Dr. Huganir: “How memories can last for decades is really, I think one of the most fascinating things about brain science… and one of the focuses of my laboratory.”

Dale: “Dr. Richard Huganir is the chair of neuroscience at Johns Hopkins University School of Medicine, and the co-director of its Brain Science Institute.

Today on brain talk: Erasing fear from our memories.”

Dr. Huganir: “My specialty is really trying to understand learning and memory, how memories are encoded in our brain. So we’ve been very interested in what actually physically changes in your brain when you learn something new and when a new memory is encoded.”

Dale: “The brain has 200 billion neurons, cells communicating to each other at connections called synapses. Each cell can have 10,000 synapses. Meaning there are quadrillions of synaptic connections taking place in our brains.

So how exactly is a memory formed? Why can they last for decades, or even for your entire life?”

Dr. Huganir: “So what happens when we learn something new is that certain connections in the brain modify their strength, they get weaker or stronger or actually new connections can form. This sculpts a new circuit that actually physically codes the new memory.”

Dale: “Dr. Huganir says it’s traumatic or fearful experiences that create the strongest and most long lasting encoded memories. It’s a way our body warns us of predators and danger.

But this post-traumatic stress can cause great suffering to people, like war veterans.”

Dr. Huganir: “This is really an interesting part of our research and research all across the world, is how these fear associated memories are encoded and is there any way we could erase them or reverse them to help relieve this fear association.”

Dale: “Researchers want to use drugs to target the transmitters and hormones that create these traumatic memories.”
Dr. Huganir: “Now, we’re not trying to erase the memories themselves, we’re trying to erase the fear that is evoked by the memories.”

Dale: “Dr. Huganir says a newly formed memory is open to intervention in its first 24 hours. His lab is working on a compound that could help remove the fear connected to the memory. This 24-hour window can even be reopened for treatment, by reminding the person of the traumatic event.”

Dr. Huganir: “So even say a year later, if you expose them or have talk therapy to expose them to relive the traumatic event, 24 hours later this therapeutic window would open up that we could specifically only, in theory of course, affect that traumatic memory.”

Dale: “Researchers are now trying this approach with vets from Iraq and Afghanistan. They’re playing virtual reality war games that recreate the traumatic event in a safe environment. Dr. Huganir says drugs along with talk therapy could help erase the fear connected to the memory.

Scientists are also targeting loss of memories in diseases such as Alzheimer. But Dr. Huganir says the reality of people using memory drugs is a few years away.”

Dr. Huganir: “The difficulty is targeting the drugs to certain memories, you don’t want to erase all memories when you’re treating post-traumatic stress, and you don’t want to enhance all memories when you are treating Alzheimer disease because you don’t want to enhance fear or anxiety. This is where developing therapeutics will be very tricky.”

Dale: “And what will happen first, he says, will likely be an intense public debate.”

Dr. Huganir: “Memories are who we are, so a lot of people don’t want you tampering even with their traumatic memories, that’s who they are and so this is going to be a very ethical and controversial question.”

Dale: “To learn more about erasing fear from our memories, log onto brainscienceinstitute.org. I’m Dale Connelly, and this is Brain Talk from Johns Hopkins University.”

Learn more about Dr. Huganir

Post-Traumatic Stress Disorder (PTSD) | Johns Hopkins Health Library

The Solomon H. Snyder Department of Neuroscience at Johns Hopkins University Website

Read Scientists Gain Insights into How to Erase Pathological Fear | By Jason Castro Scientific American. December 14, 2010

Read Innovator: Richard Huganir | By Olga Kharif Bloomberg Business Week Magazine. December 02, 2010
Read Brain Molecule May Offer Key to Erasing Fearful Memories | by Jon Hamilton
NPR Shots - Health News from NPR. October 29, 2010

Read Johns Hopkins Researchers Discover How to Erase Memory | Johns Hopkins Press Release

Read Profile of Richard L. Huganir | Tinsley H. Davis, Freelance Science Writer
Proceedings of the National Academy of Sciences of the United States (PNAS). March 21, 2006

http://www.brainscienceinstitute.org