STEVE INSKEEP, host:

This is MORNING EDITION from NPR News. I'm Steve Inskeep.

RENEE MONTAGNE, host:

And I'm Renee Montagne.

Time now for our consumer health segment. Lots of people turn to physical exercise to get their bodies in shape. The concept of reshaping the mind is more elusive. Some neuroscientists have begun investigating meditation as a way to achieve that goal. People who meditate say it induces well-being and emotional balance. Scientists hypothesize that meditation does that by changing the way the brain works. NPR's Allison Aubrey reports.

ALLISON AUBREY reporting:

A few weeks ago, a bunch of brain scientists gathered in an old monastery for an unusual meeting. They rose at 5 AM, ate breakfast in silence and then got down to business discussing meditation. The conference was organized and bankrolled by the Mind & Life Institute. It's run by a guy named Adam Engle.

Mr. ADAM ENGLE (Mind & Life Institute): What we're trying to do is to establish, if you will, a new subfield of science that will ask and answer the question: How do you
create and maintain a healthy mind?

AUBREY: Engle is a Harvard-trained lawyer who spends much of his life as both an entrepreneur and a Buddhist meditator. It's an unusual profile, but it helps explain what he's doing now, which is supporting the work of scientists who are using sophisticated tools to evaluate the brains of meditators.

Mr. BRENT FIELD (Neuroscientist, Princeton University): It seems absolutely clear that meditation is doing something that can't be measured with standard, you know, cognitive tasks.

AUBREY: Brent Field is a neuroscientist at Princeton University. He's one of 200 or so scientists at the monastery for the week. His research is focused on figuring out what happens inside the minds of the most experienced meditators. It's work that he never imagined doing five years ago. Back then, he was working for Microsoft where he was applying his knowledge of neuroscience to computer technology. But as his personal practice of meditation grew stronger, he began to think of the mind as mental technology and meditation a sort of software or a tool for upgrading.

Mr. FIELD: People that have spent a lot of time in their head have figured out that there are ways to start controlling the mind in ways that in our very chaotic world that we live in we don't really appreciate that. So they've developed this mental technology, if you excuse the metaphor.

AUBREY: Which allows them to use meditation to encourage positive emotions and diminish negative ones. This is what some people are calling mindfulness. In order to nail down what happens to the brain as the result of this practice, Field has been studying Tibetan monks. These are contemplatives who've logged thousands of hours in complete introspection. What Field's team does is to fly the monks over to their lab in Princeton and give them dozens of tests designed to measure mental clarity. In one task, for instance, they show the monks a bunch of words which also happen to be colors. The monks' job is to call out the word and the color. The trick is not to be thrown off when the word is, say, green but happens to be written in brown. The researchers measure how the monks respond and use visual imaging machines, MRIs, to snap pictures of their brain activity.
Mr. FIELD: In pretty much every task, when monks are in a state of meditation, they perform different than when they're not. Frequently enough, they perform better even if only by a little bit, but across this gestalt of experiments that we've done, I think at this point we really don't have a map that we can put them on. And that's why I think this is going to be a 20-year project.

AUBREY: So the results are slow in coming, but two published studies by researchers at the University of Wisconsin have nailed down a few connections between the brain and meditation. The Wisconsin scientists have demonstrated that meditators do have increased activity in one part of the brain, the left prefrontal cortex, which is associated with emotional well-being. The response is strongest with long-time adept meditators, but the researchers see the same pattern of brain activity in people who are just being taught to meditate.

It's these kind of novice meditators that interest Amishi Jha. She's a neuroscientist at the University of Pennsylvania. And a few years ago, she wanted to know if meditation could benefit the everyday Joe. She started looking into existing meditation research where psychologists asked people to report how meditation made them feel.

Ms. AMISHI JHA (Neuroscientist, University of Pennsylvania): Over and over again, people say it does change the way they feel. And my part of it is an understanding if it is true that people are reporting that they feel better, what might be the mechanism by which that change happens? And the hypotheses that I'm testing, 'cause I'm an attention researcher, is to look to see if it really is particular aspects of attention that are getting strengthened.

AUBREY: Meaning is the brain sort of rewiring itself to be more attentive? In her lab at Penn, she recruited medical and nursing students who were participating in a two-month class called mindfulness-based stress reduction. Here they got basic instruction in meditation. Throughout the course, Jha put the students in front of computer screens and gave them a series of concentration tests to establish which aspects of attention were being engaged. One task, for instance, had the students stare at blank screens, wait for instructions about images that were about to appear and then respond by analyzing some quality of the picture. She's still combing through her
preliminary data, but she says there does seem to be a strong relationship between meditation and attention.

Ms. JHA: There's a developmental or practice-related trajectory of what seems to get better, and initially, it seems to start out as really the ability to focus your attention in a specific way, and as you practice more and more, the ability to flexibly allocate attention in a more open way may actually improve. Now I'm saying this and when I came it to from our results, I was shocked. I was, like, very surprised. `Wow, this is great. Mindfulness is not a single end point but actually a whole path.'

AUBREY: Jha discussed her findings with the scientists gathered at the Mind & Life Conference. Also on the speakers platform were some of the Olympians of meditation, in particular, a French-born Zen monk named Matthieu Ricard. He gave a talk to the scientists about a concept called the open mind. And afterwards, Amishi Jha wanted to pick his brain a little more.

Ms. JHA: And something that you said really struck me 'cause I don't really understand it.

AUBREY: Ricard was trying to shed light on one mindfulness technique. It's the idea that you open your mind or your consciousness to everything, yet you're distracted by nothing, something that sounds contradictory.

Ms. JHA: So when it's really open, you're not focusing at all.

Mr. MATTHIEU RICARD (Zen Monk): Yes, you're not focusing at all, that's right.

Ms. JHA: So that's what I don't understand...

Mr. RICARD: I see.

Ms. JHA: ...because we don't have a model for that.

AUBREY: Jha uses the language of neuroscience. She speaks in terms of the taxonomy of attention and the neurobases of attentional systems, so translating the Zen concept of the open mind into science is going to take some time.
Mr. RICARD: The concept is not weird at all. I mean, it can be understood.

Ms. JHA: If I think about what that means, I mean, it doesn't follow the logic that we're using...

Mr. RICARD: But you can...

Ms. JHA: ...of how we think attention works.

Mr. RICARD: ...make an example. You say, `OK. Now instead of focusing, you know, right there in front of your nose, lay back, relax and try to make your mind like a vast space.' So, I mean, this, people can understand. You know, it's a very vivid relaxation but no tension.

AUBREY: It's the sort of thing that makes no sense to people who've never meditated. That's why first-timers are often taught a mindfulness 101 approach. The technique focuses on breathing, and Amishi Jha says it's pretty straightforward.

Ms. JHA: Put all of your attention to your breath. Don't think about other things. Don’t think about other sensations, thoughts. If your attention wanders from your breath, gently return it. That's really the complexity of the instruction. I mean, that’s what it boils down to.

AUBREY: The intent is to shut off all the chatter in the brain to stop endless rumination and anxiety.

Mr. ENGLE: Mindfulness is just a tool.

AUBREY: A shovel in the labor of training the mind. That's the way Adam Engle sees it.

Mr. ENGLE: We can actually learn how to become happier and healthier people.

AUBREY: His goal at the Mind & Life Institute is to keep the research going, staging conferences and supporting more young researchers who want to join the investigation.
Allison Aubrey, NPR News.

MONTAGNE: You can read about mindfulness for the masses at npr.org.

This is MORNING EDITION from NPR News.