



*Richie Davidson at the Center  
for Investigating Healthy Minds*

# Taking the Measure of Mind

At the newly created Center for Investigating Healthy Minds, prominent neuroscientist Richie Davidson and his team try to see how far our minds can go and how many ways meditation can help us. BARRY BOYCE reports.

PHOTOS BY KRAKORA STUDIOS

WE'RE PRETTY CLEAR about what leads to a healthy body: good nutrition, exercise, sleep, moderation in all things. But what leads to a healthy mind?

As a longtime meditator, Richie Davidson has strong suspicions. His firsthand experience suggests to him that becoming familiar with how your mind works by paying attention to it helps you cultivate and maintain a composed, alert, and attentive mind.

As a renowned neuroscientist, he wants evidence. And he wants a picture of how the process works. Not only that, he wants to explore the limits of the mind's possibilities, by studying those whose intensive meditation practice seems to have opened up vast potentialities of mind. He also wants to learn how different practices work differently for different people in ordinary walks of life. He wants to reach out to a variety of groups—schoolchildren, patients, veterans, and more—and find out how they can be helped. And he wants to measure the results. Above all, he wants to learn.

"Science," Davidson tells me in the boardroom of the Center for Investigating Healthy Minds (CIHM) at the University of Wisconsin–Madison, "is not a process of merely confirming what you already suspect. It's a process of learning from what you observe. In good science,

we learn as much from experiments that don't show the result we expected. In the study of meditative practices, our science needs to have that kind of rigor to be accepted by the broader scientific community and the public."

For more than a decade, Davidson has been leading teams doing just that kind of science, where long years of basic research help in developing models for how a system works. It's slow, time-consuming, even tedious, but it's the time-honored way to do good science. His Holiness the Dalai Lama, an early and consistent mentor of Davidson's and a champion of his work, was delighted with the focus on basic research, even saying that if the research proved his tradition wrong, he would alter the doctrine he had learned. However, in recent years, Davidson told me, His Holiness began to give him a nudge. He suggested that perhaps it wasn't necessary to wait until decades of solid basic research had been conducted before venturing into applied research (what is now commonly called translational research). It could help people while also advancing scientific knowledge and educating others about the value of meditation from a scientific perspective. The idea for the Center for Investigating Healthy Minds was born, and Davidson founded it in 2008.

The center has a mandate to study the effectiveness of meditative practices through both basic laboratory research and applied research in many societal contexts. It seeks to answer basic questions: does meditation work, how does meditation work, what are the benefits of specific practices, and how can they be used to help people in their daily lives—in schools, doctors’ offices, hospitals, community centers, you name it. If solid evidence for the effectiveness of meditative practices can be established, they will become adopted as standard methodologies in many public institutions. After seeing only a few of its many activities, I understood why the Dalai Lama put his faith in this initiative. It’s going to help a lot of people. It already is.

## “How do we know eight weeks of meditation is any better for you than eight weeks of mind wandering?” Davidson asks.

THE UNIVERSITY’S Waisman Center, in which CIHM is housed, has one of the best laboratories in the world for the kind of brain imaging research that Davidson directs. The lab has an impressive armamentarium of hi-tech tools to study the brain, but overall the facility doesn’t have the cold, clinical feel of a research institution. For one thing, the scientists—starting with the youthful and jaunty Davidson himself—don’t stalk the halls absentmindedly, looking at the floor. They’re cheerful and energetic and they greet you with interest. Most of them engage in the practices they’re studying. It’s also the only scientific research facility that contains a world-class meditation room, complete with comfy and sustainable cork flooring. Davidson wanted the center’s facilities to convey the contemplative qualities of the practices that are studied there. It does.

