Armenia. Next he lobbied the formidable Armenian Caucus in Congress. The result: $15 million of the State Department's 2001 budget was earmarked for SESAME or "a comparable project" in Armenia.

Even as Jordan was struggling to make its case for SESAME, Hovnanian made a surprise announcement in November 2000: Armenia would instead build a synchrotron from scratch. Physicists in Yerevan, he says, had convinced him that "they could build a bigger and better machine for less money." CANDLE got extra clout the following spring when prominent high-energy physicist Alexander Abashian, recently retired from Virginia Polytechnic Institute and State University in Blacksburg, was appointed project director.

If CANDLE secures its U.S. grant, Abashian hopes to begin construction in 2004. For the rest of the funding, "we'll target everyone we can," he says, including U.S. government sources and nonprofits that support FSU science. Provided the fundraising succeeds, CANDLE might still have trouble luring users to Yerevan. One reason that Armenia wasn't chosen to host SESAME is its "difficult accessibility," says Herwig Schopper, who heads SESAME's interim council. "Jordan is much more centrally located," he says. (BESSY I arrived in Jordan earlier this month and is expected to be operating by 2006.)

Still, CANDLE technical director Vasili Tsakanov expects "broad participation" from the Middle East, Russia, and other FSU countries. And scores of Armenian scientists could be called on to do contract research. "If somebody doesn't want to come to Armenia, we will do the research for you," Hovnanian says. "This is an investment that would benefit the world, not just Armenia."

–RICHARD STONE

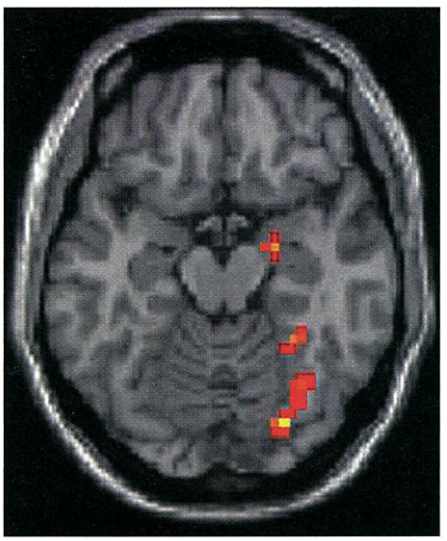
NEUROSCIENCE

Gene's Effect Seen in Brain's Fear Response

The saying "like father like son" reflects the common assumption that temperament, like eye color and pattern baldness, can be passed on in the genes from one generation to the next. But demonstrating how genes influence behavioral traits has been much more difficult than tracing the lineage of physical characteristics.

A study on page 400 might provide a tantalizing glimpse of things to come. A team led by psychiatrist and neurologist Daniel Weinberger of the National Institute of Mental Health in Bethesda, Maryland, has shown that people with different versions of a single gene have different patterns of brain activity in response to emotion-laden stimuli.

The findings demonstrate that individual genes can contribute to how the brain interprets its environment, Weinberger says: "How that translates into a person's perception of the world is a much more complex question, but I think we'll be able to understand how genes contribute to emotionality, temperament, and psychiatric illness by understanding how they contribute to information processing in the brain."



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Yikes! A single gene appears to modulate the amygdala's reaction to emotional faces.

"It's a fascinating study," says Joseph LeDoux, a neuroscientist at New York University. "It will surely stimulate lots of additional work on the neural basis of normal and pathological fear and anxiety."

The gene in question encodes a transporter protein that shuttles the neurotransmitter serotonin back into neurons after it has been released, thus limiting serotonin's effect on neighboring cells. The gene comes in two common versions, or alleles. One contains a short promoter region, the stretch of DNA that controls the gene's expression; the other has a longer promoter. In cell culture experiments, the short allele produces only about half as much of the transporter as the long allele, but the jury is still out on whether this difference exists in vivo. One hint that the transporter gene influences behavior comes from the finding that people who have a copy of the short allele—about 70% of the population in North America and Europe—are slightly more likely (3% or 4%) to show signs of anxiety or fearfulness on clinical personality tests than those with two copies of the long allele.

Weinberger's team reasoned that the gene's effect might show up more clearly in patterns of brain activity—particularly in an almond-shaped region of the brain called the amygdala, the brain's emotional command center. The researchers used functional magnetic resonance imaging to monitor activity in the amygdalas of 28 volunteers, half of whom had two copies of the long allele and half of whom had at least one copy of the short allele. While being scanned, subjects saw a picture of a face with either an angry or frightened expression and then had to choose which of two other faces showed the same emotion.

Both groups matched expressions correctly about 90% of the time. But people in the short-allele group showed considerably more activity in their right amygdalas while engaged in the task. There was no difference in brain activity when subjects had to match shapes. Many studies have shown that the amygdala revs up in frightening situations, Weinberger says, and the heightened activity in the short-allele group might help explain why, at the population level, people with the short allele are more prone to anxiety. "The amygdala puts a label on information that says 'This is dangerous,' " he explains, and a hyperactive amygdala—perhaps resulting from less serotonin transporter—might make people feel threatened even in nonthreatening situations.

Researchers say the study is one of only a handful to link a genetic variation to differences in brain activity. "It is a true milestone in psychobiological research and behavioral genetics," says psychiatrist and neuroscientist Klaus-Peter Lesch of the University of Würzburg in Germany, whose group discovered the two alleles of the serotonin transporter.

Still, some caution that the study doesn't prove that the difference in amygdala activity is caused by a difference in serotonin function. "To make the demonstration complete, it would have been so nice to measure aspects of serotonin transmission," says Chawki Benkelfat, a research psychiatrist at McGill University in Montreal, Canada. Even so, the new study puts researchers one step closer to understanding how small genetic differences might shape the way people respond to the world.

–GREG MILLER

FOOT-AND-MOUTH DISEASE

Report Urges U.K. to Vaccinate Herds

LONDON—Britain's top scientific body has urged the government to abandon its longstanding practice of relying solely on slaughtering animals to combat future outbreaks of foot-and-mouth disease (FMD). Instead, in a report released 16 July, a Royal Society panel has concluded that vaccination and improved data collection should result in better control and fewer dead animals.

The use of vaccination to control FMD