Shrink Rap Radio #154, May 22, 2008, The Good News on Memory

Dr. David Van Nuys, aka "Dr. Dave" interviews Dr. Sue Halpern

(transcribed from www.ShrinkRapRadio.com by Susan Argyelan)

Excerpt: *This is one of the questions that I come wandering around the world asking the great neuroscientists of the moment: Should we be spending $35 a year on the New York Times crossword puzzle subscription? And the basic answer was, if you like doing crossword puzzles, do crossword puzzles. But the literature is really not…it doesn't really suggest that it's protective or preventative to do crossword puzzles, or any other kind of puzzle. It's a useful thing to keep your mind engaged, clearly. But all of the research tends to indicate that just as important – in fact, more important – than simply keeping your mind engaged is keeping your mind engaged while you're in a communal, social kind of setting.*

Introduction: That was the voice of my guest, Dr. Sue Halpern, author of the new book, Can't Remember What I Forgot: The Good News from the Front Lines of Memory Research. Here's what she says about herself. "I was educated at Yale and at Oxford, where I was a Rhodes scholar, and from which I received a doctorate in political theory. Before I received my degree, I worked with young men just released from prison and with welfare mothers at the Vera Institute of Justice in New York. After I got my degree, I spent a few years teaching, first at Columbia Medical School (ethics) and then at Bryn Mawr (politics), all the while writing for various magazines and newspapers. Writing was more compelling to me than teaching, so I left academia to write full time, and to more to the Adirondacks, where I wrote my first book, Migrations to Solitude. In addition to writing, I helped start and edit, with Robert Coles and Alex Harris, the award-winning documentary magazine, DoubleTake; helped start the first public library in my town; and founded and ran a wilderness-based elementary school there. In Vermont, where I am a scholar-in-residence at Middlebury College, I am on the board of three schools and the director of a national civic education program for high school students that uses journalism to inculcate democratic values called The Face of Democracy, which I founded in anticipation of the 2006 midterm elections. Can't Remember What I Forgot is my fifth book; the movie version of my last book of non-fiction, Four Wings and a Prayer, was released in late 2007. I live in the Green Mountains in a town of 500, on land once owned by Robert Frost. I am married to the writer and environmental activist Bill McKibben, and we have a teenaged daughter." Now, here's the interview.

Dr. Dave: Sue Halpern, welcome to Shrink Rap Radio.

Halpern: Hi David.

Dr. Dave: We're going to be talking about your book on memory, Can't Remember What I Forgot, but I have to note that I happily just discovered that you're the author of the lead story in this week's New Yorker magazine.

Halpern: That's true.

Dr. Dave: Yeah…which is about Virtual Iraq. So, there's another feather in your cap. A new book out and the lead story in the New Yorker!

Halpern: It was a good week.

Dr. Dave: Yeah, I would say so! And also exciting for me is that you and I have been traveling in some of the same circles, because I noticed that one of the people who kind of stars both in your book and in your article in the New Yorker, which is called "Virtual Iraq: Using simulation to treat a new generation of traumatized veterans," and one of the key figures in both the book and that article, even though they're about disparate subjects, is Dr. Skip Rizzo. And I actually interviewed him myself, oh, some long time ago about his work in virtual reality and the treatment of trauma. So…

Halpern: I'm sorry. He's a really interesting character, and I actually met him in the course of doing the work for the book, and I just was really interested in *all* the stuff he was doing using virtual reality, and so that's how the piece evolved.

Dr. Dave: Yeah, I can imagine so. I unfortunately have not had the privilege of meeting him in person or going to his lab, as you were able to do. I wish I could, but I found him to be very personable in our interview, my contact with him on the phone. He was very friendly and open and a fun guy, and you kind of managed to communicate that in your article in the New Yorker. And in other places where I feel I must be doing "the right stuff" because I also discovered in your book a reference to Dr. Daniel Amen, who's another person that I interviewed and in your book on memory…

Halpern: Mm-hmm.

Dr. Dave: And then I did an interview with someone on memory and I don't know… I didn't see a reference in your book, and I'm just wondering if you know him, or know of him, Dr. Thomas H. Crook?

Halpern: No, I don't.

Dr. Dave: Okay. He's a psychologist and the author of a book called The Memory Advantage: Improve Your Memory, Mood, and Confidence Throughout Life. And he mentioned a product called MemoProve, which I think is a nutraceutical. And I tried it for a while, but I have to say it didn't seem to help me. (laughs)

Halpern: Most of that stuff is just not really worth your time, and it's definitely not worth your money. You can do a lot of other stuff that doesn't require putting out lots of cash.