The Healthy Minds center has three aims:

**Research**—both basic and translational, intended to lead to more widespread incorporation of practices that nourish positive qualities of mind by various parts of society;

**Outreach**—the center conducts projects with members of the local community (including educators, parents, and children) in the context of doing research, and globally communicates about the work through talks and the CIHM website (investigating-healthybrains.org);

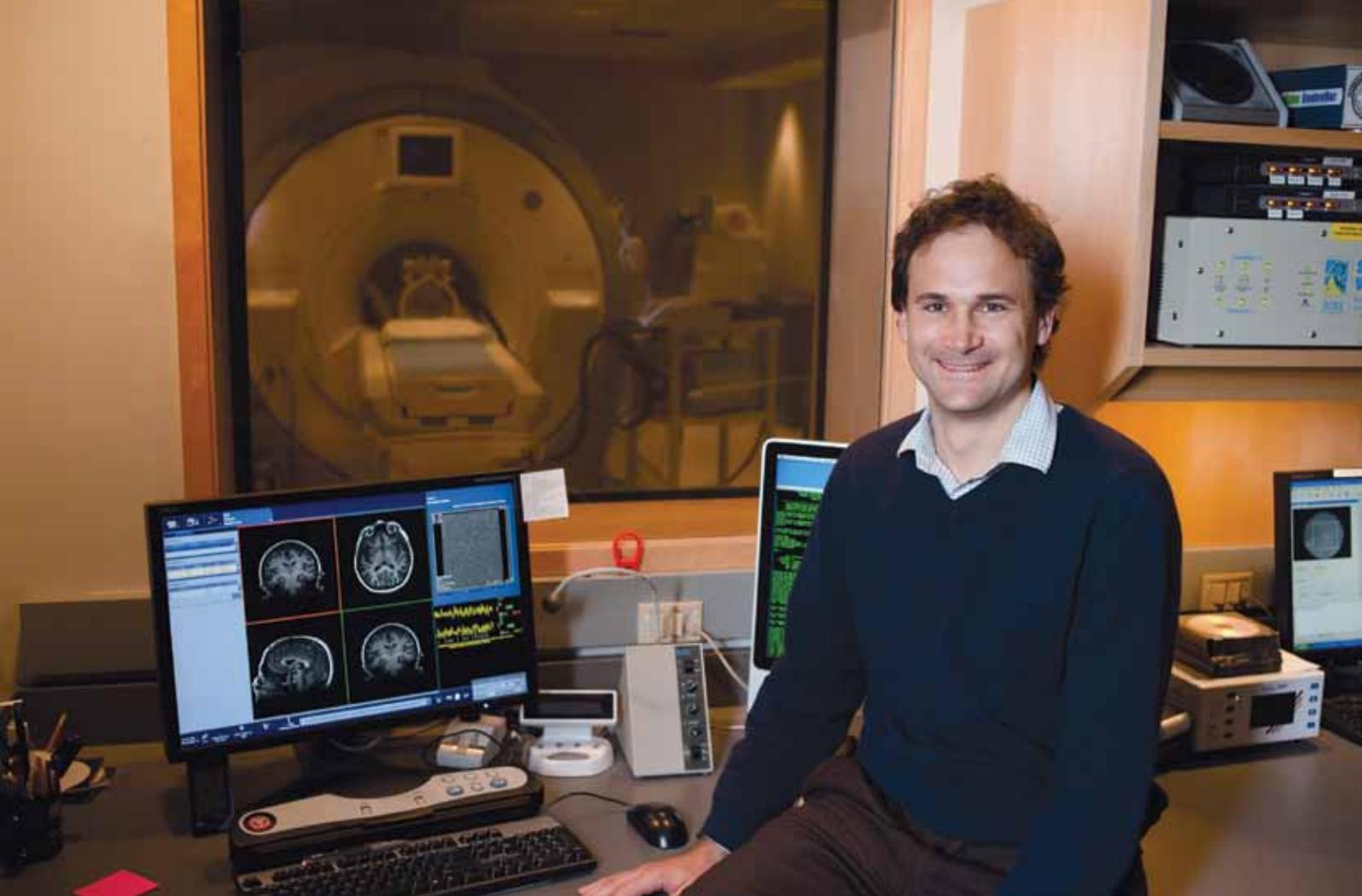
**Training**—conducted for postdoctoral fellows and senior scientists on site, as well as for participants in research conferences.

Reflecting the insatiable curiosity of its founder, CIHM has more than a dozen projects underway and new possibilities popping up all the time (investigation of videogames designed to develop kindness and compassion, for example). While Davidson is its leading light, the center clearly operates collegially and collaboratively. More than twenty-five people are on the go, including scientists, graduate students, research assistants, outreach specialists, and support staff. During an extensive visit there, I

learned about basic meditation research, a study of meditative methods for decreasing asthma symptoms, programs in local schools, a study of mind wandering, research on our ecological mindset, and how veterans are being helped through yoga practice. I also learned about the work they do at the center to find good controls to compare with the practices they are studying. “Otherwise,” Davidson says, “how will we know that the effects of eight weeks of meditation are any better than eight weeks of taking time to let your mind wander?”

