BIOMEDICAL RESEARCH

Cell Biology Meets Rolfing

A diverse group of researchers wants to create a new discipline from scratch by bringing together experts in fascia and deep-tissue massage

BOSTON—Peter Huijing was far from enthusiastic when he received an invitation to speak at the Fascia Research Congress. The meeting, held here last month, would be the first dedicated to the soft part of the body's connective tissue system—an important but medically neglected organ. It would bring together top scientists from fields as diverse as cell biology and biophysics, but it would also include alternative medicine practitioners, such as chiropractors and deep-tissue manipulators known as Rolfers. "I had a fear of damaging my reputation," says Huijing, a world-renowned biomechanics researcher at Vrije Universiteit in Amsterdam, the Netherlands, who, despite his hesitation, decided to attend. By the time the conference was over, Huijing had agreed to organize the next one.

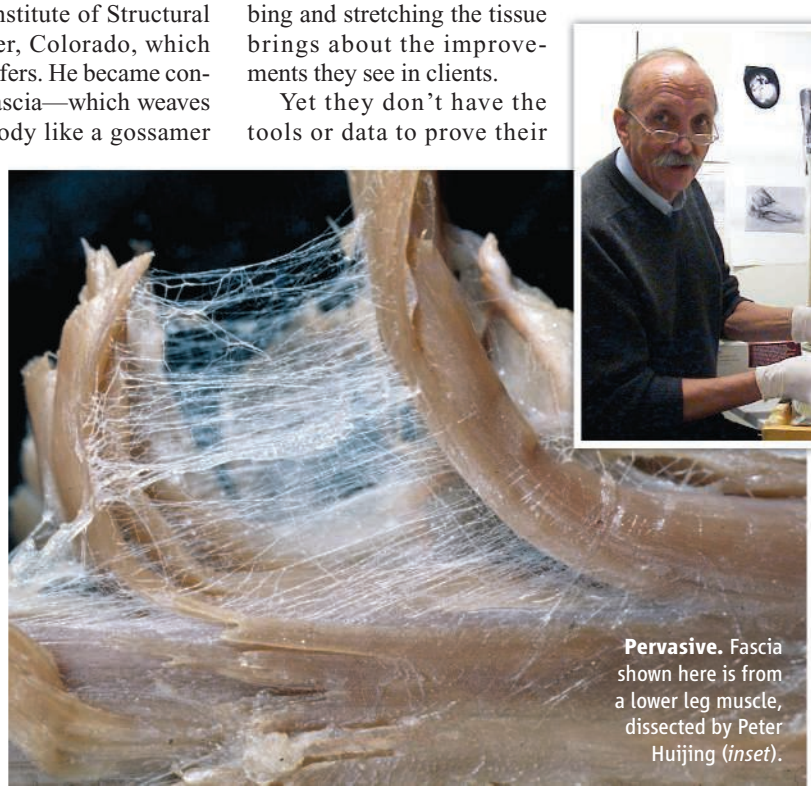
The conference was the brainchild of Thomas Findley, an M.D.-Ph.D. co-director of research at the VA Medical Center in East Orange, New Jersey. For 30 years, Findley has been studying the science behind rehabilitation medicine; he is also director of research at the Rolf Institute of Structural Integration in Boulder, Colorado, which trains and certifies Rolfers. He became convinced early on that fascia—which weaves its way through the body like a gossamer blanket, cradling organs, ensheathing bones, and providing structural support—plays a key role in how patients respond to treatment. He wanted to learn more, but there were no identifiable fascia researchers.

Frustrated, Findley began e-mailing scientists like Huijing in 2005. He knew that researchers around the world had been studying fascia in some form—MEDLINE references to it have spiked in the past 3 years—but that they didn't see themselves as part of a coherent field. Huijing, for example, looks at how the body generates force via the interactions between muscles and fascia, but he was unaware of cell biologists who were studying how fascial cells respond to movement. Findley hoped that bringing such scientists together would stimulate new research collaborations and shed light on the mysterious tissue.

Findley also wanted to bring in clinicians, but he knew that M.D.s wouldn't cut it. Some researchers have speculated that fascial anomalies may be responsible for black box disorders like fibromyalgia and lower back pain, yet doctors have traditionally ignored the tissue. Medical books barely mention fascia, and anatomical displays remove it. "It's just not sexy," says Elizabeth Montgomery, a pathologist who specializes in soft tissue at Johns Hopkins University in Baltimore, Maryland.

