in any quantities that are meaningful, but what it does do.

And this has been clearly demonstrated and documented now is it brings about increased diversity in the gut.

Microbiota.

So it may very well be that the positive benefits of something like kki are actually established by bringing about increased diversity because there's no doubt about it that increased diversity is associated with good health.

Um, we all want to age healthily, and one of the things that happens as we age, particularly if people become frail, is you see a decreased diversity in the gut.

Microbiota and decreased diversity is followed by frailty very rapidly in the in the elderly.

So I do think that, um, you know, polyphenols in fruit and veg and they're not the only compounds of fruit and veg.

There are many others that are beneficial.

But I do think that that these polyphenol phenolic compounds like resveratrol, um, can have major health benefits.

That is super helpful.

Um, information.

Um, you know, you said that you prefer food versus supplements.

I'm curious your thought on people taking a probiotic and its benefits or stick more to the fermented foods.

Well, I suppose the advantage of the probiotic is that, um you're probably taking in much higher concentrations of the, uh of the bacteria, the problems with probiotics.

And I'm not against supplements entirely.

I'm largely against them, but not entirely against them.

I think if you're a very healthy person and you're not suffering from any sleep disorder or stress related problem, I would suggest sticking to fermented foods.

That will be my view.

Um, the the problem with with with capsules or or supplements of probiotics is that if you go into health food store, there is a massive array on the shelves and it's very hard to know, particularly in the US.

It is quite so bad in Canada or in Europe, but in the US it is very difficult to know what actually is beneficial and what is not.

I mean, in a recent article, I was interviewed there by the Economist, Um, I think last year, and I described the situation with probiotics in the in.

The US is a bit like the Wild West because there are stuff supplements on the shelves that don't even have live bacteria, not of mine.

Things that could do any good.

And it's very hard for your average person who wants to do the right or the healthy thing to go in and to buy something that is going to be beneficial Now.

What what I would say to people.

I'm not going to mention any companies because I don't I have no interest.

I have no major shareholding or any any extra grind for any company out there.

But I think it's probably a reasonable rule of thumb to say that the bigger companies you know are less likely to put, you know, supplements on the market that really are inactive.

But you know, at the end of the day for the consumer, if one could look back on the date and see is there, look if somebody says, you know, here is a Here is a supplement.

We have a bifida bacteria in it.

Well, you know, there are loads of strains of bifida bacteria.

Some of them would be found to be beneficial, and some of them are found to be absolutely and utterly useless.

So, you know, it's important to And look, people are busy.

They don't have time to be going and looking up a data.

But like, you know, if you really want to take a supplement, you probably should look up the data.

Is there data out there to suggest that this supplement actually works in what it is claimed to work Or, you know, because people take supplements for I BS type symptoms, they take supplements for, you know, probiotic supplements for dress that might take probiotic supplements for sleep.

And there are data sets out there for I BS for sleep, for stress.

But then there are things on the market that are claiming to be effective and all these things, and they're absolutely and utterly useless.

And some of them, as I say, don't even have live bacteria in the capsule.

Well, and I'm curious about like the future of medicine as it looks at the Microbiome because it seems like and maybe this is a misperception.

But it seems like taking a patient centred approach and actually looking at that person's diversity and then treating what they're missing makes the most sense versus just kind of a throw it all at the wall.

I think that's where we're going.

I don't think we're there yet, though, because, you know, the problem really is if you ask me what is a normal microbiota, I couldn't define it.

Um, you know, people talk about this biosis, which is an abnormal gut microbiota.

Now, if you if you've eaten, you know, a dodgy hamburger and it was a dodgy bug in it, you know?

Well, if it if it's in your microbiota, that's a diss biotic microbiota.

But really apart from pathogens in the microbiota, we don't actually know what the ideal structure of a gut microbiota an optimal gut.

Microbiota actually is, um and so So you know what you say I think, is where we should be aiming for.

We should be aiming to be able to say the optimal gut Microbiota is this and adding in the following microbes would benefit the particular individual.

Now there are a lot of companies out there purporting to offer microbiota analysis.