Davidson talked about his days as a graduate student in the mid-1970s, when he shocked his professors by taking off for India to explore meditation practice and Buddhist teachings. After three months there and in Sri Lanka, he came back convinced he would do meditation research. He was quickly disabused of this notion by his professors, who let him know that if he had any hope of a career in science, he’d better stow the meditation and follow a more conventional path of research. He became a closet meditator and an affective neuroscientist—a student of the emotions. In those early days, he says, whatever “research” there was on meditation was half-cocked, filled with extravagant claims of magical results but not following standard protocols or building on the methodologies of previous research in related areas. A study that correlated drops in crime with the activity of Transcendental Meditation practitioners in the vicinity (and similar misguided efforts) tainted meditation research and helped keep him in the closet. As well, he says, “the science and the methods of the time were not suited to the task of studying subtle internal experience.” They lacked technology like fMRI (functional magnetic resonance imaging), which takes a moving picture of brain activity. They didn’t have any appreciation of epigenetics, the process by which our gene makeup can be changed throughout our lifetime. But above all, Davidson says, “we lacked an understanding of neuroplasticity. It is now widely accepted that the brain is an organ designed to change in response to experience and, importantly for our work, in response to *training*.”

For many meditators, talking about “the brain” seems materialistic, as if all we were was a lump of electrically charged flesh; similarly, many scientists are uncomfortable talking about something as intangible as *mind*. Where is it? How do you measure it? Davidson is comfortable talking about both, and says that nowadays many more researchers are too. Mind may not be so easily defined and delineated as brain, but the center uses the term healthy *minds*, he says, because it is minds—different types of minds—that can be trained in beneficial ways. And the effects of this training leave their mark on the brain, and can be observed and measured. These demonstrable positive results are the point. Not only do they increase Western science’s understanding of the brain’s nature and capabilities, they offer convincing evidence for U.S. institutions like the Department of Education, the National Institutes of Health, the Department of Defense, even the Department of Energy, that mind/brain training could offer beneficial results that would help them fulfill their missions.



*Antoine Lutz in the control room of the fMRI scanner*

While the brain-mind conundrum is likely to remain a koan and a Buddhist metaphysical contemplation, if people develop more positive states and traits, does it really matter whether we can pinpoint the mind on our Around Me app?

In his new book coming out in March, *The Emotional Life of Your Brain*, written with Sharon Begley, Davidson counsels using your mind to train your brain. To oversimplify, the pathways carved in the brain take you quickly to places you need to go, but they can also take you quickly to less desirable places, like anger, jealousy, depression. Through training, you can use the power of your mind to change the pathways in your brain. As you follow those new pathways, it has beneficial effects on your mind, such as greater composure and a combination of attentiveness and relaxation. Mind and brain form a virtuous circle.

THE BRAIN IMAGING and behavior laboratory is a Frankenstein-like lair of lab benches, booths, wires, screens, and dials. The list of high-end measuring devices would require a treatise to explain: a 3T MRI scanner; visual, auditory, and gustatory stimulation capabilities with online eye tracking during MRI scans; a PET (positron emission tomography) scanner; a micro PET scanner; a scanning simulation room with a mock scanner; a tandem accelerator to support the PET scanners; a 256-channel EEG facility for stand-alone and combined electrical and hemo-

dynamic imaging studies; and dedicated computing facilities.

This machinery, Dr. Antoine Lutz tells me, has been blessed by many meditation adepts, including, most famously, the Dalai Lama. Both Matthieu Ricard and Mingyur Rinpoche underwent studies of their brain activity there. Lutz, who began his studies in Paris working with Francisco Varela, a pioneer in the study of consciousness using first- and third-person methods of investigation, has long focused on experts. In psychology, he says, an “expert” is someone who has devoted at least ten thousand hours to develop a specific skill (playing a violin, hitting a baseball, knitting). In the case of meditators, many of the people he has studied have completed the traditional Tibetan three-year retreat.

