# The Immortal Mind: An Interview with Neurosurgeon Dr. Michael
https://mindmatters.ai/podcast/ep344

Robert J. Marks:

Greetings and welcome to Mind Matters News. I'm your dualist host, Robert J. Marks. Just to be clear, by dualist, I don't mean in the sense of Alexander Hamilton and Aaron Burr. I don't duel. I believe like our guest today, rather in the alternate definition of dualist, that the mind is greater than the brain. This is the mind-brain problem that because of recent evidence is gaining a lot of traction. I'm an electrical and computer engineer, and when I want facts about something to do with my specialty, I go to practitioners, not philosophers, not theoreticians. I want somebody with hands-on experience. So who better to talk to about the mind-brain problem than the practicing neurosurgeon? And that's our guest today. Dr. Michael Egnor is no stranger to mind matters news. He regularly writes articles and often hosts this podcast. With the Denise O'Leary he has written a book, The Immortal Mind, a Neurosurgeon's Case for the Existence of the Soul.

And if you want to have your mind blown, I guess I was going to say, we're talking about the mind-brain problems, so getting your mind blown is kind of a pun. I was going to say, no pun intended, but maybe it didn't intended. The book addresses some fascinating aspects of the mind-brain problem. I found the book again, mind-blowing. Dr. Egnor is a professor of neurosurgery in pediatrics at State University at New York Stony Brook, and he serves as the director of pediatric neurosurgery there. He's an award-winning brain surgeon. He was named one of New York's best doctors by New York Magazine in 2005. So get ready for a fascinating conversation with Dr. Egnor about faith, science and the mystery of you. Michael, welcome.

Michael Egnor:

Thank you, Bob. It's a privilege to be here.

Robert J. Marks:

This is great. I always like to start out with definitions. So let's start out with a definition. How would you define the mind? We're talking about the mind-brain problem, so I think everybody knows what the brain is, but I'm not sure people know what the mind is. So could you unpack that a little bit?

Michael Egnor:

Sure. Well, first of all, I think that's a great idea because so much of the discussion that we have around topics like this, consciousness, the mind, the soul, all that stuff begin without ever defining it. So people end up talking about stuff that doesn't make any sense because they don't even know what they're talking about. So I'm an Aristotelian or sort of a Thomist. So I'm a strong supporter of the philosophy of St. Thomas Aquinas. So I have a way of understanding the mind that is basically his way. And the ancients did not have the concept of mind. They had the concept of soul. And Aristotle defined the soul as the activity of a living body. And what he meant by that is that if you take a dead body and then you take a living body and you put them side by side, everything the living body has or does that the dead body doesn't have is a soul.

So the soul is not a spooky, ghosty thing, it's not translucent. It doesn't slide out of your body at night and walk around. That's not what a Thomist means by soul. By soul you mean all the stuff that makes you alive, all the stuff that you do. So thinking and reasoning and willing and loving and breathing, and a heartbeat, all of that is your soul. So the mind that us moderns talk about the mind all the time is just

several of the powers of the soul. So whereas the beating of our heart is a power of the soul and our thinking about logic is a part of the soul. Well, the mind is the thinking about logic part. We don't usually include the heart in the mind. So I'd say that my definition of the mind is that it's several powers of the soul, specifically the ability to move your limbs and to move your body. The ability to have perceptions, the ability to have emotions, the ability to have memories, the ability to have imagination, the ability to think rationally, and the ability to exercise free will. So those are the mind.

Robert J. Marks:

Okay, very good. So you used to be a materialist a long time ago. I heard it said when God was a boy, right.

Michael Egnor:

Right, right, right. It was a very long time. As I was saying to Fred Flintstone at the time, it actually wasn't that long ago. It was about 25 years ago.

Robert J. Marks:

And so used to be a materialist, which is in direct opposition to being a dualist. And maybe you could unpack materialism and say a little bit about what the difference is between materialism and dualism, at least in neuroscience from the neuroscience perspective.

Michael Egnor:

Sure. Materialism is the viewpoint that vis-a the mind is a viewpoint that the mind completely supervenes on the brain. And by supervenes, that means that everything that's in the mind depends completely on the brain and that there's no change in the mind without a corresponding change in the brain. So there's no independence. And there are different kinds of materialism. People usually describe three kinds. One is reductive materialism, which is the belief that the mind is the brain in some way, in some weird way, whatever mind state you have, it just is the same thing as a particular brain state. That's called identity theory.