So Findley turned to the alternative-medicine community. Findley knew that Rolfers and other alternative therapists held fascia in high regard: They believe that rubbing and stretching the tissue brings about the improvements they see in clients.

Yet they don't have the tools or data to prove their claims. "Practitioners want to know the science behind what they're doing," says Findley, "and scientists want to see clinical applications of their work." Combining the two groups to create a new field seemed natural. But as the meeting in Boston revealed, bridging the gap won't be easy.



Pervasive. Fascia shown here is from a lower leg muscle, dissected by Peter Huijing (*inset*).

CREDITS: RON THOMPSON; GUUS C. BAAN (INSET)

The great divide

Frederick Grinnell picked up on the gap right away when he heard the applause—in the middle of a talk. It was 9:00 in the morning on the first day of the conference, and Paul Standley, a vascular physiologist at the University of Arizona College of Medicine in Phoenix, was describing his work on fibroblasts, the chief type of cell found in fascia. When Standley's team placed the cells on flexible collagen and stretched the collagen in ways that replicated repetitive motion strains on the body, many cells died. But when the team followed the strains by stretching the collagen in ways that approximate techniques like Rolfing, more cells survived. The audience erupted.

"It's rare to see such enthusiasm at a conference," says Grinnell, a cell biologist at the University of Texas (UT) Southwestern Medical Center in Dallas. "I was really struck by it." The audience was composed mostly of alternative-medicine practitioners—chiropractors, massage therapists, and Rolfers—who signed up in droves when Findley first advertised the meeting in the fall of 2006. Within 5 months, the 500-seat venue at Harvard Medical School had sold out.

The scientists took more convincing. In addition to Findley's aggressive e-mail campaign, a 51-year-old graduate student named Robert Schleip (see sidebar, p. 1235) traveled to labs around the world looking for plenary speakers. Some, like Grinnell, saw the conference as an opportunity to learn from other basic researchers. "I never realized my work on cell mechanics related to tissue mechanics until I heard about this meeting," he says. But others, like Huijing, were turned off at first: "I had never heard of

Published by AAAS

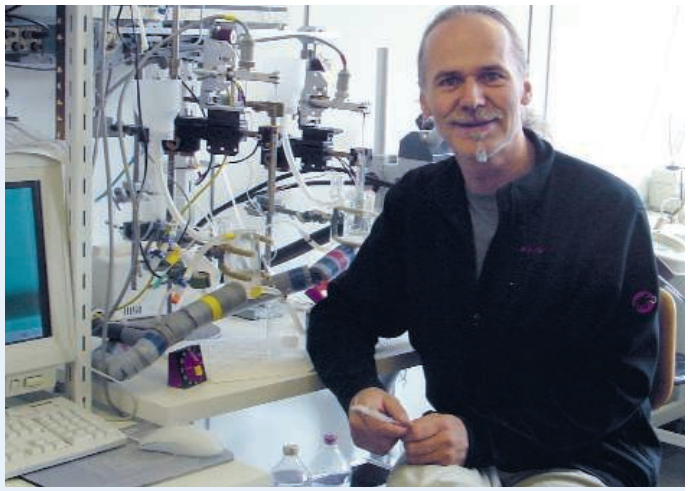
FROM ROLFER TO RESEARCHER

Robert Schleip remembers the moment he became a "born-again scientist." For 13 years, he had been teaching Rolfing—a technique that involves rubbing and stretching a bodywide network of soft connective tissue known as fascia—when he began to question his lesson plans. "I found there was a pseudoscientific mentality behind what I was doing," says Schleip, who in 1978 became Germany's first licensed Rolfer. "I thought, 'I'd better check this stuff out.' "

So Schleip turned to the scientific literature on fascia. "When I did my homework, I discovered that some of [the Rolfing dogma] didn't look so good." For example, as part of their training, Rolfers assume that if they apply enough force to an area of fascia, they can lengthen it and remove tension. "But the science says you would have to apply a ton of pressure to effect these changes," Schleip says.

The literature also provided insight: Schleip discovered, for example, that fascia is highly innervated, and that might explain why manipulating the tissue could ease pain. "I knew there were many gold mines waiting," Schleip says. So he stopped teaching and pursued a scientific career.

