



Season 7, Episode 11

Unlocking the Mysteries of the Brain

[Teaser Clip]

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Maayan Hoffman:

A pacemaker for the brain

Dr. Dina Ben Yehuda:

Exactly. You can implant it directly in the area of the brain that causes the seizure and it will and it will sense when the seizure starts and prevent it from developing.

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I'm sorry to interrupt you, so people that would use this would no longer need to take medication, but rather could use the pacemaker instead?

[Intro Music]

Maayan Hoffman:

Hello, and welcome to Hadassah on Call: New Frontiers in Medicine. I'm your host, Maayan Hoffman. The human brain has always fascinated me, maybe because despite everything we've learned about it, it's still such a mystery. I write a lot about brain health for Health Policy Watch, a global health site based in Geneva, and we often cover topics like dementia and Alzheimer's, diseases expected to become the biggest financial and social burden on healthcare systems in the coming decades.

And yet, even with all the brilliant scientists and cutting-edge technologies working to unlock its secrets, we still don't fully understand what causes Alzheimer's or how to stop it. The truth is, the brain remains our body's final frontier. In this episode of Hadassah on

Maayan Hoffman:

Call: New Frontiers in Medicine, I sit down with Professor Dana Ekstein, head of the Department of Neurology and co-director of the Epilepsy Service at Hadassah Medical Center.

Together, we explore the incredible complexity of the human brain, from memory and aging to epilepsy, trauma, and even the potential role of herbal-based treatments in neurology. We'll talk about how the brain responds to stress and war, how lifestyle might influence brain health, and whether new research could one day prevent or even reverse neurodegenerative diseases.

Welcome, Professor Ekstein.

Dr. Dana Ekstein:

I'm very happy to be here today.

Maayan Hoffman:

Great. So I want to start, right at the beginning. What makes the human brain such a fascinating and mysterious organ to study?

Dr. Dana Ekstein:

Wow, this is a big question. I think it's because, the brain, it's what really defines us and it's like studying ourselves, it's the studying the existence of an human being, okay? So I think this is the reason it's so fascinating, for most people, at least for me of course.

Maayan Hoffman:

So you've been here as the head of the Neurology Department at Hadassah for quite some time, and you've seen many conditions that affect the brain, whether it's Parkinson's, Alzheimer's, epilepsy.

But why do you think it is that with all of this the brain being such an important organ, that we still know so little about the brain?

Dr. Dana Ekstein:

Maayan Hoffman:

Actually, maybe I beg to differ. Because I think we nowadays know more and more about the brain and I think it still is the final frontier of knowledge and science.

But we, little by little we start to know more and more about the way the brain functions, and the way diseases of the brain are really developing. And fortunately for the patients, I think we, thanks to this knowledge, we can now treat more and more of the brain diseases.

Maayan Hoffman:

Now, how much is the brain connected to our overall health? For example, when we talk about heart health, and we say lifestyle can protect your heart, is it the same thing with the brain, or is this just a completely different system?

Dr. Dana Ekstein:

This is also very good question because the brain is ... we think it's the most important organ, and it not only defines us, but also is in charge of everything that's going on in our bodies. But it does reside inside the body. And it is influenced by everything that happens in other parts of the body. and we know again, more and more about that.

For example, stroke one of the most prevalent diseases of the brain, so it is really influenced by the way-- by having a high blood pressure and by diseases of the heart and diabetes and all those things. But there are also other things going on in the body that we know can influence the brain in other ways as well.

Because the, the-- what I mentioned before, the vascular diseases so the-- so it's easier to understand because of course, there are also blood vessels in the brain, and they-- once they are occluded, then you have a stroke. In the same way you can have heart disease if the, -- if a blood vessel is occluded in the heart.

But there are also more subtle influences. For example of oral hygiene. People who don't have a good oral hygiene, and they have inflammation in-- like chronic inflammation in their mouth, in the-- in their gums, they are more at risk to have Alzheimer disease and also strokes and other diseases of the brain. So here we don't really understand all the details why it happens, but we know there is an association.