The other reductionism is non-reductive. It's materialist. And that means that everything in the mind is from the brain, but the mind is not reducible to the brain per se, but it has no independence from the brain. And the third kind of materialism is eliminative materialism, which believes that we don't have a mind that is that what's actually going on that we think of as mind is just brain and mind, it's a superfluous word. It's kind of a misunderstanding. And we should probably stop using the word. So those are the three different kinds of materialism. I think they're all wrong and I'm a dualist.

Robert J. Marks:

But you used to think it was right, one of those was right. And then you became a dualist. What led you to believe that the mind is distinct from the brain? What led you from materialist to dualism? What kind of materialist were you?

Michael Egnor:

It's a great question. First I should point out something that you had mentioned earlier that I was kind of a hands-on guy in terms of being a neurosurgeon. And I've wondered over the years, I've known some neurosurgical colleagues who many of whom are quite religious, and there's a little group of people that feel as though they have a little bit deeper insight into the mind and what makes us human. And the

reason for that is that there is really no other group of doctors or scientists who see people before an operation who see and work with their brain and then see them after the operation and get a total picture of what goes on. For example, if you're a neuroscientist, let's say you're one of the leading neuroscientists in the world, actually, there is an excellent chance that you've never, ever examined a patient who had a stroke or that you've never examined a patient who had a head injury. You wouldn't unless you were a doctor.

You've probably never seen a living brain, you've never been in the operating room and looked at the brain. And so you have people who are world experts in fields that they have absolutely no personal contact with at all. It's all theory, it's all textbooks. They put some cells in a Petri dish and they do some little tests and so on, and they think they understand the human mind and the human brain. This is not to say that neurosurgeons understand everything, far from it, but it is a unique experience. I mean, just this morning I was doing an operation where I was using an endoscope inside someone's brain, mucking around, and I-

Robert J. Marks:

Wait, wait.

Michael Egnor:

I probably shouldn't use the word mucking around you.

Robert J. Marks:

You shouldn't use the word mucking.

Michael Egnor:

That's a term of art actually. And I was doing very careful meticulous surgery, and the patient has done very well. But this is the same guy that I talked to an hour before and I talked to an hour after. And so it is a unique perspective. And what I like thinking about it is that it gives neurosurgeons a BS detector that is that when we hear things that neurophilosophers or neuroscientists say that just doesn't add up, we see it clearly. A very good example is that there are parts of the brain, there are some major parts of the frontal lobes, parietal lobes, particularly the cerebellum at the back of the brain that you just don't need, that we can take out and it has no effect on you whatsoever. And yet when you read the textbooks, I mean there are massive volumes devoted, for example, to the anatomy of the cerebellum and all the intricate pathways inside the cerebellum. And it's really quite beautiful, except you can remove most of it and throw it in the garbage. And it has nothing to do with the person's functioning.

And I was amazed. That's one of the things that turned me on this is when I was brought up in a materialist kind of atheist environment, kind of an unchurched environment. And I never thought religion was that important. I liked Christianity. I thought Christians were nice people. I wasn't a malignant atheist, but I just thought it was silly, a nice story, but it's silly. So I lived my life and I love science 'cause I thought science was a wonderful way to get at these fascinating realities around us, the deep truth of nature. And I went to medical school. I fell in love with neuroanatomy and neurophysiology because I figured this is going to give me insight into who I am, into what a human being is, what a mystery to go inside the brain and understand things.

So when I began actually doing neurosurgery and dealing with patients, I realized neurosurgery, there's a lot of cool stuff, a lot of interesting stuff, but it didn't fit the textbooks a lot. I did my training in residency at Jackson Memorial Hospital in Miami in the late 1980s, from '85 to '91, and that was the time that they had the cocaine wars, the gang wars in Miami.

Robert J. Marks:

Oh, yes.