Dr. Dave: Yeah…

Halpern: I write a lot about these things. People are really trading on other people's fears and desperation, and desire to be younger…and better…and faster, and all these things that are kind of in front of us now. And it's a hard place to be if you're a consumer, especially an aging consumer, because you don't know what's coming at you, and you don't know who to trust.

Dr. Dave: Right. Definitely. We get so many conflicting messages. Well, you have such a varied background as a scholar and as an author. And your degrees seem to be in political theory and ethics, and yet here you've written an article that, the section is called – in the New Yorker – they're calling it Annals of Psychology, and your book is about memory, so I'm wondering (laughs)…given your background, how did you get off into this psychological space?

Halpern: Well, it's funny. I've written a lot about a lot of different things, and one of the really most wonderful things about being a journalist and a writer is that you can explore your interests without anyone saying, "Well, wait a minute. Who are you to do that?" And one of the great other things about being someone like a scholar or someone with that set of skills – those really fine research skills, which is what you really learn when you're writing a dissertation – is that you can just kind of throw yourself into a subject and learn it, and trust your instincts that you'll do just as good a job as you can possibly do learning that subject. And so that's kind of…I had the luck of having these two twin things going on in my life, which is why… You know, I wrote a book on butterflies which has nothing to do with anything, except that I was interested in the subject.

Dr. Dave: Yes. Well, you're background as a Rhodes scholar and as a student at Oxford, evidently it served you well as a person who can learn to learn.

Halpern: It really has. You know, it was a choice between doing this kind of work and, say, being an academic, and the thing about being an academic is you're sort of tied to one discipline, and that really didn't suit me. But what did suit me was the concept of continuing to learn as I went along, and that's what's the greatest part about being a writer. And so I feel really, really privileged to be able to do the kind of work that I do.

Dr. Dave: Yes. Well, "privileged" is right. In the course of doing your book, you actually made yourself a research subject in the top neuroscience labs and hospitals around the country, taking all the paper-and-pencil tests that they had to offer, their SPECT scans, their fMRI scans, and so on. How in the world did you get to do that, did you get access to these busy scientists?

Halpern: Well, it's funny. Almost anyone can do this (laughs) if they so desire, in the sense that there are plenty of clinical trials out there which need volunteers. And the volunteers typically have to be…well, there are requirements. So, some will say, you know, you need to be between a particular age, or you need to be a woman or a man, or you can't be a smoker, you have to be a smoker…it just depends. They have their qualifications. And then if you fit, they will say yes or no. And so I just looked. There are websites online – the government runs a big one that has lots and lots of clinical trials listed. I was also interested in a couple of particular research groups, so I looked on their websites to see if they had trials going on. And that's how I got myself in the door, and invariably I would say, "I'm writing about this stuff; I really want to understand how it works." And that turned out to be a wonderful thing as well. So not only was I getting tested, but the researchers were willing to spend the time with me both before and after to explain what was going on, what they were looking for, and what my particular contribution was.

Dr. Dave: Yeah, clearly they gave you a lot of space and a lot of attention. Did you already have a book contract, or was this a leap of faith on your part?

Halpern: Let's see. I had a book contract when I first contacted the research group at Columbia, I believe, but I wasn't completely sure how I was going to do this. I had an idea, but I hadn't yet gotten accepted into any clinical trials. So, I was hoping that that was going to happen, but it took a little while. It took a couple months before… of me applying, and then getting in the door, for a number of these places. So, I had already started to do a fair amount of the research, the basic going to the library, doing the reading, before I ever showed up in anyone's lab, because I didn't want to show up and be a complete neophyte. I wanted to show up and have the language that would let me have real conversations with these people, so that we weren't just going over the same, basic stuff; that we were actually really talking about something else that's substantive.

Dr. Dave: Yes, and you really did your homework. I have to say that I also marveled at your ability to digest a lot of very complex information, and then to write about it in such a conversational way, such that I even thought I might be understanding it.

Halpern: Yeah. Well, that was my goal. And that was the hardest – by far, the hardest – part. So getting tested, that's hard in a particular, sometimes emotional or physical way. But being able to master the material enough to be able to talk about it in a way that anyone could understand it – even me – that was my goal: I had to understand it. And I had a kind of person in my mind who might be reading this book, and it wouldn't be someone who had spent any time reading neuroscience, or even someone who had spent a whole lot of time, say, in an examining room, having this conversation about themselves. I wanted the people who are interested in the subject – particularly who are worried about the subject – to be able to pick it up, read it, understand it, and then have a much better grasp of this whole field, so

that when they went to talk to their physician, they were armed, they had a lot of information.