I can't see what the rationale for that is at all because we don't know what a normal microbio is.

So you get a big, long string of strains or whatever you know, a bacteria that are in your intestine.

And so what?

It's not telling you anything, you know, and maybe some.

You know, quack Doctors might say You need to take XY and Z because your microbiota reads this.

This is rubbish.

Like there's no science behind that.

It's just it's just rubbish.

Um, but, um, you know, so so III I agree with you.

I think that we we should hopefully get to a point where we're able to add to advocate taking certain things.

But remember that when we talk about probiotic bacteria in general, we're talking about tourists and the gulf we're not talking about, um colonisers.

So, you know, let's suppose you you have low levels of flex say lactobacillus rab nosis, right?

Well, there are probiotic bacteria out there with lactobacillus RM nosis in a capsule.

If you take those, they'll win them out and out the anus.

They do not grow in your intestine.

Now, that doesn't mean that they haven't been impact when you take them in, they may very well have, um but I think it is important for people to realise that if you're missing a certain strain of bacteria, it doesn't mean that taking that particular strain will, will will produce long term benefits.

In other words, if you found that a particular biff was actually impacting you in a positive way because you have G I symptoms or whatever, it's likely that when you stop that the symptoms are going to to recur, they're not going to be gone because you've taken in that strain of bacteria and you've replaced the missing strain in your intestine because the reality is that these bacteria don't grow in the intestine.

Now, there are some exceptions to what I'm saying, but really they are exceptions.

In the vast majority of cases, these are in the mouth and out the anus, and they do not grow in our intestine.

Hm.

It's all just fascinating.

Um, why I I'm gonna circle back that you said something about it's not currently practised in the field of psychiatry, really looking at nutrition and physical activity.

And I'm just curious what your thoughts are on.

Why, that is, um I think that, um, science often, you know, needs well, clinical practise often takes a while to catch up with science.

I think that there is an increasing, uh, knowledge base coming out there.

I just edited a book which is out next month with Cambridge University Press.

And it's on nutrition and mental health, you know?

And it, you know, covers the kind of broad spectrum of nutrition and mental health and mental health in the general sense depression, schizophrenia and a variety of other mental health problems.

And I think that I mean, there are some clinicians now who are giving advice in relation to mental health.

They're most definitely in the minority.

But I really do think that it's just a question of, um, you know, time.

You know, most things do not catch on immediately.

They take a while.

And I think that this is one of these things as well.

The same is true with exercise.

I mean, and and and what exercise is I mean, you know, I have 25 year olds or 30 year olds coming into my clinic, and they, you know, they've, um Yeah, you advise them to exercise.

And a week later, three weeks later, they come into the clinic.

Maybe they've been depressed.

They're on antidepressant.

You tell them to take some exercise and they come in and they say, Yeah, I've been walking every day and I say, Well, how far?

A mile and a half two miles.

I mean, you know, for a 25 year old, walking a mile and a half a day is just a joke.

I mean, you know, it needs to be vigorous aerobic exercise, and I do think vigorous is is important.

Um, and and the more vigorous I mean, I even look for all sorts of reasons I love running.

I have since I've been able to walk, I've ran you and I still run marathons or whatever, but, you know, if I want to really get a high from running, I really have to run more than 10 miles.

You know, I really don't.

You know, I run five miles five miles this morning because, you know, that's what I do in the middle of the week.

I can't afford any more time than that.

But you know, to really get a buzz, I really have to more than 10.

I'm not suggesting that if you're suffering from depression, that it's easy to run.

It is not.

It's easy for me to say it.

It's very difficult to do it if you're depressed, it's very difficult to be motivated.

But I do think that that if you can motivate yourself, it really can have a major impact and not just in people with with depression.

I have this.

A patient is a wonderful young man and he has schizophrenia and he found this himself.

I mean, I didn't tell this guy to exercise.

I mean, I'm always telling depressed patients to exercise, but this guy is terrible.