Michael Egnor:

So it was a very violent time. It was so violent actually, that at one point we had to shut the huge medical center, one of the biggest medical centers in the country, we had to shut down the operating rooms for elective surgery because there were so many gunshot wounds coming in. It was basically a war zone. And so I saw hundreds and hundreds of patients with gunshot wounds to the head, all kinds of devastating injuries. And although some of them died and some of them didn't do well neurologically, some of them did. I had patients where I would dig a bullet out of their frontal lobes, and by all the anatomy textbooks, this person should have all kinds of deficits. Oh, I sent home in a week and is doing pretty good, and he's neurologically normal. So there's a lot of stuff I saw that didn't add up.

When I got out into practice, I saw patients. I saw, for example, the baby girl born missing half of her brain. And I told her family that I thought she's probably going to have a lot of problems growing up, and she probably would be rather handicapped. But even then, I knew to be careful and say I couldn't guarantee one way or the other. And she grew up entirely normally, completely normal kid. She's in her early twenties now. She's smart, she's fine. She's got half a brain. I have a young lady who is missing a lot of her brain who has a master's in English literature and is an excellent musician.

I have a little boy who's missing roughly half of his brain who's now, he's an older teenager. He plays football. He's a normal kid, perfectly normal 18-year-old. I had a patient many years ago, a very handicapped little boy who had hydranencephaly. And hydranencephaly is a condition where you're missing the entire hemispheres of your brain so that you don't have anything basically above your brain stem or your thalamus. So all the big parts of the brain are gone, including the cortex of the brain and all the theories that I had read about what makes us conscious is that it came from the cortex in some way, processing of information in the cortex, blah, blah, blah.

And here's a kid with no cortex, no hemispheres, who's perfectly conscious. I mean, he was quite handicapped. He couldn't walk and he couldn't speak and so on, but he's wide awake and laughing, crying, interacting with people, perfectly conscious. So I realized that the stuff in the textbooks didn't have much connection with the reality in many ways. That doesn't mean that the textbooks were completely wrong. There are parts of the brain that are very hardwired and are very precise, and if you have an injury in that part of the brain that's just a millimeter in size, you have a definite problem. I mean, that's certainly true, but there are other parts of the brain that are completely forgiving, and the textbooks don't say a word about that, not a word. So I came away from my early neurosurgical experience thinking there's a deeper truth here. There's something else going on.

The one case that really, really got me going was a relatively young woman who had a brain tumor in her left frontal lobe. And the tumor was probably benign, turned out to be benign, but it had fingers that were growing into major parts of her frontal lobe. And I wanted to get the whole thing out so we could just get rid of it. But her speech area was near the tumor in her left frontal lobe. So we had to do a kind of surgery called awake brain surgery. And of course, my partners always tease me about that. They say, "Well, of course you're supposed to stay awake during the whole surgery. I know you don't fall asleep." So the awake is for the patients and what you want to do. I'm always awake during brain surgery.

Robert J. Marks:

I was a little slow on that, but I finally got the joke. That's good.

Michael Egnor:

That's right. So in awake brain surgery, and it's been done now for about a hundred years, and it's fairly common. And what it involves is the patient is in the operating room, we put their head in a support thing so they can't move. They're given some sedatives so they're not so frightened. And we give local anesthesia like Novocaine, and the brain itself doesn't feel any pain at all. It's the place where all your pain is interpreted, but it doesn't itself feel pain. So if you anesthetize the scalp, people don't really feel pain. So you can open the head and explore the brain without the patient hurting. And so what we do is we do mapping of the surface of the brain to find out where the vital areas are, like the area that controls speech, and we just make sure that we protect, that we don't damage it as we're taking out the tumor.

So I was mapping her brain, found her speech area, and was taking out the tumor, and we had a conversation. So during this several hour operation, we're having a talk about the weather, talking about the politics, talking about what's in the cafeteria for lunch. And I'm having this lovely conversation sucking out most of the left hemisphere of her brain or of the left frontal lobe of her brain to get this tumor out. And at one point she asked me, what's that noise? And the noise was, we have surgical suckers that remove tissue and blood and so on. That was her brain going up my sucker. And of course, I didn't tell her that. I just said, "Well, sometimes the instruments make noise." And she did fine. She never turned her hair. She did well with a tumor. She was cured. And she went home a few days later, and that case haunted me.

I said, "Goodness gracious. I mean, I'm taking out major parts of the brain that are supposed to be the association areas of the brain and all the textbooks that allow you to reason and to think and to think abstractly. And it went up a sucker into a canister as I'm talking to her, and she didn't turn her hair. It was like I was talking to her on the bus." And so I said, "There's something about the relationship between the mind and the brain that's not in the textbooks. There's something more real."