Dr. Dave: Yes, and boy, it's just packed with information. And I gather that as you went into these tests, you had a little bit of trepidation.

Halpern: (laughs)

Dr. Dave: There was the chance that you were going to discover that maybe you had Alzheimer's, or some problem developing. Were there things going on in your life that were causing you to question your memory?

Halpern: You know, I wasn't really questioning my memory, and then I worried that I was just in some sort of denial, since everyone else was questioning their memory. I had a pretty good memory, so it wasn't something that I particularly worried about. But my dad got sick, and he got sick with a kind of memory loss that was basically undefined, so that by the time he died, the doctor, all he could really say was, he didn't think he had Alzheimer's disease. Well, that's a really weird diagnosis; it's sort of you're nowhere. And he could have had it, he might not have had it, who knows? And Alzheimer's disease tends to run in families, so suddenly there was this possibility that I hadn't really taken in fully until I showed up at the first place where I was getting scanned. And suddenly I thought, oh, my goodness! These guys are going to look into my head. It's like looking into my future. They're going to find something out about me that I have no idea about.

Dr. Dave: Yes, sometimes…I remember when I was just starting out in psychology as a graduate student, going to cocktail parties, and people would, "Oh, you're a clinical psychologist? You're going to be a clinical psychologist? You're probably reading my mind." We all have that fear that somebody could see something that we can't see ourselves.

Halpern: Right. And when it comes down to being an artifact like a scan, it's a picture…

Dr. Dave: Yeah.

Halpern: And someone else can read it, and you can't read it. You don't even know what you're looking at.

Dr. Dave: And it's really scientific, so it must be true, too.

Halpern: Exactly!

Dr. Dave: (laughs) Well, I was fascinated and perhaps even relieved to read that there's a difference between normal memory loss due to aging and Alzheimer's. So let's start by focusing on "normal" memory loss. Does it happen to everybody?

Halpern: Yes. And depending on your mood, that's either a very good thing or not. I take it as a very good thing. And the reason I do is because it happens to everybody, and it just means that when you misplace your keys or can't remember someone's name at a party, or something like that, you shouldn't automatically jump to a conclusion that you're getting sick. You should rather say to yourself, "Gosh, this is just part of getting older. This is just a normal thing that just happened to me," and let it slide. So, I think I'm in the minority, perhaps, right now, but I'm trying hard to get other people over to my side that saying 100% of us will get some kind of memory loss is actually a relief. It takes away a lot of the burden of assuming we'll be sick.

Dr. Dave: Well, I'm trying to take it that way myself because I notice all sorts of memory issues for myself, where I have difficulty remembering the names of movies that I saw just even a day or two ago, and it drives me crazy. I'll be sitting in the movie, and I can't remember the name of the star that I'm looking at, even though it's somebody whose name I have known quite well and will be able to remember later. So I read your book very closely, with considerable interest as a result of those kinds of experiences. It does seem to me that either it doesn't happen to everybody – because I know people that don't seem to, that it doesn't seem to be happening to, at least not to the degree that I'm experiencing it – or it happens at different ages and different rates for different people.

Halpern: Yeah, I think that's more likely, and it's a physiological process. People…as they get older, some people lose the color of their hair. Their hair goes gray sooner than other people.

Dr. Dave: Right.

Halpern: Some people have problems with, I don't know, their eyes sooner than other people do. It's just a function of your body going through its life cycle. It also depends on what your strengths were to begin with. So, if you were the person who always remembered the name of the star on the screen, that could be really frustrating, and you might notice it more than if you just never really were good at that to begin with.

Dr. Dave: Yes.

Halpern: But I do think it's not something you can point to and say, oh, at age 60, this is what your memory should look like. It doesn't work that way. It's idiosyncratic.

Dr. Dave: Right. Now, I seem to recall that somewhere early on in the book, you gave an age. And it was either – again, my failing memory – it was either 8 or 18, as I recall, where I think you said that some form of our memory starts to decline.

Halpern: Yes. (laughs) It was 18.

Dr. Dave: It was 18? Okay.