Schizophrenia is really terrible, paranoid ideations and hallucinations or whatever, and he found out himself that, you know, if he does run long distance and this guy runs half marathons and he's quite a good runner, Um and he he finds that when he runs vigorously that his symptoms do improve and there is evidence that both the positive symptoms of schizophrenia, which are the hallucinations and the delusions and the negative symptoms, the kind of social withdrawal and so forth that both the positive and the negative symptoms of schizophrenia do improve with vigorous aerobic exercise.

And this guy found it out by himself.

He just, you know, he happens to be a runner.

So he just found that, Yeah, I'm better when I'm actually exercising.

So I think there are many scenarios.

Look, I mean, you know, you take risk factor for Alzheimer's disease.

A lot has written, and there's been a lot recently, I suppose, with hanuma and these other the other antibody for treating Alzheimer's disease.

But of course, you know, one of the most important protective steps that any of us can take in relation to Alzheimer's disease is vigorous.

Aerobic exercise is dude, I love that.

We also interviewed another researcher from Brazil on the impacts of physical activity and mental health.

And he had a lot to say about about that as well.

Yeah, no I.

I think it is very important.

I mean, you know, when you look at the effect sizes of these antibodies that are Well, there's two of them, isn't there there now?

Uh, well, one is on the second is about to be launched in the US market, and neither of them are yet licenced in Europe.

But the effect sizes are actually relatively small.

I mean, if you want to take preventive measures that are significant, one of the things is a proper diet and exercise regularly.

I'm curious.

Is there research that you can share with us about the impact of exercise on the gut?

Microbiome.

It's an interesting question.

Um, what I can tell you is that and this is not data from our lab, because it's not something that we have we have published data on, but there is evidence out there that vigorous aerobic exercise does increase, uh, microbial diversity in the gut.

I suppose the big question is, how does it do that?

Um, now, when we exercise, our muscles produce a lot of different proteins that are released into the bloodstream.

These are myo kinds and BDNF brain derived neurotrophic factor, which is a trophic factor, is actually produced by muscle in the periphery.

Um, and I think it is likely that these myo kinds that are produced by the muscles we exercise when we engaged in aerobic exercise that they in some way influence microbial diversity.

But really, although we know there is a relationship that people who exercise a lot tend to have greater microbial diversity, the precise mechanism through which this is established is not fully understood as yet.

Hm, that makes sense.

Uh, circling back to nutrition and mental health.

I'm curious if there are certain foods, um, that might negatively impact mental health.

You talked about processed foods, um, primarily and fast food.

But I'm curious if there's any, like, macronutrients or different things, that right?

Well, I do think that, you know, I suppose a lot has been written about trans fats, and there's been a concerted effort in Europe and in the US to reduce the levels of trans fats and food because trans fats, which are found, let's say in margarines and and, um, you know, and in in processed foods because they increase the lifespan of these foods, you know it's used well.

It's been long established that trans fats are bad for your heart, and that's why the levels are being reduced because they're cardiotoxic basically trans fats.

Um, I think they need to be almost fully if it is possible to fully eliminate them from the from the food chain.

But trans fats not only are cardiotoxic, but they're bad for brain function, so they're bad for brain health.

So I think they they one element in the, uh, in the food chain that definitely have a very negative impact on both cardiovascular and brain health.

Um, and you know, the the the problem with with, you know, look, you know, we all to some extent, I suppose, eat fast food intermittently.

You know, we live in a society where things move at a rapid pace and it just suits to go and have a whatever, you know, whatever fast food, um, you know, the problem with fast foods, if that's all you're eating is that the nutritional intake is limited, you know, it really is limited.

You know, at the end of the day, you know, the term commences, so comes from the Latin meaning, eating at the same table minsa.

And you know, the microbes in our gut, we feed them, and in turn they produce molecules that we require.

Now, if we feed them badly, they're going to be a reflection of that.

So if you have, if the only thing you're eating is from the local fast food outlet, you are going to have a microbiota, which affects that simply because the nutritional intake is not adequate now.

Different microbes require different things.

I mean, personally, I have a sweet tooth.

I mean, I love apple pie, and I like sweet things.