We look first at the fMRI facility. A study participant lies down and enters the MRI tube. Researchers on the other side of the glass might show participants images that appear on the inside of goggles. How do their brains react to a gory image, a pleasant one, a neutral one? What brain pattern emerges when they’re asked to move a thumb? Or think about moving a thumb? They might ask participants to do some compassion practice.

The fMRI is expensive to run and maintain, so meditators are not being fed through it right and left. Time in the machine must be scheduled and prepared for. By the time someone goes into the machine, the researchers know exactly what they will ask the person to do. After collecting the data, they spend months

crunching it, using sophisticated computer algorithms to interpret what they're seeing.

"There are two types of images," Lutz explains. "Structural images give us a snapshot of brain anatomy. Functional images show the dynamic activity within the brain over time. We can try to observe, for example, how the brain regions associated with attention or empathy function differently for an expert practitioner compared with a novice practitioner when they focus their attention or cultivate compassion during meditation."

Lutz describes the EEG facility across the hall as a modern-day meditation cave, and indeed, it's dark and black and quiet. When the EEG net is attached to someone's head, it measures the electrophysiological activity in her brain. Lutz and the team recently used EEG to study meditators before and after three months of silent retreat at the Insight Meditation Center in Barre, Massachusetts. Then, back in Wisconsin, they tracked novice meditators' brain activity in the same way. "We found that the long periods of meditation had positive effects on several indicators of attention—above and beyond the increases that would result from simply becoming habituated to any task." In other words, there were demonstrable long-term effects on the practitioners' ability to attend to what they are doing in the moment.

Lutz offers an overview of the spectrum of research at the center. "One type of research aims to understand the brain mechanisms

that underlie meditation states, and the long-term impact of meditation training on brain and behavior. This is part of the emerging field of contemplative neuroscience. The second type uses meditation practice as a tool for neuroscience to address novel questions about the mind and its functions. For instance, how much can you train compassion? Can you reduce mind-wandering through training? Finally, we study clinical interventions like Mindfulness-Based Stress Reduction or yogic breathing for novices to see how such training might be applied in settings like schools and hospitals to develop well-being and positive human qualities."

Another scientist whose focus is basic meditation research is Daniel Levinson, a graduate student doing work on mind wandering. According to studies that interrupt people during the day to ask what they're thinking, Levinson says, mind wandering accompanies about half of waking life. Does this wandering come at a cost? Some researchers argue wandering doesn't use up mental energy, because it seems to happen without effort. His research challenges that assumption because it shows that participants devoted valuable mental energy to wandering when given an opportunity to do so, but also were able to reduce wandering when their attention was directed to immediate perceptual experience. "A wandering mind is not a free mind," he says, "if you're wandering through tomorrow's plans and future goals when you meant to pay attention to the experience at hand—a game with your child or a run in the park."



*Laura Pinger and Lisa Flook and students in the prekindergarten kindness project*

Levinson thinks a healthy mind may be one that balances its use of mental resources. “Mind wandering can provide the opportunity to envision your future, which could perhaps lead to clarity and perspective,” he says, “and yet a healthy reprieve from overthinking can free your mind to enjoy the life right in front of you. We may also tend to let our mind wander when our mental energy has been depleted, but *resting* a wandering mind, through a meditative discipline perhaps, may more effectively restore our mental resources.”

TRANSLATIONAL RESEARCH is where the rubber meets the road. It’s where investigators get to see where relatively modest amounts of meditative practice can make potentially significant differences. CIHM scientist Lisa Flook is interested in exploring prevention and early-intervention strategies to promote well-being at a young age and is studying the impact of introducing mindfulness practices in educational settings. “Mindfulness could offer many benefits to children’s mental and physical health,” Flook says. “It could help children and adolescents improve their daily well-being and