Robert J. Marks:

What part of the brain were you removing and what was it supposed to be dedicated to?

Michael Egnor:

The part I was removing was the anterior part of the left frontal lobe, something that's called the left frontal pole. And there are two areas in the frontal lobe on the left side that really are important. One is the speech area, which is lower down a little more posterior, and the other is the motor area, which is at the very posterior part of the frontal lobe.

Robert J. Marks:

But you saw no hesitation in her speech though, it sounds like.

Michael Egnor:

Right, right, because I protected that part.

Robert J. Marks:

Oh, you did? Okay.

Michael Egnor:

Yes, yes, yes. In fact, that was the reason for doing the awake brain surgery. What we do is we have them talk, and then I use an electrical probe to stimulate the surface of the brain and the probe, when

you're over the speech area, it messes up the speech. So when you're stimulating the speech, she will have a speech arrest where she can't talk for a few seconds, and so you just map it out to where you know these particular gyri are the gyri that she uses for speech. So we just protect them and make sure we don't injure them because those gyri look exactly the same as all the other gyri. And so you had to be careful what you take out. So it was very clear that she was perfectly normal through all of this. Yet the textbooks have all these fancy diagrams. I mean the 19th-century neuroanatomists who named all the gyri and so on, and all that was just gone and she was fine.

Now, there are parts of the brain where if you even touch that part of the brain, the person has a serious problem. So it's not all like that. In fact, one of my professors when I was training in neurosurgery said that the essence of neurosurgery is knowing what you can get away with. And because there are things you can't get away with, but there are things you can. So I became a bit of a skeptic, at least of traditional neuroanatomy and neurophysiology that doesn't describe things too well. And then you realize that the people doing the neuroanatomy and neurophysiology probably have never seen a living human brain. This is all removed several steps from reality.

Robert J. Marks:

And if I could interject something personally, all the people writing about artificial intelligence probably have never written a line of code nor understand the difference between error-backed propagation and Adaline neural networks.

Michael Egnor:

Absolutely.

Robert J. Marks:

They have no idea. It's a big echo chamber, and they're all reading what each other have written, and they're just expounding on that, and it's inaccurate. You have people like Henry Kissinger writing a book on AI. What does Henry Kissinger know about AI? There was a book, I think it was by Laura Ingraham about actors that says, "Shut up and act." We don't want political views. You don't know anything about them.

Michael Egnor:

Absolutely.

Robert J. Marks:

So that's the reason talking to practitioners is so important, like you. This is great.

Michael Egnor:

And the interesting thing is, I think in some ways the reason that people who really don't have experiential knowledge, which is what this is. People who don't have experiential knowledge with things like AI or with things like neurosurgery, they'll write about things like this because it's easy to do so because you're not tethered by reality. You can just write all the... I mean, some of the debates people have, for example, a very good example of the insanity of this is that when you look at the list of theories of consciousness, and I have a list right here. These are the current theories of consciousness, the higher order theory, the global workspace theory, the integrated information theory, the predictive processing theory, the attention schema theory, learning-based theories, affect-based theories. These

are all theories. Each one of these theories has scores of philosophers and neuroscientists who are advocates for them. They populate journals with debates about whether global workspace theory is more acceptable than attention schema theory and all of that. And all of these theories depend upon processing in the cortex of the brain for consciousness.

Robert J. Marks:

And they're all materialistic, aren't they?

Michael Egnor:

Oh, yeah. All of them.

Robert J. Marks:

All of them are materialistic.

Michael Egnor:

But I have patients in my office who don't have a cortex who are conscious, and these people don't know it or they don't care. There is a neuroscientist named Mark Solms with whom I've actually done a podcast who is a good guy. He's a very thoughtful neuroscientist who is aware of these problems, and he's a materialist. He still believes in the materialism, but he is attuned to this. He does believe that neuroscience is simply untethered from any kind of appreciation of reality, but there aren't many neuroscientists who look at it that way.

Robert J. Marks:

I think in talking to you, I remember that most neuroscientists have never touched a brain or never seen a brain.

Michael Egnor:

Right. Or a living brain.

