

Brain faces up to fear, social signs

A woman who contracted a brain disease that destroyed an almond-shaped swatch of cells known as the amygdala has given scientists a rare peek at how that brain structure facilitates social communication.

The amygdala, often thought to regulate a variety of emotions, may instead be indispensable for recognizing fearful facial expressions, assert Antonio Damasio, a neuroscientist at the University of Iowa College of Medicine in Iowa City, and his colleagues. It also proves critical for discerning a combination of emotions, which often get incorporated into facial expressions, they say.

"Anatomically, the amygdala has links to brain areas involved in cognitive and sensory processing, as well as those involved in bodily states related to feelings," Damasio holds. "That's why it plays such an important role in emotion and social behavior."

Damasio's team studied this unfortunate 30-year-old woman, whom they refer to as S.M. She displayed normal intelligence and good emotional health but had a history of badly misjudging others' intentions and making poor social decisions. Brain scans revealed the nearly total loss of her amygdala but the preservation of other structures.

The researchers presented a series

of photographs of male and female faces to S.M., to 12 patients with other types of brain damage, and to 7 individuals with no brain damage. The faces displayed anger, fear, happiness, surprise, sadness, disgust, or a neutral expression.

S.M. assigned substantially less intensity to fearful faces — but not to other expressions — than did the two comparison groups, Damasio and his coworkers report in the Dec. 15 *NATURE*.

Extensive damage to the amygdala leaves the ability to recognize faces intact, the scientists say. S.M. easily remembered photographs of familiar faces.

Further tests revealed that S.M. failed to perceive similarities between emotional expressions. For instance, she did not rate surprised and happy faces as more alike than sad and happy faces, a distinction grasped by the comparison groups.

Damasio theorizes that when someone ponders a course of action that contains potential pitfalls, the amygdala helps coordinate bodily reactions that serve as internal warnings and help produce negative emotions.

A study of another patient who suffered damage to her amygdala, set to appear in the February 1995 *BRAIN*,

finds that she has great difficulty in identifying many emotional expressions and in telling when individuals look at her or away from her. Andy Young of the University of Cambridge in England directed that investigation.

"The discovery that the human amygdala is involved in detecting both gaze direction and facial expression shows that it is indeed part of a brain mechanism for representing the intentions and dispositions of others," write John Allman, a biologist at the California Institute of Technology in Pasadena, and Leslie Brothers, a psychiatrist at the West Los Angeles Veterans Affairs Medical Center, in a comment accompanying Damasio's report.

The lack of interpersonal skills typical of autism may stem from damage to a brain system that converges in the amygdala, Allman and Brothers suggest.

A related review of nonhuman animal research, published in the Dec. 6 *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES*, suggests that one part of the amygdala allocates attention to events or cues that unexpectedly occur together, a key step in learning about one's environment. Michela Gallagher of the University of North Carolina at Chapel Hill and Peter C. Holland of Duke University in Durham, N.C., both psychologists, conducted the review.

— B. Bower

University probe faults 'cloning' research

In October 1993, two researchers created a stir when they announced that they had "cloned" human embryos. At the time, many ethicists denounced the work, saying it could lead to scores of duplicate humans. Last week, a National Public Radio report broke the news that the researchers had failed to obtain timely approval for their controversial experiments.

Robert J. Stillman and Jerry L. Hall of George Washington University (GW) in Washington, D.C., remain at the center of this lingering saga. The duo first presented their work on Oct. 13, 1993, at the annual meeting of the American Fertility Society, held in Montreal. Their research involved separating two- to eight-cell human embryos into their constituent cells (SN: 10/30/93, p.276; 2/5/94, p.92).

In theory, the method, which the two researchers referred to as "cloning," could create identical twins or triplets. But the Hall-Stillman experiments relied on abnormal human embryos that could not develop properly and had been slated for disposal because they were not suitable for in vitro fertilization.

Throughout the whirlwind of publicity, the researchers noted again and again that their work had won the university's

ethical okay. For example, in an October 1993 press statement, Stillman said the experiment was "approved by the Institutional Review Board (IRB) and the Ethics Committee of the Medical Center." The IRB is a group of professionals that reviews all requests to conduct research related to human subjects at GW.

Last week, a spokesperson for the GW medical center's office of public relations refused to answer any questions about the affair. The office did, however, release a statement saying that after the two researchers presented their results in Montreal, the IRB, as well as an independent three-member panel, went back and conducted an investigation. That probe found that Stillman and Hall had violated university policy by obtaining IRB "approval" after they had already completed the controversial experiment.

The statement says, "The IRB was never told that its approval was being sought for work that had already been performed." Furthermore, the IRB had granted its approval on the condition that the researchers obtain informed consent from the people who had donated the embryos. At the time Stillman and Hall received the university's okay, consent was not possible: They had already

finished the work, using anonymous embryos.

The GW inquiry concluded that the researchers had submitted their work without full disclosure of the facts, a violation of university policy. GW President Stephen Joel Trachtenberg has directed Hall and Stillman to discard all data from this experiment. In addition, the university says it will monitor Stillman's research for a period of 2 years. (Hall left GW early this fall.)

The IRB's conclusions are based on errors of fact, contends Washington, D.C., attorney Ronald Goldfarb in a March 15, 1994, letter to the Office for Protection from Research Risks at the National Institutes of Health (NIH) in Bethesda, Md. Goldfarb has been retained by Stillman, who contends that informed consent was "impossible" and probably unnecessary, since the human embryos were grossly abnormal.

Although the experiment was not conducted with federal funds, GW (as well as other universities that receive a mix of private and federal money) complies with federal guidelines for the protection of research subjects, points out Gary Ellis of the Office for Protection from Research Risks. GW informed NIH of its investigation and the corrective measures taken. "We accepted their findings," Ellis says.

— K.A. Fackelmann