Halpern: Yeah, it was 18. So, that should make everyone say, "Hey, wait a minute. That's pretty cool. It just starts happening then." And the other thing, I think, that's really important to remember is – or that you should use to feel better about yourself is – you should go into any middle school in the country and ask to see the lost and found, because kids are constantly forgetting stuff. They're always forgetting stuff, and we don't normally say, "Oh, my goodness! This person must be experiencing early-onset Alzheimer's." We just say, "Oh, well, they don't remember." So, it's only as we get older that we start ascribing these anxieties. We give them a name, and then we're really scared.

Dr. Dave: Yes. Now, what do we know about why our memory starts to decline at age 18?

Halpern: Basically, your memory is a function of a lot of different moving parts in your brain. One of the key moving parts is a part called the prefrontal cortex, which is the part that sits right behind your forehead. And it is crucial for lots of different things; for instance, it's crucial for attention, and it's crucial for planning. It's a key element of your personality, and it starts to get smaller as you get older. It starts to move slower; it becomes hypometabolic. It's just not as tip-top as it was. And it starts having not as much of the neurotransmitter, dopamine as it had had before, so that slows it down as well. So, your reaction times aren't as quick, your ability to focus and concentrate begins to deteriorate, and all of this happens over time. So that's one issue that's crucial. And one of the reasons it's really crucial is because… for two reasons: You need your prefrontal cortex to pay attention, and attention is a *huge* part of memory. If you're not paying attention to something, there's no way that you're going to remember it because it's not going to get in, it's not going to get into your memory. So, not being able to focus and concentrate can be more important than having a faulty memory. And then there's another moving part in your brain called the hippocampus, and it's the gatekeeper of memory. And the reason why it's the gatekeeper is that it takes in all the sensory information that you acquire through your daily life. So, what you see and hear and taste and feel, and so on… And it, too, starts to deteriorate as you get older. So if something doesn't get in because a) you haven't attended to it, or b) because you've got a problem with your hippocampus, there's no way you'll remember it. And this is why, for instance, someone with Alzheimer's disease can't remember that they just had lunch. It's because it never registered in the first place.

Dr. Dave: What about the notion that we're recording everything, regardless of whether or not we're attending to it? We may not be able to retrieve it. I'm thinking in particular about those early studies or reports by Penfield, that when they stimulated certain areas of the brain, suddenly a person got such a clear image of the childhood home that they'd grown up in, that they could count the pickets on the fence.

Halpern: Yeah, I've heard that, too. I don't know I feel about that, because a lot of those memories, they found out, were not real.

Dr. Dave: Aha!

Halpern: That they were false memories. So, it's really unclear. I think that if nothing else – even if it's a perfectly tuned recording instrument – there wouldn't be enough synaptic space for every single thing to register like that, although I will tell you a funny story. When I was taking one of the sets of tests that I took, there was a test for visual memory that I found almost impossible to do. And it was that they would show you these three pictures. They were each about, let's say, 3" x 3". So they were each a square, and within that square they were broken up into many, many, many hundreds of geometric patterns – tiny, and mostly straight lines. And it was all grayscale.

Dr. Dave: Oh, my goodness.

Halpern: Okay, so you got this idea. So, they show you three of them at once, and then you get maybe 30 seconds to acknowledge that you've (laughs) sort of stared at this thing. Then you flip the page, and there are nine of these drawings, and you have to pick out the three that you saw. And I would just like to say, first of all, the first three look exactly alike, and now all nine look exactly alike. And it's just, at least for me, a completely maddening task. And I realized, after trying really hard on the first set, that I just couldn't – with my conscious mind – pick out the ones that I'd seen. So, I decided just to go for broke and simply let my finger do the walking. So, they'd show me, I'd look, and then they'd flip the page, and I would just randomly say this, this, and this, and hope that my subconscious was going to get me there. And weirdly enough, when I got my scores back, I scored better than average on that set of tests, not because I have a good visual memory – I don't – but I thought at least my subconscious was working that day.

Dr. Dave: Yeah, that's interesting. That makes me think about Malcolm Gladwell's book, Blink, where he reports a lot of information about how we are able to subliminally process things beneath consciousness. But that would take us probably off in a whole 'nother direction. When I went to the last APA – American Psychological Association – convention, I saw a number of software programs being hawked as developing the brain in various ways. And I believe somewhere in your book, you refer to such a program being tested at the Mayo Clinic. Can you tell us about that?