Maayan Hoffman:

And what about what you eat? Alcohol, we know for example, we know impacts the brain. Is there an amount of alcohol that is acceptable, or is it really to refrain? And are there other foods or drinks that people should consider either eating or not eating to maintain their brain health?

Dr. Dana Ekstein:

In terms of alcohol, I don't know that there is a certain cutoff point. But of course, it's not good to, to use it a lot, to drink a lot, and especially not to drink it on a regular basis, because then there are chronic changes in the brain as well. It's very important to keep a healthy diet because of, especially because of the vascular diseases of the brain, of the strokes.

Everything is interconnected, so once the diet also keeps all your body health- healthy once your body is healthy, your brain will be healthy as well. If you are asking, so there are other ways as well to keep a healthy brain. And I think one of the most important ones are exercising with the brain.

Dr. Dana Ekstein:

So not only exercises with the body, exercising with the body, which is also important because, again, once your body is healthy, then your brain will also be healthy. But as you know that you n- you have to exercise your muscles so they are they are, they... You have enough power and strength, then you also have to exercise your brain.

Even retired people in should, it's very important that they stay active and they continue to do things with their brains to learn new things and to be active, like in terms of brain activity.

Maayan Hoffman:

That what exercise is? Is it reading and studying? Is it talking to people? What does a brain exercise look like? Is it a crossword puzzle?

Dr. Dana Ekstein:

So it's important to learn new things. For example, learn new languages, learn a, a new profession. Many people now after retiring they have a new career. So it's we advise them to do that. So to be active, not only passively reading and going to lectures.

Maayan Hoffman:

Interesting. Now, of course, here in Israel, they're talking about the older patients, but here in Israel we've had a number of younger patients suffer from brain injuries, traumatic brain injuries. Our thousands of soldiers who have been fighting on the front lines over the last two years.

How is Hadassah helping these patients recover, and what are some of the long-term challenges that they might face?

Dr. Dana Ekstein:

So yeah, unfortunately, this is really a big issue that we are having, and that I think as a country we are going to see the consequences of this war for a long time now.

In the beginning I think the most important things are treating those patients, like at orthopedics and neurosurgery. But then they go to rehabilitation, and, uh, as we know, as you know, we have a new rehabilitation center at Hadassah. I think they are very fortunate to be treated there.

I've been there, and it's really amazing. I mean, the what we can give those people. But once they're... Once everything is kind of... Like, after the first rehabilitation, then I think we'll have to see those patients more. Also in terms of their mental health, psychiatry and psychologists will have to take care of them. And also brain diseases, I mean many of them are head, head trauma. So then we can see diseases developing in their brains like epilepsy and maybe cognitive issues that we'll have, we will have to deal with. Yeah.

Maayan Hoffman:

And for the average Israeli, I mean, they're still living under a tremendous amount of tension and stress. I mean, tell us about how the brain responds to trauma, what builds resilience in the brain, especially when you're living in an environment like this.

Dr. Dana Ekstein:

I don't know. We are the startup nation, aren't we? So maybe it's because of that, I don't know. But so maybe it does something good. But we actually addressed that question recently when thinking about the stress induced by the war now. So we looked at patients with MS, with multiple sclerosis. And we are able to see that the disease was more active during the first year after the war than the year before. So no doubt the, the stress and the increased stress induced by the war increased probably the activity of the immune system in the brain.

So and we also know that it may increase the blood pressure, and then increase the risk for strokes. So, of course healthy-wise, I don't know about the startups, but healthy-wise, it's better to... for the bodies is better to live in a quiet place. But, we love Israel, and this is our home, so-

Maayan Hoffman:

For sure

Dr. Dana Ekstein:

so we're here.

Maayan Hoffman:

Definitely. Definitely. And in terms of any statistics, and maybe it's too early, but with that preliminary research, are we seeing, for example, an increase in strokes or other challenges as a result of the tension of the war?

Dr. Dana Ekstein:

So, apart you, you're saying about apart from multiple sclerosis

Maayan Hoffman:

Like actual numbers, right? Aside from the MS that you studied.

