NEWS

Parents turn their skills to furthering autism research

BY **EMILY SINGER**

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Browser not compatible.

When **Monica Coenraads** learned in 1998 that her daughter had Rett syndrome, a genetic disorder that shares some symptoms with autism, she was shocked.

“It’s a severe disorder, and you have to come to grips with the fact that your child may never walk, talk or use their hands,” says Coenraads. “But the next huge shock came when I realized there was very little research going on.”

Coenraads, who had been managing a family restaurant business, spent six months speaking with neuroscientists and other researchers.

“What motivated me in the beginning were questions about the roadblocks in research,” says Coenraads. “Was there something a motivated mother and non-scientist could do?”

In 1999, she and five other parents launched the Rett Syndrome Research Foundation. This group evolved into the **Rett Syndrome Research Trust**, of which Coenraads is executive director. The trust’s main goal is to support and stimulate Rett research.

That same year, researchers discovered **MeCP2**, the gene underlying Rett syndrome. Animal models were developed soon after, and research on Rett, until then a relatively obscure disorder, took off.

Though Coenraads didn't know it yet, she would help shape the growing field. The trust now has nearly $14 million in its coffers, 96 percent of which goes to grants.

Most parents educate themselves as much as possible when their child is diagnosed with a disorder. But Coenraads and a handful of other parents — in many cases, mothers — are taking this a step further. They have devoted their professional lives to research on autism-related disorders, using their resources and influence to help direct the field.

Alison Singer left a career in journalism to co-found the **Autism Science Foundation,** which funds autism research and helps educate the public about the disorder. **Geraldine Bliss** joined the **Phelan-McDermid Syndrome Foundation** after her son, now 14, was diagnosed with the rare autism-related syndrome at age 7. Peter Bell, now executive vice president for programs and services at the research and advocacy organization Autism Speaks, used to be a marketing executive at Johnson & Johnson. His son, now 20, was diagnosed with pervasive developmental disorder-not otherwise specified, a mild form of autism, in 1996.

“Most parents want to be involved and become advocates for their children,” says Singer. “A small group of parents says let me apply my professional training and change my career and devote all of my time to this as well.”

High risks:

Coenraads doesn’t have formal science training, but she was a quick study and educated herself by reading the scientific literature and talking with scientists. When she first began, she says, the

scientists she reached out to were generous with their time and patience. “They treated me with respect,” she says.

“She has educated herself in regards to neuroscience, and to Rett syndrome in particular, to such an incredible degree that it’s hard to distinguish her from a neuroscientist,” says **Benjamin Philpot**, associate professor of cell biology at the University of North Carolina, Chapel Hill, who has received funding from her organization.

Coenraads’ knowledge allows her to be more hands-on with funding decisions. Where once the organization waited for grant proposals, it now actively encourages collaboration among scientists, promoting the sharing of reagents and mouse models, for example.

“I tend not to have biases against different approaches,” she says. “No one views me as a competitor, and I usually come to the table with agnostic views.”

Coenraads cites an example from the 2006 Rett Syndrome Symposium, a recurring event that she organizes. She had cajoled “two dozen of the brightest and most creative scientists” in the field to join her for an early morning meeting, asking them to list five or six high-risk experiments they would run if resources were not an issue.

The top candidate was a mouse screen to look for **genetic modifiers of Rett syndrome**. (Scientists theorize that mutations in genes other than MeCP2 may explain why symptoms vary widely.) In 2008, the trust funded Monica Justice, professor of molecular and human genetics at Baylor College of Medicine in Houston, Texas, to look for these modifiers.

So far, the trust has committed $1.5 million to the project, which involves thousands of mice. Justice and her colleagues have already **identified some candidates**, which may prove to be good drug targets.

Coenraads has also helped to drive another unusual approach to treatment: activating the silent copy of MeCP2. The gene lies on the X chromosome, and in girls undergoes a process called X chromosome inactivation, in which one copy of the gene is silenced throughout the body.

In girls who carry MeCP2 mutations in one copy of the gene, sometimes the good copy is silenced, and sometimes the bad. (The disorder strikes girls almost exclusively, because a mutation in a male’s single copy is usually fatal.) If the silent copy is capable of producing a functioning protein, turning it back on may treat the symptoms.

The trust is funding various labs to test the idea, including that of Philpot, who has had some success with a **similar approach** for **Angelman syndrome**. Philpot notes that it would have been difficult to get funding from the National Institutes of Health for the project, because they had little preliminary data.

“In the beginning, I couldn’t get anyone to take me seriously; they thought it was very science fiction-y,” says Coenraads. “They are now realizing that it’s not as crazy as some people thought.”

Aligning goals:

Many of the parents say one of their main goals is to try to align scientists’ interests with their own.

That’s not an easy task: Most parents are focused on the urgent need for treatments, whereas scientists may be more involved in basic research and in the business of science — publishing papers, training young scientists and supporting a lab.

“A lot of scientists look at the value of their research to the scientific community; their goal is to be published in *Cell* or *Nature*,” says Singer. From a parent’s perspective, “The goal has to be to make a discovery that improves real people’s real lives.”

Several parents cite gastrointestinal problems as an example of an issue that is hugely important to families but that the scientific community has been slower to explore.

“The bias is that autism is a brain-based disorder,” says Bell, whose son suffered from serious gastrointestinal issues as a child. “I think it took [scientists] a lot of education and listening to the patient community and families to recognize how it affects the entire person.”

Parents aim to bridge that gap in part by encouraging more interaction between scientists and families.

Bliss, who now chairs the research support committee at the Phelan-McDermid Syndrome Foundation, has helped create an online registry for families and researchers, which includes a database of clinical information. “The families were dissatisfied that they were answering questions repeatedly but never seeing the outcomes,” she says.

So far, 500 families have filled out a 200-item, Internet-based survey with questions about developmental issues and medical problems. Researchers can analyze the data and send additional surveys to interested participants on specific topics, such as sleep or attention deficit hyperactivity disorder.

“Our greatest asset as a rare-disease group is our patients, and our registry is an example of how to use that to facilitate research,” says Bliss. “We have developed into a tight-knit community and we can help them to participate in research, which helps speed things along.”

Most participants have uploaded genetic information (the disorder is genetically diagnosed), or donated skin biopsies and blood samples at a **Phelan-McDermid syndrome conference** in July.

“I think it’s a really important resource,” says Bliss. “Parents have lots of information and it has all been hidden from the science community.”

Parents involved in research organizations also say part of their role is simply to introduce scientists to the realities of autism and related disorders.

“I have brought my daughter to many labs and I try to set up opportunities for researchers to go to schools and spend time with the kids,” says Singer. “Some scientists have never met anyone with autism; they deal with mice and rats.”