Halpern: Yeah. First of all, back to my rant about people being nervous and getting assaulted by products and not knowing how to evaluate them. This is becoming more and more true for this kind of product, the software product. And it's really hard for people who haven't done the kind of work I've done to evaluate them. Most of them have not been tested in any scientific way; in other words, they

haven't been tested with a placebo-controlled, double-blind study, which is really the only way that you can figure out if something is valuable or not. It can't be anecdotal; that's useless. Testimonials, forget it. So, I was really interested in the one product which had not just simply been developed by a neuroscientist, but where he had said, "Hey, you know what? I believe in my product, and now I want to have independent test to see if it could go through this rigorous scientific testing and come out the other end, doing the kind of job I think it's doing." And so he had (?) the Mayo Clinic and USC and one other research group – I'm not sure which – to put it through tests, and the results came out last fall, I guess. And as he had predicted, it was improving the memory of the people who were using it by quite a lot. So, I also went to a site where they were testing this – it was a retirement home in San Francisco – and just sat in on the classes and saw what it was like, and watched the people going through it and talked to them about their experience, and what their life was like before they started and after they had done it. It really was the only one of these programs, many of which I had tried myself, that had the feel of (being) based in reality, that really was helpful.

Dr. Dave: I have to ask you, what's the name of it?

Halpern: It's called Posit Science, that's the name of the company, and they have a couple of different products. Now, I only was there for this one product, which sounds kind of odd, but sort of makes sense. It trains your ear to hear very minute distinctions in sound, and the theory behind it is, again, back to this attention problem, that one of the reasons older people have a hard time remembering things is because their filtering mechanism in their brain isn't as robust as it had been, so that they can't block out distractions. They have basically noisy brains, and the point of this program is to make your brain more focused, make your brain less noisy. And that, in theory, would help your memory, and that's what they showed. So, that's the first program that they put out. And they're just doing beta tests on a second program, which is a visual-memory task, which I'm looking forward to because as you know, I have terrible visual memory. So, I'm kind of curious about how that might improve my memory.

Dr. Dave: Of course, there's this part of me that wants to run out and get a copy of the software right away.

Halpern: Yeah, it's not cheap.

Dr. Dave: I'll bet it's not! Then there's this other voice that says, you know, you'd have to use it, actually, to have it work.

Halpern: Yeah, yeah.

Dr. Dave: It's like, I could learn to play the piano, too, but…(laughs)

Halpern: Well, it's different. No, it's different. But the thing about using it is actually very crucial, because that's one of the things I found with that particular program. It was a lot less…it has many fewer bells and whistles than a lot of the other ones that I tried, which I found more fun; they were more like games…

Dr. Dave: Mm-hmm.

Halpern: But as I say, I don't know that they actually were doing anything. It was just a really good way to waste some time, since I'm a writer – you know. You need a lot of procrastination tools.

Dr. Dave: Yeah.

Halpern: But this one wasn't fun to use. And that, I think, that is a down side of it. I have it, and I used it for a while, and then I just thought, God, this is taking forever and it's really dull. A lot of people do it in a classroom setting, and I think it's a lot better that way, 'cause you have other people to bounce off and (inaudible).

Dr. Dave: Yeah, they need to integrate it into a video game of some sort. That would make it fun, and it could do two things at once. Give it to Skip Rizzo to turn it into something. (laughs)

Halpern: (laughs)

Dr. Dave: You know, on the same topic – as you point out – we're assaulted in the popular media with the message along the lines of "use it or lose it." Do crossword puzzles. Do crossword puzzles and other sorts of challenging tasks actually halt memory decline? Do we know if that works?

Halpern: No, no. It doesn't…

Dr. Dave: Interesting.

Halpern: …I'm sad to report. (laughs) But this is one of the questions that I come wandering around the world, asking the great neuroscientists of the moment: Should we be spending $35 a year on the New York Times crossword puzzle subscription? And the basic answer was, if you like doing crossword puzzles, do crossword puzzles. But the literature is really not…it doesn't really suggest that it's protective or preventative to do crossword puzzles, or any other kind of puzzle. It's a useful thing to keep your mind engaged, clearly. But all of the research tends to indicate that just as important – in fact, more important – than simply keeping your mind engaged is keeping your mind engaged while you're in a communal, social kind of setting. So, there's this great study that was done at UCI by a guy named Carl Cottman (see p. 11), who works with beagles. And he had four sets of beagles. One was a control group; one was a group that got special, enhanced antioxidant dog food; another was a group that got special, enhanced treatment, like

environment – they had more playtime with other dogs, and they got trainers, and they got a roommate, and they got a lot of toys. And then there was a fourth group that got all of that plus the good food, and as you can imagine, the ones that got all that and the good food did the very best. The ones who were in the control group in their kennel did the worst – these are on memory tests – and between the good-food dogs and the social dogs, the social dogs learned new tricks faster and remembered them, than the good-food dogs. So that indicates to everyone that the very best thing you can do is have good food and enriched environment. But if you're going to have to choose between the food and the environment, choose the environment.