## Scientific Minds Want to Know

THE QUESTION	THE STUDY	THE RESULTS
<b>Is meditation effective for pain control?</b>	In a Wake Forest study 15 volunteers who had never meditated before attended four 20-minute meditation classes. Participants’ brain activity while a pain-inducing heat device was placed on their leg was examined before and after meditation training.	Subjects reported a 40% reduction in pain intensity and 57% reduction in the unpleasantness of their pain. Morphine typically reduces pain ratings by about 25%. ( <i>Journal of Neuroscience</i> )
<b>Can long-term meditation practice reduce brain atrophy and help prevent dementia?</b>	Using Diffusion Tensor Imaging, researchers at UCLA studied 27 active, long-term meditation practitioners and 27 control subjects.	Meditators’ brains showed a range of brain areas with stronger neural connections and less atrophy than the control group. ( <i>NeuroImage</i> )
<b>Can Mindfulness-Based Cognitive Therapy (MBCT) help prevent relapses of depression?</b>	84 subjects in a study by Ontario’s Centre for Addiction and Mental Health took antidepressants until their symptoms went into remission. Then 1/3 stayed on antidepressants, 1/3 took placebos, and 1/3 underwent MBCT.	After 18 months, relapse rates for the MBCT and antidepressant groups were in the 30% range, compared to a 70% for those on placebos. ( <i>Archives of General Psychiatry</i> )
<b>Does mindfulness benefit cancer patients?</b>	A meta-analysis assessed the data from 13 research papers and four conference abstracts reporting the benefits of mindfulness-based intervention in cancer care.	Individual studies reported significant improvements in anxiety, depression, stress, sexual difficulties, immune function, and a variety of subjective benefits. The meta-analysis recommends more research into different styles of mindfulness delivery, but finds that mindfulness approaches are a promising intervention in cancer care. ( <i>Psycho-Oncology</i> )
<b>How does yoga compare with conventional treatment of lower back pain?</b>	156 patients with long-term back pain took a 12-week yoga course, while a control group of 157 patients received standard care from the British National Health Service.	After three months, those who took yoga classes could undertake 30% more activities than those receiving conventional care. They also reported less pain. ( <i>Annals of Internal Medicine</i> )
<b>Does meditation help women cope with menopausal symptoms?</b>	In a study at the University of Massachusetts Medical School, 110 women who experienced at least five moderately to extremely bothersome hot flashes a day did mindfulness training and stretching exercises.	After completing the mindfulness program, the subjects were less stressed and anxious, and their menopausal symptoms were no longer considered abnormal. They also slept better and rated their quality of life higher. ( <i>Menopause Journal</i> )
<b>Does meditation affect brain structure?</b>	Researchers at Massachusetts General Hospital took magnetic resonance brain images of 16 subjects before and after they took a Mindfulness-Based Stress Reduction program. MR brain images were also taken of a control group that did not meditate.	Brain imagery after the meditation program showed increased gray-matter density in the hippocampus, important for learning and memory, and in structures associated with self-awareness, compassion, and introspection. Lower stress levels correlated with decreased gray-matter density in the amygdala, which plays a role in anxiety and stress. These changes were not seen in the control group. ( <i>Psychiatry Research: Neuroimaging</i> )

decrease stress. And the best place to test this is in school settings.” Flook is collaborating with Laura Pinger, a senior outreach staff member with CIHM and a teaching affiliate at the UW Hospital Integrative Medicine Center for Mindfulness who serves as a liaison between CIHM and local schools, developing and teaching programs and curriculums focused on mindfulness meditation, which are then used in CIHM research projects.

Two of the areas Flook and Pinger have been collaborating on are a pre-kindergarten kindness project and a teacher wellness program.

Four- and five-year-olds from two classrooms at a university preschool participated in the kindness program, beginning in fall 2010. The center developed a curriculum consisting of about ten hours of instruction over eight weeks. Three lessons lasting twenty to thirty minutes each week included breathing and movement exercises to develop awareness, readings related to kindness and caring, and activities that gave children an opportunity to be kind toward one another.

Students in one of the classrooms engaged in the kindness curriculum, while students from the other served as a control group. (They received instruction when the testing was completed.)

## Mindfulness training can enhance teachers’ well-being and also provide a buffer against the stress of the classroom environment.

Flook says they tested the thirty or so students in both classrooms before and after the curriculum. “We examined the effects of the training on students’ attention and emotion regulation, relationships with classmates, and prosocial behaviors,” she says. “Children completed computer tasks measuring their attentional ability. Teachers completed reports of the children’s behavior in the classroom, while parents reported on children’s behavior at home. Our research suggested that there were improvements in attention and increases in prosocial behaviors among children who received instruction.” Pinger adds that the preliminary results of this pilot project suggest “this curriculum may help to promote self-regulation for children in this age group and improve their social and academic competence. The students, the teachers, and the parents were all delighted to take part.”