It's It's, you know, the one aspect of my diet that I I'm not exactly pro but I.

I have a very sweet I just enjoy.

And I often think, is that I'm looking for the apple pie or is it my gut microbes that that, like the sugary intake I I'm not really sure.

But the problem with fast food, as I say, is that it really it lacks the diversity of essential nutrients that are essential for good health.

So it's really about eating foods that are nutrient dense, which is real.

It is absolutely, and that absolutely and you know, and that means you know, fruit and vegetables and so forth.

And and, you know, in the world in which we live, that's I won't say it's difficult.

It takes time.

It isn't difficult, and but it does take time.

You know, I was at a conference there in London about two years ago, and and it was to medics, and I was giving my usual talk on microbes in the brain, and this lady stood up and she was a primary care physician in London.

And she said, You know, my patients don't have the money to eat the sort of diet you're talking about.

And she named the part of London she was working in and and fortunately, it's a part of London.

I know very well because I used to be professor of psychiatry in, uh, head of psychiatry in this particular part of London and one of the medical schools that cover that part of London.

And I pointed out to her, and I do think it's genuinely true.

The problem isn't a financial issue.

The problem is an educational issue.

You know, there are vegetables that are grown locally in every state in the US that are cheap.

Of course, you can eat imported fruits and vegetables, exotic fruits and exotic vegetables, and you can pay a lot for them.

But it actually you know, if there was better education in our schools.

I do think that people would be able to eat without spending a fortune, the appropriate fruit and vegetables that are necessary in a healthy, well balanced diet.

And and I think that is a problem.

So I think, look, you know, there are always going to be people in our society who are less well off and who struggle financially, and I'm not going to, you know, suggest otherwise.

But I do think that a lot of the problem isn't a financial problem.

It is a lack of education.

Yeah, I agree.

And, you know, in the United States we do have food deserts where the people don't have access to fruits and vegetables.

I had a, um, person that I was working with in the diabetes Prevention programme who we were doing health education with, and she came up to me after class in tears, saying, I want to eat the way that you're talking about, and I literally don't have access to this in my neighbourhood or I don't have access to this in the food pantry because the food pantry here locally, um, at the time only was giving canned foods right non perishable foods.

And so, luckily, we had a programme to start a, um, a prescription food pantry where you could get access, but you had to have a prescription from your physician so that it was connecting her.

Right.

So there is this complex access issue, Um, that we have That makes it extraordinarily challenging.

And if your closest food option is a convenience store, right, you may not have access, so yes.

Yeah, indeed.

And you mentioned diabetes or prediabetes there.

And of course, you know, we know that the gut microbiota is altered in prediabetes and in diabetes, and we know that, you know, certain microbes.

I mean, we we published a paper there about two years ago, Harriet Chelis and I.

And it was a study looking at a particular strain of bifida bacteria in, In in people who were prediabetic.

They were overweight.

Um, And what we found was that their glucose levels dropped when they were taking this.

Now there was no change in diet.

They stayed on the same nutrition.

They stayed on the they had the same exercise, you know, activity.

The only change that one could attribute the drop in glucose was the ingestion of this particular probiotic.

Now it was a bifidobacteria.

We originally found an effect in in in rodents.

And then we did a study in humans.

I think about 100 and 26 humans who were either on placebo or unactive.

And we found that this probiotic actually reduced.

Um uh, uh, glucose levels.

I think we published it in EOM, the Lancet journal.

Um and so, you know, we're talking about the brain, but I do think that, you know, when we're talking about gut health, um, it straddles a whole variety of things, not just not just brain health, but a variety of things.

And of course, you know, one thing that's worth mentioning is that, you know, there are a lot of medications prescribed by physicians in the US.

And in Europe, about 75 to 80% of them impact the gut Microbiota, and not all but the majority of them do not impact in a particularly positive way.

I mean, if you take, you know, one group of drugs the proton pump inhibitors, they're widely available for treating peptic ulcer disease and so forth and, um, gastritis and, um, they impact the gut Microbiota and not in a particularly positive way.

So there are, You know, so one needs to.