Dr. Dave: Interesting. What about exercise? I've heard of some recent research suggesting that exercise enhances brain function and slows down the cognitive decline of aging.

Halpern: Yeah, it's probably *the* most important thing you can do.

Dr. Dave: Okay.

Halpern: That's *aerobic exercise.* It does all of the above. If I told you I had a drug that would get you new neurons – increase the production of your neurons – and then would also increase the production of brain-derived neurotrophic factor, which would help those neurons connect with each other, *and* I told you that that drug would improve your memory and it's been scientifically proven, you'd tell me you'd give me a lot of money for that drug. And I say I have it, but it's not a drug, and it has no co-pay. It's your sneakers.

Dr. Dave: (laughs)

Halpern: You know, just strap them on and do something for 45 minutes a day. Walk, jog, swim – well, you don't want to swim with your sneakers on. But if you do that, then you have done something so good for your body that basically, money can't buy it.

Dr. Dave: Okay. Well, that's reassuring, because I have an exercise bike, and I'm working out on that every day.

Halpern: That's fantastic.

Dr. Dave: Yeah. So that's good. Well, let's talk about Alzheimer's. We're all scared of it, yet the stats suggest most of us won't get it. Is that right?

Halpern: Yeah. Basically, it's a disease of old age. The problem, of course, is that we're living longer. That's a double-edged sword. It's a good thing, obviously, but it comes for many people at a cost. So, most people will die before the age of 80. By that time, or by the time you're 85, about half of your age cohort will have

Alzheimer's disease. So, the longer you live, the greater your chances of getting this disease are. That's kind of an awful fact, but most of us won't get there.

Dr. Dave: Okay, well… (laughs) It's a good news/bad news kind of situation!

Halpern: Exactly! But you know, the thing is, if you can hold it off, if you can slow it down – do your exercise and eat right – and make sure you acknowledge that there are a lot of risk factors – not just for Alzheimer's disease, but for all of the other diseases that ultimately contribute to it, like diabetes…terrible connection between diabetes and Alzheimer's disease. Or vascular problems, or heart disease – all of these things. If you do the preventive stuff for any of those diseases – all those diseases – and you can slow down the progression of Alzheimer's disease, the chances are that you will outlast it. That's a good thing.

Dr. Dave: Yeah, yeah. Now, I'm a bit embarrassed to admit that I'm kind of fuzzy on the term, "dementia" and what it refers to. Is dementia synonymous with Alzheimer's, or is that something different?

Halpern: You know, you're fuzzy and so's everybody else. So, I wouldn't feel too bad about it.

Dr. Dave: Oh, good.

Halpern: I think it's just one of those generic terms that people use. There are many, many, many different kinds of dementias. Alzheimer's is the most well-known. But there are many other kinds. There's dementia that accompanies Parkinson's disease. There's a dementia that comes with MS, for some people. There's a kind of dementia called frontal-temporal dementia, which affects your frontal temporal lobe. It changes – it has profound effects on not only your memory, but on your personality. There are numerous kinds of dementias, and I think it's just a catch-all term that people use because it's easier, and it signifies the most important part of what's gone wrong, which is that you've lost your memory, no matter how it happened.

Dr. Dave: Okay, that's helpful to me. That was sort of my sense of it, but I wasn't sure. I guess the early diagnosis of Alzheimer's has been sort of a holy grail for some time. Where are we now in terms of early diagnosis?

