

## Infant brains imply adult ills: Researchers study traits in babies as young as two weeks

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Brain images from newborns are giving scientists a glimpse of the future - not just into the lives of their tiny subjects but also paths to treatment for adult patients with schizophrenia and Alzheimer's disease.

Researchers from the University of North Carolina-Chapel Hill found degeneration in the brains of 2-week-old infants, a result considered a "game changer" for the field of [brain research](#), said Jay Giedd, a [brain](#) imaging specialist for the National Institute of Mental Health.

"Our original model was that the brain was fine until someone got the illness," Giedd said.

"This work shows that these changes are there probably from conception. It also suggests that while these traits don't cause brain damage, they set up the brain to be slightly different."

The researchers examined scans of 272 newborns. About 15 percent were found to have smaller medial temporal lobe sections.

"The medial temporal lobe plays an important role in memory," said Rebecca Knickmeyer, a UNC assistant professor of psychiatry and co-author of the research, published last month in [Cerebral Cortex](#), an online journal.

"The idea is that this is an anatomical vulnerability. If you start out with less, you might hit active symptoms earlier in life."

The researchers also found specific gene traits associated with Alzheimer's in babies with the smaller media [temporal lobes](#).

"We were interested because it was generally known that people's genes contribute to [psychiatric conditions](#) later in life, but pretty much all the existing studies were in adults," Knickmeyer said. "Our question was 'When were these genes exerting their effect?' Now we know it's much earlier than previously thought, perhaps before birth."

Research such as this would benefit from the Brain Activity Map under development through the National Institutes of Health. The project's 10-year goal is to create a map of the brain's nearly 30,000 genes as well as the circuitry system that transmits information via brain waves.

President Obama mentioned the project in his State of the Union address and is expected to include funding for the project in the upcoming federal budget. Foundations and some private companies have also expressed interest in assisting in the project, which is expected to push brain research to a higher level.

"As brain scientists, we were giddy to hear this," Giedd said. "Motivation is sky high. If they fund this, we believe our work will really take off."

Giedd, who is familiar with but did not participate in the infant brain study, said the search for treatments or cures for diseases such as Alzheimer's, autism, schizophrenia and Parkinson's disease have been stymied by the many mysteries that remain regarding how the brain functions.

"If we understood more about the mechanisms that cause these diseases, we could step in and do something about it," Giedd said. "The brain is so complicated. Most diseases don't just involve one or two or even three genes. It might be 60 or 100 genes, along with upbringing, diet and

environment. There are so many parameters to the equation."

Knickmeyer said her research team plans to follow up with the newborns as they grow into adulthood to see whether the traits displayed by infants change over time or remain stable throughout their lives.

Daniel Kaufer, cognitive neurology and memory disorders chief for UNC's Department of Neurology, said he thinks the time is right for great advances in brain research.

"We are at the crossroads of two important events: the realization that brain disorders may occur long before symptoms begin, and the development of brain imaging technology to record brain processes," Kaufer said.

Learning more about the brain's functions through gene mapping may be the third piece of the puzzle.

"Right now, there is no map of the human brain," said Murali Doraiswamy, professor of psychiatry and behavioral sciences at Duke University School of Medicine.

Doraiswamy said the brain carries thousands of genes that influence thought, perception, emotion, memory and other mental activities.

"We want to find out how much is nature and how much is nurture," he added. "I think we are at the forefront of something very insightful, but also a little frightening."

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## MAPPING A NEW WORLD

The [Brain Activity](#) Map is being planned as a decade-long research effort to create a comprehensive outline of the structure of the human brain and its neurons.

Funding is expected to come from a variety of sources, including the federal government, private industry and research foundations.

Details of the project have not yet been made public. But it is being compared to the DNA sequencing effort known as the Human Genome Project, which ran from 1990 to 2003 and cost \$3.8 billion.

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