The goal of the teacher wellness program was to increase attention and awareness while decreasing stress. The center worked with the Madison Metropolitan School District to carry out and evaluate the effects of mindfulness training for elementary school teachers. As a longtime teacher herself, Pinger is very enthusiastic about this research, especially since teacher burnout, particularly in tough school districts, is a nationwide problem. About twenty kindergarten to grade five teachers participated in the study during the 2010-2011 academic year. It involved almost twenty-four hours of training in an eight-week modified MBSR program that consisted of weekly two-hour sessions, daily

homework, and a full day of mindfulness practice. The training included mindfulness of breathing, body sensations, emotions, and thoughts; mindful movement; and kindness practices.

The researchers compared assessments done before and after the training program across a number of measures, including performance of cognitive tasks, physiological markers of stress (via saliva sampling), observation of teachers’ behavior in the classroom by research staff, and self-reports by teachers. Teachers reported increased mindfulness and well-being and reduced stress, and demonstrated more effective teaching behaviors. Flook says the work she and Pinger have done with teachers suggests that “mindfulness training can enhance teachers’ sense of well-being. It can also provide a buffer against the stress that arises from the demands and challenges of the classroom environment.”

MELISSA ROSENKRANZ’S quest is to understand the circuitry in the brain that causes psychological stress and negative emotion to affect the immune system in negative ways and, conversely, causes “positive psychological events and mental flourishing to affect the immune system in salubrious ways.” She first became interested in mind-body medicine in high school when she saw a PBS special on psychoneuroimmunology—the research domain she now works in. On the show, they gave a drug to people who had lupus at the same time that they introduced them to a novel scent. Afterward, their immune system responded to the scent alone, without the drug. This showed that the immune system responds to classical conditioning—just like Pavlov’s dogs salivating when they heard the bell even though no food was available. “The way I learned it,” she says, “the immune system appeared to be a separate entity driven by the threats it was exposed to, not by action in the brain.”

What grabbed Rosenkranz was “just how much power the brain can have over the health of the body. The idea of psychosomatic illness was also interesting to me—that you could experience symptoms that the brain was totally responsible for generating.” The first study she worked on with Davidson was a now well-known study he did with Jon Kabat-Zinn that showed that after three months of meditation training, employees of a Madison biotech company demonstrated increased activation in the “left prefrontal cortex,” a condition associated with enhanced joy and energy. The subjects also showed a boost in immune system function.

Rosenkranz recently received a grant to investigate the efficacy of mindfulness training as an intervention for asthma. Stress will be induced in the subjects via a psychological stressor commonly used in stress studies, so the researchers can see the patterns of brain activity occurring when the subjects with asthma experience stress. Tests measuring changes in the cells in the subjects’ lungs and other markers related to the experience of asthma symptoms will be conducted before and after MBSR training to see how the subjects’ relationship to the psychological stressor changes and how those changes affect physiology relevant to asthma. Using the resulting data, they’ll be able to associate the changes in brain

activity with the changes in inflammation in the body.

“That way,” Rosenkranz says, “we can start to identify the mechanisms through which something like MBSR practice might affect physiological processes associated with disease.”

If you study a phenomenon in people who have a particular disease, it’s also helpful to study people who don’t have it. In that way, researchers can determine that what they observe is not something happening only in the physiology of those with the disease. In a stress-response study with healthy individuals Rosenkranz’s team put capsaicin, the active ingredient in chili peppers, on subjects’ skin. It causes the release of inflammatory molecules from nerve endings in the skin, which causes a “flare response.” They exposed this group of subjects to a standard stressor, as above, and measured the intensity of the flare response afterward. They did this both before and after MBSR, to see if MBSR buffers the effects of that stressor on the inflammatory response in the skin. Naturally, medical research proceeds cautiously and slowly. As results of this ongoing research become known in coming years, it may lead to breakthrough interventions using meditative practices for a variety of disease conditions where stress may be a key factor.

EMMA SEPPALA had been passionately educating herself about veterans for a long time before joining CIHM. Reading about the suicides and other aftereffects of the trauma they had endured in Iraq and Afghanistan motivated her to want to help them. After arriving at CIHM, she received a grant from the Disabled Veterans of America to implement programs. Seppala started doing yoga and meditative breathing with the veterans, and found it helped them. Davidson encouraged her to start a pilot study. As a result, the center offers free programs to local veterans and is developing a research agenda to evaluate the effects of these types of programs for those returning from war zones.