Dr. Dana Ekstein:

Right. There were some there were some results about that from other centers in Israel saying that this was, like with strokes, it was a more like an acute effect. So, in the first days, there was an increase, but then but there it went down

[Commercial Break – Previous Episode]

Maayan Hoffman:

If you like this episode you'll love our previous episode with Dr. Dina Ben Yehuda, one of Israel's leading hematologists and experts in molecular diagnostics. She discusses the rapidly evolving medical landscape in which doctors may soon be able to tailor treatment not simply to a disease, but to the particular biology, environment, microbiome and lifestyle of the person sitting in front of them.

(Audio Clip from The End of One-Size-Fits-All Medicine)

Dr. Dina Ben Yehuda:

Let's say I have two patients with lymphoma. They're the same age. They have the same disease, you know, if somebody would evade. Exchange the slides in portfolio. I wouldn't have known who is whose they're this. They have the same stage. We give them both the same treatment. One of them. Is cured and the other after four years, we're still fighting for her life with the most advanced treatment. So when we're talking about precision medicine. The main role is to understand what's the difference between these two patients, not only because...

Maayan Hoffman:

We also discuss how precision medicine could move increasingly toward prevention, using a person's biological and lifestyle data to identify risk before disease develops.

And now back to our discussion with Dr. Dana Ekstein.

[Commercial Break Ends]

Maayan Hoffman:

interesting. Now, you're also obviously an expert in epilepsy. So, can you explain what's actually happening in the brain during a seizure, and what new treatments or technologies are showing the most promise?

Dr. Dana Ekstein:

Yeah, I'll be happy to do that. An epileptic seizure is actually an increased and abnormal electrical activities caused by increased and abnormal electrical activity in the brain. And most of the people know what tonic-clonic seizures are, which are the big seizures where the patient loses consciousness and they have convulse-- convulsions. But many, actually many other types of seizures are known as well, and actually, they are more prevalent than the, more common than the tonic-ton- tonic-clonic seizures, like disconnection or other small transient behavioral changes or movements or things like this.

So this is what a seizure is. And in terms of treating epilepsy so I think we are in a very exciting era about that because the treatment of epilepsy nowadays, and until now, it was mainly with medications. And, people have to take every day a medication in order

Dr. Dana Ekstein:

to prevent a seizure, even a short seizure of several minutes happening once every few months.

Which is amazing, because those medications may induce side effects in the brain and also in the body in general. I think the future of treatment of epilepsy, will be much better where we can electrically change the activity in the brain, like with pacemakers, kind of pacemakers.

We already have this kind of technology. Actually, we are going to start using a new type of pacemaker here at Hadassah as the first country in outside the US using that technology. It's called RNS So it's a new type of pacemaker that you can im-

Maayan Hoffman:

Pacemaker for the brain.

Dr. Dana Ekstein:

Exactly. You can implant it directly in the area of the brain that causes the seizure, and it will and it will sense when the seizure starts and prevent it from developing.

Maayan Hoffman:

I'm sorry to interrupt you. W- But people that then would use this would no longer need to take medication, but rather could use the pacemaker instead?

Dr. Dana Ekstein:

So nowadays, they need to still use medications because this technology is still in its beginning. So, but as it develops and it becomes better, I think in the future, in maybe 10 or 10, 20 years from now, this would be one of the first options of treating epilepsy, because it makes much more sense to just treat the cause of the disease and the very focus of the disease in the brain and not the whole body.

So I think... and also maybe in the future, we'll be able to target our medications to the to the epileptic focus and not give it generally to the whole body.

Maayan Hoffman:

More precision type medicine.

Dr. Dana Ekstein:

Yes.

Maayan Hoffman:

And just in terms of, you mentioned that Israel will be the first country outside the US to implement such a pacemaker in the, for the brain.

Maayan Hoffman:

So just tell me, number one, is Hadassah leading that charge? And with that, is it accessible to patients at this point, or is it really gonna be another decade till the average Israeli can get access to the machine with or without medication?

Dr. Dana Ekstein:

So Hadassah has led the process of bringing the technology to Israel. I'm very proud to say that. And for now, it is still not completely accessible to everybody, but we think it has a very good chance to be introduced in the Israeli technologies basket. Over the, over this year, one or two years, I think it can be available to everybody.

