

An Inside Look at *the Brain in Pictures*

When my children were young, I gave a presentation on the brain at their elementary school. I entered the school with a full-size brain model and a CT scan of a child's normally developing brain in hand. As I walked down the hall to the classroom, a crowd of curious children gathered behind me.

"What is that?" they asked. "A brain?" This was followed by a chorus of more questions. "Can we see it?" "Can we touch it?" "What does that part do?" "Does my brain look like that?"

We compared the brain model to the CT scan. The children (and their teachers) were fascinated that it was possible to see, in detail, a living person's brain. That was 15 years ago. Back then, CT (computed tomography) technology was the latest innovation. As our Brain Imaging Special Section shows, we have come a very long way.

In this issue, we devote 16 pages to the most exciting advances in brain imaging — and how this technology is used to examine what the brain looks like and how it functions in both health and disease.

Our in-depth look at neuroimaging was prompted by the recent release of the Human Brain Atlas. This unique atlas comprises brain imaging data from 7,000 people throughout the world. Scientists can use this information to study everything from normal brain development to the damage caused by Alzheimer's disease or drugs like amphetamines to brain changes that may lead to such disorders as schizophrenia and autism. Dr. John Mazziotta and his colleagues in the International Consortium for Brain Mapping have been working 13 years to make this invaluable resource available to researchers. Even he is amazed by what can be done with the information in the brain atlas.

A real breakthrough in imaging technology — and, indeed, in all neurological research — is our ability to see how the brain functions. While CT and MRI (magnetic resonance imaging) scans detail the structure, the latest advance — functional MRI, or fMRI — shows the brain in action. It allows us to see the effects of different medications on the brain, and it can also track changes in brain activity due to emotions such as fear, sadness and meditation.

Our Brain Imaging Special Section features an intriguing article on how scientists proved that the belief in a medication's pain-relieving effectiveness (even when the "medication" is a sugar pill) causes the same changes in brain activity as real pain medication. That story on the so-called placebo effect also explores the practical application: ongoing fMRI studies that teach people to soothe their pain by controlling certain parts of their brain.

The powerful ability to see the brain at work is paving the way for a better understanding of many diseases, which is already translating into much more effective therapies.

And in case you feel slightly overwhelmed with this alphabet soup of brain imaging tests, just turn to our pictorial glossary defining all the scanning techniques.

The advances in brain imaging technology over the last decade have been truly amazing. And they promise to get only more amazing as scientists experiment with MRI machines 180,000 times more powerful than the Earth's magnetic field.

Of course, this Special Issue goes far beyond the brain imaging section.

We present Junior Soprano as you've never seen him on TV, profiling Dominic Chianese's use of his personal experiences to inform his portrayal of Alzheimer's on "The Sopranos."

Perhaps the feature that most makes this issue truly special introduces Cathy Wolf, who refuses to let the paralyzing progression of amyotrophic lateral sclerosis (ALS) deter her writing. We are honored to publish her inspiring poems as a testament to the strength of the human spirit in the face of a degenerative neuromuscular disease.

The promise of today's brain imaging breakthroughs gives us hope that someday poets will be writing about diseases like ALS and Alzheimer's in the past tense.



Today's hi-tech
brain images
fascinate
children of
all ages.

A handwritten signature in black ink that reads "Robin Brey".

Robin L. Brey, M.D.
Editor-in-Chief