Halpern: We are so far along it's remarkable. There are a lot of different research groups attacking this from a lot of different angles. Right now, there are three very productive ways, and the most productive that I know of is a biomarker test that looks at your blood and cerebrospinal fluid to look for a marker that indicates that you have a particular protein, I believe it is, in your blood or in your CSF that is predictive of Alzheimer's nine years ahead of any symptoms. So, that's being worked on all over the world, but the research group I know best is the one at NYU, and they have a relationship with a pharmaceutical company that is working on

making this into a commercial product, a commercial diagnostic product. So, but they're not the only ones. There's a group at Stanford that's also very far along in this. So that's one thing. One of the odder kinds of diagnostics that is being worked out right now is a scratch-and-sniff test. Turns out that with Alzheimer's your ability to distinguish smells starts to get impaired really early on, well before there are symptoms, so there are people developing these scratch-and-sniff tests to see if, in fact, well before their symptoms, you could give this to someone and they… You could say, oh, look, they can't distinguish the smell of cinnamon, or they can't distinguish the smell of smoke. That must mean that they're on the path. That's pretty new, and it hasn't been proved yet, but that's the theory behind that. There is a group of physicians, engineers, neurologists at the University of Pittsburgh and another group at UCLA that have developed a way of looking inside a living brain in the scanner and seeing plaques and tangles, which are the signatures of Alzheimer's disease. So again, this is something that normally you wouldn't be able to see until autopsy. So, they're pioneering that. And there is a group that is sort of in tandem with that – maybe not exactly in tandem, but it's kind of useful – is working on a vaccine to clear those plaques and tangles. The question, of course, is whether or not by clearing them you've improved someone's memory, and that really hasn't shown up to be true.

Dr. Dave: Right, I remember taking that point in your book.

Halpern: Yeah, it's just not clear yet. And then there's Skip Rizzo. He hasn't really marketed this, but when I went to see him, his idea was that people who get Alzheimer's disease lose their ability to negotiate the world spatially. They start getting lost. That's something you probably, if you know anyone that had Alzheimer's, it's something that happens. So, his idea was to create a virtual reality setting that could test people's ability to navigate their way through the world physically. So he developed this virtual auditorium that let people…first introduce them to where they were sitting and then introduce them through a different door to find their way back. It really hasn't gone all that far, but it's an interesting idea that you could use virtual reality diagnostically like that.

Dr. Dave: Yes, it is a fascinating idea. And this is another instance, though, where if you did find out nine years in advance that you're getting Alzheimer's, that could…I don't know if that's a good thing or not, because there's really no treatment at this point. And you talk about the quest to find a drug to either prevent or to reverse Alzheimer's and what you found was that it's been a refrain for the past 20 years or more that a drug is just five years away.

Halpern: (laughs) Yeah. It doesn't matter what day you ask, what month you ask, what year you ask, it's always five years from now. But five years ago, we didn't have very good scanning techniques. Five years ago, we didn't know a whole lot about biomarkers. Five years ago, we weren't really using the microarray technique to look for very specific molecules and genes. So much of the science is dependent on the technology, and the technology just gets better and better and better, so it feels

like the five years actually might come to fruition sooner rather than later. But in the meantime, there is this neurogenesis story which comes out of the exercise piece. As I said before, if you could make a drug that does the exact, same thing that exercise does, people would hail it as one of the great miracles of modern medicine, and we already have it.

Dr. Dave: Yes, yes. I was just listening, actually, to a podcast with a – you probably know this person. I'm blocking on his name, but he's a Harvard psychiatrist who's written a book called Spark that reviews that literature.

Halpern: I don't know that book.

Dr. Dave: Okay. Well, I'm going to chase him for being a possible interviewee.

Halpern: There's a great scientist at Harvard who is a genius about scanning. His name is Randy Buckner.

Dr. Dave: Okay.

Halpern: He's a really young guy. I mean, he's just remarkable for how much he knows and how far along he's pushing this field. I found him really fascinating to talk to, just about the technology and how fast it's moving…

Dr. Dave: Yes.

Halpern: …and where it's going to take us. I think it will take us into even better diagnostic tools than we have right now.

Dr. Dave: Yes. If there's a star figure in your book, I think it would have to be Dr. Scott Small, who you both begin and end the story with. Do I understand correctly that he's pretty much proven that both normally memory loss due to aging and Alzheimer's are due to molecular damage in the hippocampus, but that each is associated with a somewhat different region of the hippocampus and a different molecule.

Halpern: Yeah, it's really amazing research. And if I had to bet on someone getting the Nobel Prize down the line, I'm going to bet on Scott Small. He had this idea that everyone knew there was something that went wrong in the hippocampus in both Alzheimer's disease and in normal memory loss. Everyone knew that because symptomatically, they look kind of the same, at least in the beginning, and because they knew the function of the hippocampus, which is this short-term memory gatekeeper. But Scott's idea was that the disease is a very specific process. And if it's a specific process, it can't be the same as a normal process. It stands that it couldn't possibly be true. And so he had to invent this new wave scanning in order to see these different regions of the hippocampus. And he used that scanning technique and combined it with another technique called microarray, in which he

could sift through the molecules in a particular brain. He was able to determine that these two regions were functioning differently in normal memory and in Alzheimer's. This led him, then, to explore those different regions, and within those different regions, he – yes – found different molecules that weren't being expressed in the ways that they needed to be in order to have fully functioning hippocampi. So, he did this, and this is all brand-new. It's likely to lead to much more targeted interventions and drugs…

Dr. Dave: Yes.