Maayan Hoffman:

Now, you've also studied botanicals and herbal medicine- in relation to how that can be used to treat epilepsy and the brain. What kind of natural remedies are best for treating epilepsy, and is there a way for patients to know what they could do on their own versus needing the medicine that the doctor gives you?

Dr. Dana Ekstein:

So yeah I did study that. So it actually was I trained at Harvard many years ago, and my mentor there, it was his idea to study botanicals for epilepsy, Dr. Steve Schachter. And the idea was to use the knowledge of many thousands of years, like in Chinese medicine or in Ayurveda, which is the Indian medicine and to try to understand what compounds may be used as new treatments for epilepsy.

Because the medical treatment of epilepsy, it's It was at the time, and it's also now stuck. Because we have new medications which are safer, but they are not more effective. So this was a way to find new ways, new venues for new mechanisms of treating epilepsy.

Maayan Hoffman:

Are there any specific botanicals that have shown real scientific potential?

Dr. Dana Ekstein:

So there are few that showed efficacy in animal models, because this is the way we first study if a patient is if

A drug is can be used for a certain disease. So there are quite a few like this, and some of them are being studied now in clinical trials. So yeah. Some of the compounds are already much more advanced in being close to used as clinical remedies. Yeah so hopefully we have some ne- good news from there as well.

Maayan Hoffman:

Sure. So when we do this podcast, soon maybe in a couple of years you'll be able to tell me about some new natural medications. Now I wanna jump to Alzheimer's and Parkinson's. We're seeing a huge amount of investment right now in neurogenetic neurogenetic...

Maayan Hoffman:

I'm saying it wrong. Neurodegenerative diseases. And certainly, this is, one of the biggest, what they're saying will be an epidemic, in the next few centuries in terms of the many people that will be suffering from Alzheimer's and other similar diseases. Are we getting any closer in terms of the research now that we are investing in either preventing or, even better, reversing some of the some of the trends toward these diseases?

Dr. Dana Ekstein:

You're right. As the population becomes older- we see much more patients with Al- Alzheimer's disease and Parkinson's disease, all these neurodegenerative diseases. But I don't think you are so wrong, because they are also neurogenetic diseases. my

Maayan Hoffman:

And- Also mistake was an intentional mistake.

Dr. Dana Ekstein:

Yeah.

Maayan Hoffman:

Thank you for allowing me to-

Dr. Dana Ekstein:

because, and this is one of the ways actually to address those diseases, because now we start to understand more about the genetics of those diseases, and this is, again, one of the ways-- can be one of the ways to treat them in the future.

We know now that people with certain genetic traits may have-- may be in more risk to developing those diseases when-- And when we clinically see them, it's actually many years after they started to develop. So in the future, not in the close future, but at some time I hope we will be able to identify the people who are at most risk of having those diseases, and really treat them genetically very early in their lives.

But this is for the later future, I think we do have therapies and ways to improve those diseases even in the early future in the close future and even in the present. Because there are all those new medications for Alzheimer disease, the ones that decrease the amount of amyloid beta, that protein in the brain, which was associated with the disease.

And it is being more and more used today. And we start to understand which are the best patients, with personalized medicine that can benefit from these treatments. So, I think it will develop more and more over, over these years.

[Commercial Break – Lifechanging]

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[Commercial Break Ends]

Maayan Hoffman:

And what about vaccines for Alzheimer's?

I've been reading that we're on the cusp of being able to have a vaccine.

Dr. Dana Ekstein:

The, there was also work done about that. It is still not clinically available, but it's another it's another pathway of research. And hopefully can bring some good news about that as well.

In terms of Parkinson's, we also have the pacemakers, the DBS, the electrical stimulation, which has really been revolutionary for the disease. That is also getting better and better, so have many options.

Maayan Hoffman:

And when we talk about Alzheimer's, we're often talking about it also in terms of the brain economy, that if our brains are not working, that's gonna impact on our ability to produce and to have a strong economy, and how much it's gonna cost society.