Robert J. Marks:

And so they're a big echo chamber talking back and forth. Absolutely. Some of the things you mentioned are just fascinating, and they're in your book. One of them was about a patient whose brain was removed and replaced with water. Could you talk about that?

Michael Egnor:

Let's see. Remove and replaced. There are many situations where you will remove a significant part of the brain-

Robert J. Marks:

And then replace it with water?

Michael Egnor:

Well, the water fills by itself. The brain secretes cerebral spinal fluid-

Robert J. Marks:

I see.

Michael Egnor:

And so the cerebral spinal fluid fills the hole. And yeah, a lot of people have large holes both from surgery that they needed. Many people are born with large holes, gaps in the brain from strokes inside the womb and so on. And while some people do have disabilities because of that, many people don't. And there are probably several million people walking around with heads mostly full of water, who are perfectly normal people, and sometimes they don't even know it. Meaning if you haven't had a brain scan, you're fine. You wouldn't even know it.

Robert J. Marks:

Fascinating. Could you tell us about Adrian Owen that you talk about?

Michael Egnor:

Sure. Adrian Owen is a neuroscientist who was in Cambridge, England. I believe he's currently at the University of Indiana, if my memory serves me right, but he worked in Cambridge for many years, and he was exploring a condition called persistent vegetative state. And persistent vegetative state is a state of brain damage. When a person has severe damage, usually either from trauma or from a massive stroke, and it's so severe that they are one step above being brain-dead. Brain-dead is where your brain is dead. There's just nothing there. But this is just one step better than that. It's deeper than coma, for example. It's technically inaccurate to call it the deepest level of coma because it's deeper than coma.

And the persistent vegetative state presents as a person with this terrible injury, they're in a coma, and then at some point, weeks or months later, they open their eyes and they can have sleep-wake cycles. But there's no sign that they have any awareness whatsoever of anything around them. And the traditional understanding of persistent vegetative state has been that there is no mental state present, meaning this person is quite literally a vegetable. I mean, you have as much of a mind as a tomato does, and they're basically just a shell with no mind. Terri Schiavo was in persistent vegetative state, you may recall.

Robert J. Marks:

Oh, she was really in the news.

Michael Egnor:

Oh, yeah. Yeah. It was a big deal about they starved her to death many years ago, and it was a tremendous ethical question. And so the medical thinking was that persistent vegetative state meant that you don't have a mind at all. You're just a shell. So Adrian Owen realized what anybody with any common sense would realize is that when you have brain damage that severe, how do you know somebody's just a shell? That is that you can ask the broader question, how do you know another person has a mind? And the way you know is by their behavior, because there's no other way of knowing. You have no direct contact, so you have to listen to what they say or watch what they do, or read what they write and so on. And so it's always behavioral. And Owen noted that these people in persistent vegetative state had so many disabilities.

How could you say that they didn't have a mind? Because you can't assess their behavior because they're paralyzed. They're just laying there. So he thought of a clever way to assess their mind. He used

a technique called fMRI imaging or functional MRI imaging. And functional MRI imaging uses MRI scans of the brain, and it uses a technique called BOLD, which is an acronym, and I actually forget what the acronym stands for, but BOLD represents changes in blood flow in regions of the brain. And it's been known since the work of a guy named Sherrington back around 1900, that when a part of your brain is active, that the blood flow in that part of the brain increases. It's like your brain tries to get more blood there to help all the metabolism. So by looking at patterns of blood flow on fMRI, you can get a sense of what the brain's doing and what's going on.

And there's been a lot of studies. We even use it somewhat clinically ourselves, to study the brain before surgery. So what Owen did is he took a woman in her early thirties who had had a car accident and had been diagnosed as being in persistent vegetative state for several years, a very reliable diagnosis, meaning that he got the best neurologist. Everybody said, "No, there's no their there, this lady is just a shell." So he put her in the MRI machine, put a set of headphones on her, and he started asking her to think about things. He said, "Think about walking across the room, think about playing tennis, think about stuff." So on the fMRI imaging or her brain was this little shriveled thing, areas lit up, like she was thinking, but of course he couldn't be sure that this was really thinking. Maybe she was just responding to sound or something. Maybe it was just a reflex.