Halpern: …because now you know. Before, when you looked at Alzheimer's disease and particularly Alzheimer's drugs, the drugs were moving in a general way. They'd attempt to flood the brain, so with a neurotransmitter like acetylcholine, which is what Aricept does. It affects the entire brain. Here, what Scott Small has done, he's said "Let's fix this particular molecule. Let's get it to express more. And if we can get it to express more, then we're on the way." That's a very targeted intervention.

Dr. Dave: Yes, it seems really promising, and it was fascinating to read about. And it was very, very technical, but I was able to get it. (laughs)

Halpern: Yeah. Dave, that's the thing I was really aiming for. On one level, it's hard. On the other hand…it's hard when you're first learning about it. On the other hand, you have to be able to communicate it. Somewhere along the line, it's got to be understandable to us, and really, my job was to try to make that happen. It's really important, and part of the reason why it's really important is just because it gives you a better sense of how your body works, and once you get that, it's a way to calm down about a lot of the stuff that you're hearing that's out there in the ether about your body breaking down. If you can visualize it the way I was hoping you could, then you're on your way to a calmer, more rational sense of what's going on.

Dr. Dave: Well, that leads into my last question here. The subtitle of your book is The Good News from the Frontlines of Memory Research, and I was almost all the way through the book and still asking myself, where's the good news? (laughs)

Halpern: (laughs) Then what happened?

Dr. Dave: You do finally sum it up in the last couple of pages of the book. Can you recap for us what the good news is?

Halpern: Yeah. Well, first of all, I realize that what everyone really, really wants is a drug. But I'm the ambassador of non-pharmaceutical solutions, only because that's what I learned. So, the fact that we have way better diagnostics now than we have ever had before is very good news. Why? Because if you can find a disease process very early on, as we know from say, treating cancer, you have a much better chance of treating it. So the diagnostic piece is crucial. And the diagnostic

piece is much more precise than it ever has (been) before, thanks to the work of Scott Small. And what that does, again, is create the possibility of very targeted interventions. So, that is extremely good news. The fact that we now know that exercise creates new neurons – new brain cells – and connects them, that's huge. That's very good news, and that's brand-new. Before, it was known that what was good for your heart was good for your head, but no one really knew why. They say, "Well, it must be good. There's more oxygen floating around in your brain, so it's good," which is true. But that's not the story that is really compelling. The compelling story is the story about neurogenesis. That's phenomenal news. The fact that there are foods that might also create new neurons, that's huge. Again, we're searching around the laboratory, but in the meantime, go to your kitchen. Go to your supermarket. There's stuff out there that doesn't require – you know – it's not a pill, it's not a drug, it's not a supplement; it's a food.

Dr. Dave: What are the foods?

Halpern: Well, it looks like blueberries, other kinds of berries; walnuts…I write about a bunch in the book. I can't remember all of them. I have right beside me a glass – a cup – of green tea, (which) also looks to be very effective. So, the good thing about the food is that it's pretty hard to O.D. on blueberries and green tea, you know?

Dr. Dave: Mm-hmm. (laughs)

Halpern: So go crazy, it's fine. So, that's good news. The fact that the Posit Science program has proved to be so effective, *that's* really good news. And then there's the "bottom line" good news, which is that because this is such a pressing problem – globally, locally, in every way – there are a lot of people working on this problem, this disease, this issue, from so many different angles. This is going to be a very productive time in advancing the genetics, which have advanced, in fact, even since I started writing my book, and in advancing all areas of brain science. And we've got to look at that as very positive. I didn't talk about the genetics, but while I parked my body at Columbia, they made a gene finding of a risk-factor gene for Alzheimer's disease, which also is very significant. And more of those findings will be made as the genome gets undecoded.

Dr. Dave: Okay, well, you know, I could just go on and on talking to you, because you're a font of fascinating information. But Sue Halpern, thanks so much for being my guest today on Shrink Rap Radio.

Halpern: Thank you, David.