“One of the main issues for researchers,” she says, “is not really knowing the population they’re studying. It also makes it hard to recruit subjects because you’re spending all of your time in the lab and very little time around regular people, so to speak.”

For the pilot, Seppala recruited a group of ten vets in the active group and ten in the control. She tried some meditation with them, but she quickly found that “when you ask vets suffering from post-traumatic stress to sit down and meditate, after not



Top: Melissa Rosenkranz with PET scanner. Bottom: Emma Seppala (third from right) doing breathing exercises with military veterans in the CIHM meditation room.

too long, they find it difficult to sit there and do nothing. They’re too antsy, too jumpy, and have too many recurring memories for this to be comfortable. They’re much more comfortable doing something active that relaxes them and subsequently allows them to deal with recurring memories with more ease. With post-traumatic stress, your mind is saying one thing—for example, ‘there’s no danger to me in this coffee shop’—but your body is saying another—such as ‘I’m freaked out. If I hear the bang of a coffee cup, I might just run the hell out of here.’”

But when Seppala worked with breathing, it helped the vets relax into their bodies. The main “intervention” she uses with the vets is Sudarshan Kriya, a type of yogic breathing traditionally used for purification. “It’s rhythmic breathing,” she says, “that just settles you into a really deep state of relaxation.”

Typically, vets with post-traumatic stress experience recurring traumatic memories, and sleeplessness is a big problem; they’re usually treated with medication or exposure therapy (simply speaking, exposing a traumatized person to what they fear, but in a safe environment), but often not very successfully. Medication has side effects and exposure therapy is very trying for many vets.

➤ page 81

## Healthy Minds

*continued from page 49*

Sleep deprivation aggravates the trauma. Davidson and Seppala want to test the effectiveness of using techniques that do not involve medication. That yogic breathing works so well for the vets encourages Davidson that he is on the right track with his contention that meditative practices are not one size fits all. Some practices are ill-suited to some people in some circumstances, while others may be perfectly suited to them.

Seppala is hypothesizing that there is phenomenon known as “memory reconsolidation.” Trauma sufferers have strong emotional relationships with the memories that emerge in their minds, but if the memories can be “reconsolidated,” their relationship to them changes. “I believe the breathing puts them into such a deep state of relaxation that when the trauma emerges, they create a new relationship with the memory,” she says.

One vet had been assigned to do interrogations using extreme measures, torture essentially. Stateside, he never slept. After some days of doing the Sudarshan Kriya program, he reported that he fell asleep on the couch watching television, a normal experience for many but a breakthrough for him. “I remember everything that happened over there, but I realize that’s not me anymore,” he told Seppala. That’s the past. I don’t have the same emotional connection to it.”

WHAT CHALLENGE could be more compelling for the human mind today than the survival of our planet? CIHM has a project in the design stages that would study how meditative practices might alter the way individuals make decisions about how we use resources, and therefore alter the collective effect we have on our environment. Donal MacCoon, the scientist developing the project, told me about the Happy Planet Index, a measurement of sustainability developed by the New Economics Foundation that is expressed as a fraction. Illustrating the index on a whiteboard, MacCoon explained that

the numerator is a measurement of well-being in a society that represents tangibles such as longevity and lack of illness and intangibles such as contentment. The denominator represents how much of the earth’s resources a society is using to reach its level of well-being or happiness. Developing precise numbers to represent these values is challenging, but one thing we know for sure is that in North America, we have great well-being by objective measures, but it comes at the cost of an enormous amount of resources.

What MacCoon wants to know is whether meditative practices could help us achieve higher levels of well-being—both tangible and intangible—at a lower



*Donal MacCoon*

cost to the planet. One way to approach this would be to follow people’s buying habits and see whether they were altered by meditative practice, since the consumption habits of individuals add up to the consumption habits of a society. “How else will we improve this deadly number except by finding ways to be healthier and more content while using less?” MacCoon asks. “Technological advancements will probably not suffice to sustain us. Emotional dysregulation is one of the reasons we overconsume in our pursuit of happiness and also one reason it is hard to change the way we live. Since meditative practice has been shown to reduce emotional reactivity and makes us more aware of the larger effects we have on the world around us, perhaps meditation can help us maximize sustainable well-being.” ♦