So he took 15 normal volunteers and put them in the fMRI machine, asked them the same questions, and their brains lit up basically the same way hers did. So then he did something very clever is that he took her back to the MRI machine, and this time he asked the same questions, but he scrambled the words so that the same noises were going into her head, but they made no sense and nothing lit up. The only time her brain lit up was when what he was saying to her had semantic meaning, had semantic content. So he said, "I showed that she understood."

So he published this in the Journal of Science in 2006, and the title of the paper has become a famous paper. It's Detecting Awareness in the Persistent Vegetative State. And many people have followed up on his studies, and about 40% of people who've been diagnosed in persistent vegetative state who've been studied using this technique. And there are other ways of doing it using EEGs and PET scanning, about 40% of people, you can converse with them in this deeper than coma level of coma. There are people who do mathematics. There are people, you can ask them, what's six plus eight, and you give them answers, and when you get the right answer, 14, they're-

Robert J. Marks:

But how do they respond back to you? How do they communicate with you?

Michael Egnor:

You get codes with them. For example, sort of paraphrasing, one of the groups found that with one man that if you think about your sister, that's a yes. If you think about your brother, that's a no.

Robert J. Marks:

Oh, wow.

Michael Egnor:

And then there's a pattern when I think about this sister, a certain shape to the way the brain lights up and a brother is a different shape.

Robert J. Marks:

That's very clever, by the way.

Michael Egnor:

Sure.

Robert J. Marks:

Good.

Michael Egnor:

And there are people, for example, there's one gentleman who's been described in the fMRI literature who was in persistent vegetative estate who would give detailed family histories. He'd say, "My uncle worked as a steel worker." The questioner would say, "Do you have an uncle?" And his brain would light up, yes. He'd say, "Is your uncle still alive?" And the brain would appropriately light up, yes or no. And they'd say, "Did your uncle work as a doctor?" And the brain would say, no. "Did he work as a steel worker?" It'd say yes. So people can describe intimate aspects of their lives like this. So it's even gotten to the point now where now there's a separate diagnosis called minimally conscious state, where if you find a person who does have these reactions, then of course they're no longer in persistent vegetative state because they're not the least bit vegetative. They're not a vegetable. Now they call it minimally conscious state, which is also not true because they're not minimally conscious, they're conscious. It is just that they can't express their consciousness. They can't behave because their brains are damaged.

Robert J. Marks:

That is fascinating. One of the questions I have, and let me just ask it to you. Can you explain terminal lucidity and paradoxical lucidity?

Michael Egnor:

There's a phenomenon that happens a lot. Many, many people see it. In fact, I tend to think of it as the rule rather than the exception that people who are in a very bad mental state, typically patients with Alzheimer's, will have episodes of remarkable awareness and lucidity that come and go. It classically has been called terminal lucidity because sometimes, but not always, these episodes of lucidity happen just before they die, that say some person who's really been suffering from Alzheimer's for say a decade, and towards the last week of their life, they may have a period of an hour or two where they just wake up and they're fine. They're talking about old times, et cetera, and then they drift back off again. But there's been resistance in the medical community to calling it terminal lucidity, because while it does often happen at the end of life, it's not always. Sometimes it happens just any old time, and they don't want to scare families into thinking that when your mom is more with it, it means she's about to die. So now they call it paradoxical lucidity.

Robert J. Marks:

I see.

Michael Egnor:

And in some ways, it's kind of similar to Adrian Owen's work with persistent vegetative state in a sense that there's more in there, that this idea that the mind is yoked to the brain, 100% that you've got Alzheimer's, your brain's shot while your mind's shot, or you've got persistent vegetative state, your

brain's gone, your mind's gone. It's not entirely true. The connection between the mind and the brain is a much more subtle, frankly, much more interesting idea than just the notion that the mind is just like a secretion from the brain. The mind is much more than that.

Robert J. Marks:

Boy, that's fascinating. We're going down some of the different incidents and cases that have existed. What's the story of Pam Reynolds? I think I've heard you talk about this. This is just incredible.