Physicians need to be cognizant of the fact that certain treatments that might superficially seem very good, you know, might have negative impacts.

Now, I mean, there are drugs that have a positive impact.

For instance, you know, we've shown that lithium, which is widely used for treating bipolar illness, less so nowadays.

Although I think that's a mistake.

I think there's a real, you know, use for lithium in, and some patients who respond to it do fantastically well.

But lithium actually increases diversity in the gut.

Microbiota Um but there are very few drugs that actually do most do not and some not only do not, but they actually have a negative impact on the gut.

Microbiota.

And of course, you know related to that, I suppose, is the fact that you know, when you look at people who are the people who take the most drugs, there are elderly people aren't there, you know there are people who are on often 34567 drugs for hypertension, type two diabetes, arthritis.

God knows what you know.

You come in.

They come in with a raft of medications into the clinic, so they're in a lot of different things.

And of course, you know, there's no doubt we all want to grow old healthily.

I mean, there's no one wants to live in a in A in a nil or unhealthy state.

But really, maintaining diversity in the microbiota is fundamental to maintaining a good physical health status as we mature.

Because if you if you lose diversity, frailty follows rapidly.

So I think maintaining that diversity as we age is important.

And I think that physicians need to be aware that many medications that will be given for very good reasons could have a very negative impact on the gut.

Microbiota, which could, in a counterintuitive way, impact the individual's, uh, physical status.

Yeah, I mean, 70 to 80%.

That's staggering.

It is, Yeah, absolutely.

It's a lot, isn't it?

It really is.

And, you know, I think that's very well established at this particular point in time.

So with all of the research you've done to this point, I'm curious.

Where do you see the research going, or where do you see there's more research needed on this important topic.

Well, I think that, you know, for me as a clinician, what I think would be the really pivotal I thought we'd have reached the point.

Right now, I'll explain in a minute why we haven't.

But for me, I would like to see a psychotic or probiotic bacteria that was truly effective in treating milder forms of depression.

Because mild depression is compared to the Depression I treat is incredibly common.

I mean, I treat very severe refractory depression, but in fact, you know, if you take primary care physicians, at least one in three people who come into their clinic either have a depression or an anxiety state.

Um, seeing a psychologist is often difficult and can be expensive.

Many of these people do not want to take an antidepressant, and I can understand why.

I mean, they might be mildly depressed.

I would like to see a a psychotic out there, and I think there are one or two emerging psychotics that may reach the level I'm talking about.

But I would like to see a psychotic that really had as much evidence that any antidepressant out there in treating milder forms of depression.

I think that the impact would be enormous because if you ask people, you know, would they take something that was natural when they have mild depression?

The overwhelming majority obviously would take a natural substance as opposed to a synthetic one.

And there are, of course, scenarios where, you know, taking the natural substance has overwhelming benefit.

Take, for example, pregnant women.

I mean, what pregnant woman wants to take an antidepressant?

Yet up to 20% of women become depressed during pregnancy or in the postpartum period?

Um, in Europe, we had this terrible problem, uh, back in the 19 fifties.

Apparently I it still hangs around today because there were people born having taken when their mothers took thalidomide, and thalidomide caused all sorts of deformities of limbs.

Since then, the pharmaceutical industry doesn't want to know about any medication during pregnancy for his reasons.

But, you know, that is just a very specific example of a scenario where there's a common problem.

IE depression is very common, and you would like a natural substance that if, if it didn't work, was not going to do the baby any harm.

So that is really, you know, the majority of people who were suffering from milder forms of depression, I believe would benefit from a natural occurring substance like a psychotic bacteria.

Why is this not the case?

What?

You you might ask me, Why the heck isn't there such a thing?

I thought if you asked me five years ago, I would have said that we would have had one.

Now I think the reasons are simple enough.

There are two groups of companies in this area.

There's food companies and this farm.

The food companies operate on very small margins and don't want to do the placebo controlled trials that I'm describing.

The pharma companies who have the money to do those trials are not interested because they're not sure that they can protect the intellectual property if they do the trial.

They have other problems as well, but mainly their IP related.

