Fear and survival in the brain

Fear factor The fear response—nerves tense, heart racing, cold sweat—kicks in when we encounter a scary animal, person, or situation. Even a scary movie can trigger this primitive and protective reaction.

Charles Whitman was a normal and responsible child. He became the youngest Eagle Scout in the country. He was a fine son and husband, and received commendations as a U.S. Marine. But while he was in the service, he began having unexplained fits of anger, among other personality disorders. He was discharged from the Marines and entered the University of Texas. Several times he visited campus doctors and complained about having violent thoughts. Then, on August 1, 1966, after killing his wife and mother, he gathered several high-powered rifles, went to the top of the tall clock tower on the University campus, and barricaded himself inside. From this vantage point, he killed 14 people and wounded 38 others before being shot and killed by Austin police. His autopsy revealed a tumor pressing on his amygdala.

The amygdala (Latin for «almond», which describes this structure's shape) is the brain's center for the emotion and memory of fear. When the cells of this structure are activated, your heart beats faster, your breathing becomes rapid and shallow, and your hands get cold and clammy. If you watch a horror movie, your amygdala is activated. If you encounter a threatening face, your amygdala is activated. If you are alone at night and hear an unusual noise, your amygdala is activated. What would life be like without an amygdala? You wouldn't get scared—and not being scared could be hazardous to your health.

A rare case of brain damage left a woman without a functional amygdala. When shown pictures of faces registering different emotions, she could not pick out the ones that were threatening or scary. She could not recall every having a frightening experience. In tests where she was administered mild electrical shocks, she developed no anticipatory fear; even though she knew that seeing a red card meant she was about to receive a shock, she never reacted to the red card. Thus, in real life, she would not have the reflex to pull away from a threat.

People with damage to the amygdala frequently have trouble engaging in normal social relationships. They cannot «read» the nature, mood, or intentions of other people by looking at their faces. The presence of pressure on Charles Whitman's amygdala may have been a factor in the emotions that drove him to mass murder; this diagnosis remains a matter for medical speculation.

Our nervous system enables us to experience the world around us and to react to it. But in between sensing and reacting, there is much interpretation based on memory, learning, emotions, and beliefs—all of which are based on the activities of cells in the nervous system. To understand how the eyes see, how the fingers play the piano, or how emotions affect our behavior, we have to understand how cells in different parts of our brains work and interact.

Answer the questions

- What is amygdala?
- What could happen to people with damage to amygdala?

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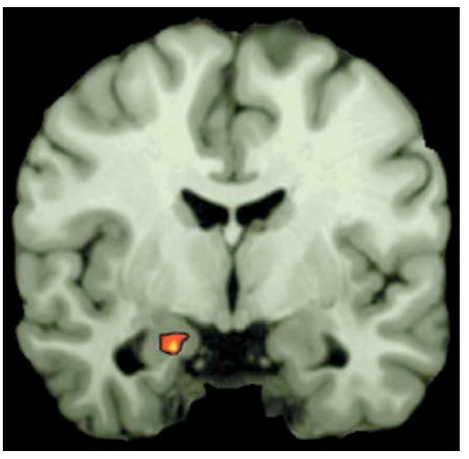

Source of the fear response Frightening situations—or even memories of such a situation—activate a group of cells in the amygdala, a structure deep in the brain.