Michael Egnor:

Yeah, she's a remarkable story. Pam Reynolds, probably the best documented near-death experience that we've ever had. Just a little bit of a background. One of the problems with near-death experiences with understanding them is that they happen almost invariably in chaotic situations. And nobody plans to have a near-death experience. You don't put it on your calendar. So when it happens, everybody is rushing around doing CPR, trying to save the person's life. So it's hard to study scientifically because again, it's not something you can do in a laboratory. But there are a couple exceptions to that, and Pam Reynolds is one of them in that she was studied very well just because of the circumstances. Pam Reynolds was a woman in her thirties who started having headaches. She was, I think from Atlanta, and she went and got worked up, and she was found to have a very large aneurysm, a ballooning out of a blood vessel at the base of her brain.

And the aneurysm was in one of the most important blood vessels in her brain, and it was going to kill her, meaning that it was not operative. There was nothing you could do for it and it was over apparent of months she was probably going to die. So there is a neurosurgeon, I think he's recently retired, named Robert Spetzler in Phoenix, who has been the best neurosurgeon in the world at treating aneurysms. And I know him from the neurosurgical circuits, and he's a great guy, and he is willing to do outside-of-the-box things. So she went to him in Phoenix and asked him to see if he could do something about her incurable aneurysm, and he proposed a radical procedure. The problem with the aneurysm is that it involved the basilar artery, this huge artery at the base of the brain that goes to the brain stem and it was extremely deformed.

And what Spetzler had to do is he had to rebuild it. He had to basically reconstruct the artery, but he couldn't do it while the artery was flowing because she'd bleed to death. He had to open the artery and rebuild it but you can't do that when there's blood flowing through it. So he would have to stop the blood flowing through it for about 30 minutes to rebuild the artery. But if he did that, then she would die from having the blood stopped to her brain. So what he proposed to her was that he would cool her body down to about 50 degrees Fahrenheit and put her almost in a state of suspended animation under anesthesia. Then he would have the cardiac surgeons put her on cardiopulmonary bypass. They would control her circulation. They would stop her heart so that her heart was stopped. Then they would stop the bypass.

So there was no blood flowing in her body, but she was cooled down to 50 degrees so she could live longer. Normally you'd be dead within minutes, but you can live for 30, 40 minutes with your blood flow stopped. It's why people who fall into ice water can sometimes get rescued later. And while they were doing this, he was opening her head in the operating room to get to the aneurysm. So they stop her heart just when he reaches the aneurysm. He then raised the head of her bed and drained the blood out of her brain completely. So not only was she dead, the blood was drained out of her brain, like you drained water out of a glass because he had to see what he was doing. So then he opened the artery, he fixed the artery 30 minutes, and then had them restart her, start her blood flowing again, start her heart again, all that stuff.

And during this procedure, he had to be sure what was happening inside her brain. So he had wires hooked up to her ears, to her scalp, measuring all her brain activity carefully during this, because he had to make sure she had no brain activity when he was doing this, because if she had brain activity, it would mean that her brain was metabolizing and could be damaged by this process. So it was a very, very carefully done scenario. And she did well. The operation went beautifully. He was able to repair the aneurysm. She came around. They got her heart restarted. So she's in the recovery room. He goes in to see her and asks her how she's feeling. She says, "I'm doing pretty good, actually. And I watched the whole operation." So Bob looked at her and said, "What?" And she said, "Yeah, I saw everything you did."

Robert J. Marks:

Oh, wow.

Michael Egnor:

And so he said, "Well, what do you mean?" And she said, "Well, as soon as my heart stopped, I heard a noise. I think it was like a D note." She was a musician, so she knew music. She said it was like this hum of a very specific note. "And then I felt that I popped out of my body. I could actually hear a pop. And suddenly I was aware of myself and I was above myself, and I was floating up to the ceiling so I could watch the whole room." And she said, "but it was beautiful vision. It was vision of more detail and color, and I've never seen anything like it. I could see everything. And I wasn't afraid. I was actually very calm. It was fascinating." And then she described to him the instruments he used. She told him what they looked like and they're instruments that a lay person wouldn't know.

Then she said, "And this is what you talked about." And she told him the conversations he had, and she told him what the other doctors said, and they were playing music in the room, and she told them the songs that they played in music. And then she said, "So I was watching the operation from the ceiling, and then I saw this tunnel, this huge tunnel, and I felt like I was being sucked into the tunnel. And I went down the tunnel. And on the other end of the tunnel, I met," I think she met her grandmother who had previously passed away. And she said it was a beautiful world. It was a beautiful place. And her grandmother was there, and there was, let's see, I actually have it written down. There was, let's see, her grandmother, her uncle was there who had died. And they all said that it's not your time. "You're not supposed to come here yet, and you have to go back."