Getting a research position wasn't easy. Ten professors turned Schleip down before one at Ulm University gave him a chance—but no lab space. Schleip spent his first year conducting experiments in his kitchen and in a storage room he rented from a nearby pharmacy. He began to study the ability of fascial tissue to contract—a property that could play a role in stiffness and lower back pain. "The professor was so impressed with how much I did on my own that he let me work in his lab," Schleip says.



Sea change. Robert Schleip was a prominent Rolfer before he became a scientist.

Schleip now has a lab of his own. He earned his Ph.D. with honors in 2006 at the age of 52, and shortly thereafter established the Fascia Research Project at Ulm University. He's continuing his work on fascial contraction and has begun collaborating with Giulio Gabbiani, a preeminent cell biologist at the University of Geneva in Switzerland. Now Schleip says that when he calls professors to discuss research projects, they call him back. **–D.G.**

things like Rolfing before," he says. "I didn't see the relevance." In the end, 58 scientists signed up for the meeting—along with 51 M.D.s. Most of them took the podium, whereas the practitioners filled the seats.

Clapping aside, many of the practitioners struggled with the science. Findley was adamant that the talks not be "watered down," and intricate presentations on the first day pulled no punches. Cell biologists spoke about how fascial cells alter gene expression in response to force, while biomechanics researchers detailed how interactions between fascial cells and the extracellular matrix contribute to whole body mobility. By the afternoon, the auditorium was noticeably emptier. "My frontal lobe was tired," says Briah Anson, a St. Paul, Minnesota–based Rolfer.

For their part, the scientists had some problems connecting with the clinicians. Huijing's fears of stigma seemed to be borne out when he interacted with one group of attendees. "They started talking about aura," he says. "I don't want my name associated with that." And Giulio Gabbiani, a cell biologist at the University of Geneva in Switzerland who studies connective tissue and wound healing, acknowledged difficulty discussing some concepts with the practitioners. "It's like we were talking two different languages," he says.

All of this prompts Wallace Sampson to question whether putting the two camps together is a good idea. "Fascia is a legitimate target of study, but a field like this has to be generated organically," says the alternative-medicine skeptic and professor emeritus at Stanford University in Palo Alto, California. "You have to do the basic science and see what evolves. You can't force the clinical side."

Partap Khalsa strongly disagrees. "It's not only valid to bring these groups together, it's essential," says the program officer with the U.S. National Institutes of Health (NIH) National Center for Complementary and Alternative Medicine (NCCAM), which, along with organizations such as the Rolf Institute and the Evanston, Illinois–based Massage Therapy Foundation, provided funding for the meeting. "You need people who can do good basic science and clinicians who can inform them about their experiences," he says. "It's the only way to advance the field."

Bridging the gap

By the second day of the conference, things began to gel. A clinician-scientist panel fostered a dialogue between the two groups, and a networking lunch sparked new collaborations. "I heard clinicians talking about how manipulating fascial stiffness was key to their interventions," says UT Southwestern's Grinnell. Now he plans to study the cell biological basis of stiffness and how it might contribute to wound repair and scarring. Huijing says he also learned new things from the alternative therapists—and he found that he had something to teach them as well. Establishing fascia research as a legitimate field, he says, will guarantee that these interactions continue.

Findley knows it won't be easy. First, he'll need to attract more scientists. Publishing fascia research in top journals would help. He'll also need to cultivate a stable source of funding. Through the Rolf Institute, Findley has helped establish the Ida P. Rolf Research Foundation (named after the institute's founder), which is raising funds in hopes of awarding $200,000 in grants per year in 2 to 3 years. That's still a pittance compared to the millions NIH can provide, and NCCAM's Khalsa says he likes what he saw at the meeting. "There's a lot of potential here," he says.

But Findley's greatest challenge will be keeping everyone happy. Practitioners want to see more of their own up on the podium, and scientists want assurances that everything will remain respectable.

It's a tightrope Huijing looks forward to walking in 2009 when he puts together the next conference, to be held in Amsterdam. Huijing plans to give a larger spotlight to practitioners and to explore even more of the basic science. He's adding days, and he's reserved an auditorium for 1000 people—twice the size of the room at this year's event. "I have a feeling it could be very big," he says. **–DAVID GRIMM**

CREDIT: RAABE MUNICH GERMANY

Published by AAAS