In Africa, I know they're talking about a very large percentage of the population, fastest growing older population. Here in the Middle East and Israel, where are we holding? Do we see this as something that's a threat to our ability if we don't come up with a solution for the number of people who are aging and developing these diseases?

Dr. Dana Ekstein:

You mean the effect for society actually of the... So you're right, there is a big effect on society now. And that's why it's so important to put more, to put all the efforts, not only for the physicians, but also from researchers and from governments to help those people.

And now we are talking before the basket committee, and the neurological association in Israel has put the treatments, the new treatments for Alzheimer's disease as first priority for the 2026 basket.

Maayan Hoffman:

And just to clarify for our viewers, the basket is the health basket where we're able to get access to the drugs and treatments.

So I wanna kinda jump to something a little bit more fun, I guess we can call it- ... than disease. But, how much of who we are, our memories, our personalities, our consciousness, can science actually explain today? Do you think that we'll ever fully understand the human mind?

Dr. Dana Ekstein:

Do we want to understand, to fully understand it? I don't know. I don't know. Maybe it will not be so interesting if we understand everything. But yes, we of course are very much interested in the understanding, and probably knowing that we'll never understand the whole thing.

But we do try to understand more and more. And actually, us in the field of epilepsy, we have a very good opportunity to study the brain because our patients, patients with severe epilepsy and drug-resistant epilepsy, who are candidates for those pacemakers or for epilepsy surgeries they have to be studied in order to understand where their epileptic focus is with electrodes that are implanted in their brains.

And those patients, they, we have them tested for several days in a row when electrodes are in their brains, and we record the electrical activity in their brains. So this is a great platform for research as well of all, all our cognitive abilities. And we can work with those patients, and we do it with many collaborations that we also have with research laboratories and try to understand how the electrical activity changes in the brain when they do things differently talk and think about something or everything or have a certain emotion, so this is one of the ways that we as clinicians can really help science.

Maayan Hoffman:

That's super wild. People say, men are from Mars and women- ... are from Venus. Is it true that the male and female brains- ... actually function differently? Is there something we can see scientifically?

Dr. Dana Ekstein:

Actually, not really.

Maayan Hoffman:

So myth.

Dr. Dana Ekstein:

I think it's more like, on an individual basis. Everyone is different. And I don't know, maybe probably at the end men and women are different. But I don't know, maybe it's more the way we are raised or I don't know We don't see a lot of difference in the brain activity in men and women

Maayan Hoffman:

So we'll be able to take an MRI and say, "See, my brain is doing this-" and that's the reason." Technology though is really increasing, in terms of in all the fields of medicine. And I'm wondering, do you imagine a future where, for example, artificial intelligence will help us to diagnose or to treat some of these brain diseases that we spoke about?

Dr. Dana Ekstein:

I don't have to imagine. We already do it. Really? Yeah. So we have like for example, for stroke- ... we have a software, an AI based software which helps us in the emergency room to decide what patients to take for advanced treatments like catheterization of their blood vessels in the brain.

And so we... It already helps us treat the patients, and all the other AI based databases to search for every question we have. It's so easy to find the answer nowadays, so I think the issue, and we of course do it as everybody does, is to learn how to work together with those amazing tools take the most from them, I don't think they will replace us. I think we have to work together.

Maayan Hoffman:

100%. So Professor Ekstein, we are running out of time. Is there anything else that you want to add that I didn't ask you, or you think people should know?

Dr. Dana Ekstein:

Yeah, I wanted to say something about the teamwork. I think it's very important and here at Hadassah it's something that we try to bring, and I think we do it very well, the way in which we work together.

Because now each physician is more and more focused on their subject and their expertise, but the issue is to work to integrate everything and to work together. So I think we do it very well here, and it's very important today not to go to a certain, a good physician, but to a team.

And the other thing I wanted to say is I think I see a very good future because we have so many young residents, and clinicians, and researchers, and I think this, they will take this profession to new heights.

Maayan Hoffman:

Amazing. Thank you so much for spending the time with us today.

Dr. Dana Ekstein:

Thank you, Hadassah, and everybody.

Maayan Hoffman:

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