And she was kind of bummed out. She said, "Well, it was so pretty there." So she got sucked back down the tunnel. And she said one of the most unpleasant experiences in her life was going back into her body because she said it was going into ice water, which it was because her body temperature was 50 degrees. So she said and she saw it. So she became very famous for this, and she was completely monitored, meaning they knew she had no brain waves. They knew she was brain-dead. They knew there was nothing in her brain, but she described everything that happened in the operation in great detail. So it was just by coincidence and incredibly well monitored near-death experience.

Robert J. Marks:

That's great. We're going to talk about near-death experiences in the subsequent chat that we have, but yeah, that's really strange stuff. Last case I want to talk about, and this is one where there were conjoined twins that actually shared parts of the brain. And so is the mind the same as the brain? Well, if you got one brain which is connected, maybe you have one mind, but these twins had two minds. Could you unpack that and tell us a little about that?

Michael Egnor:

Sure, sure. They're named Tatiana and Krista Hogan, I believe their names are. There are a number of people who are conjoined twins who share parts of their brain. For Tatiana and her sister, they share thalamic bridge, which is a bridge of brain tissue between the deepest parts of their brains and they're joint at the head. And so they can't be separated. Separating them would probably kill both of them, but they share many things. They share control of limbs. Each one controls several of the other person's limbs along with that person. So they can cooperate. They can both move a leg together. They share a sensation. You can touch one of them on the knee, and the other one will tell you that you're touching her sister. They share vision.

One of them can see, I think it's out of both of the other twins and the other can see out of one of her twins eyes. They share emotions. Sometimes they can tell if the other person is upset. They feel the emotion. It's not just that they're aware by behavior, they actually feel it. So it's a very, very fascinating thing. The one thing though that they don't seem to share, and this has not been studied carefully, I really wish it had been or wish it was, but I don't believe there's any evidence that they share intellectual activity. That is, there's no evidence that, for example, one girl could study history, the other girl could study geometry, and they both pass their exams, that the intellect is different.

And they're very different people. They have different opinions about things. They feel differently about all kinds of things. They have different moods often, so that there are differences and there are similarities. And my sense of reading about them, I've never met them, I've never examined them. I actually wish I could because there's some fascinating science that you could do with them. But my sense of them is that they are obviously two distinct human beings, meaning that one is Krista and one is Tatiana, and they're different kids, and they each have their own likes and dislikes. They like certain foods. One of them will like one food, another will like another food. They disagree. They have fights. So can you imagine they're having a fight and they're joint at the head.

Robert J. Marks:

You can't walk out of the room.

Michael Egnor:

Right, right, right. Exactly.

Robert J. Marks:

Wow.

Michael Egnor:

So they are different people, yet they share a lot of things. But I think that what they share and what they don't share is fascinating because it tells us a lot about the mind. They share perceptions. They share the ability to move. They share emotions. They share memories to some extent, but they don't share the ability to reason. That is if one girl learns her times table, the other one doesn't know the times table. Has to learn it herself. They don't share free will. One girl may want to do something, her sister wants to do something else. So there are aspects of their souls. They clearly have two souls. They're linked in some respects, but not in others. And I think that tells us a lot about the mind-brain relationship.

Robert J. Marks:

Michael, this is fascinating. Thank you. We've been talking to Dr. Michael Egnor, who is a neurosurgeon, and with Denise O'Leary, he has written the book, The Immortal Mind, A Neurosurgeon's Case for The Existence of the Soul. If you've enjoyed these stories and this background that we've talked about today, get the book, The Immortal Mind, A Neurosurgeon's Case for the Existence of the Soul. So I think the bottom line is consciousness isn't merely a side effect of neurons, that we are not computers made out of meat. As we've seen, the mystery of mind extends in the moments of silence, suffering, and even clinical death. Dr. Egnor has given us a lot to ponder. So stay curious, stay open. Until next time, be of good cheer.

Announcer:

This has been Mind Matters News with your host, Robert J. Marks, explore more at mindmatters.ai. That's mindmatters.ai. Mind Matters News is directed and edited by Austin Egbert. The opinions expressed on this program are solely those of the speakers. 