And so very few companies have stood up and said, I'm prepared to do 200 patient, depressed subject, uh, study, um, you know, with a probiotic and a placebo, and that's the sort of study that's necessary.

And that is expensive.

And I think that that's what I would like to see happening over the next few years, but and I thought five years ago it was happy it would happen.

But I think it was naivety on my part.

Not really.

I mean, I think I understand the way the farm industry operates because I've done early on in my career, and even up until now, I've done a lot of clinical trials for the pharmaceutical industry.

Uh, you know, but the food industry, I'm only kind of getting to understand how they operate.

And, uh, you know, look, whatever the reasons, the trials have yet to be done.

The sort of really definitive large scale trials need to be conducted.

And I think that it would have major societal benefit.

I mean, I, you know, I would ask.

You know, there are philanthropists out there who give a lot of money to science.

Well, I think if somebody wants to give, you know, maybe, you know, a few million to do the proper trial, then the societal benefit from that study would be absolutely enormous.

I'm so glad you named that.

I'm curious.

You know, the diet that you mentioned it sounds much like the Mediterranean diet.

And I'm curious.

It seems like, you know, you talked about a probiotic, but also like a trial utilising the Mediterranean diet or something like that with mild depression.

Because earlier you talked about the importance.

You know that you'd prefer food versus supplements, and it's and we don't have that yet, as far as I know.

No, no.

Felice Jacka at Deakin University has done one study, which I must say, II, I think, is an impressive study where she took a group of subjects for 12 weeks, randomly assigned half of them to go on a modified Mediterranean diet and half of them to receive social support.

Over the 12 week period.

She measured the Depression symptoms, using the Hamilton as the Montgomery Asberg Depression scale the Madras.

And what she found was that the changes in the Madras score were significantly greater in those who received the modified Mediterranean diet than in those who received social support.

Eding.

I mean, I don't see it as a definitive study, but I think it is a very good starting study, uh, to demonstrate that, uh, you know, the gut, the gut microbiota probably is the mediating factor here, but that the modified Mediterranean diet does impact depressive symptoms.

And remember, you know, we've known that the Mediterranean diet is associated with less depression.

We've known that for 30 years or even longer.

But what?

It was always dismissed on the grounds that in the Mediterranean region there's lots of sunshine.

So of course, they're going to be happier because they have a better climate than people in northern Europe.

But of course, we now know that people in northern Europe who are on a Mediterranean diet have lower levels of depression than people who are not on a Mediterranean diet.

So it is not just simply the added sunshine.

Nice, though that is, That is not the reason for the lower rates of depression in people who are on a Mediterranean living in the Mediterranean region.

Well and I.

I also think about the complexity of all of the variables we're talking about today.

Physical activity, nutrition, sleep right and as research, you know, in research, it's like, OK, let's let's find the variable.

And we're talking about the interconnected nature of everything, which gets really messy for researchers.

If it's messy from a research point of view, I think it's a relatively simple message in terms of the consumer.

You know, I think you know right now, if you want to be healthy and you want to have good mental health, get a bit of exercise a few days a week.

Vigorous aerobic exercise.

Eat a modified Mediterranean diet, and you're probably going to give yourself the best opportunity to have good mental health.

Thank you.

Um, so as we wrap up, I just want to check in and see if there's anything else that you want to mention.

We covered a lot of ground this morning or today.

I should say, Yeah, yeah.

Uh, no.

I think we've covered most of the the the the big issues in this area.

Really?

You know, um uh, you know, there's been quite a lot of research recently showing that an increased intake of fermented food decreases inflammatory markers.

Sonnenberg Group have shown that, and of course, inflammation and depression are intimately linked, as are inflammation and the gut microbiota.

So, um, I, I do think that a a diverse intake of fermented food will have an impact on the architecture of your gut microbiota and reduce inflammatory markers.

And if you do that.

Your risk of mental health problems is going to be significantly decreased.

Well, thank you, Doctor.

Dan, I so appreciate your decades of experience and research and for you to share them with us here today.

My pleasure.

Take care.

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