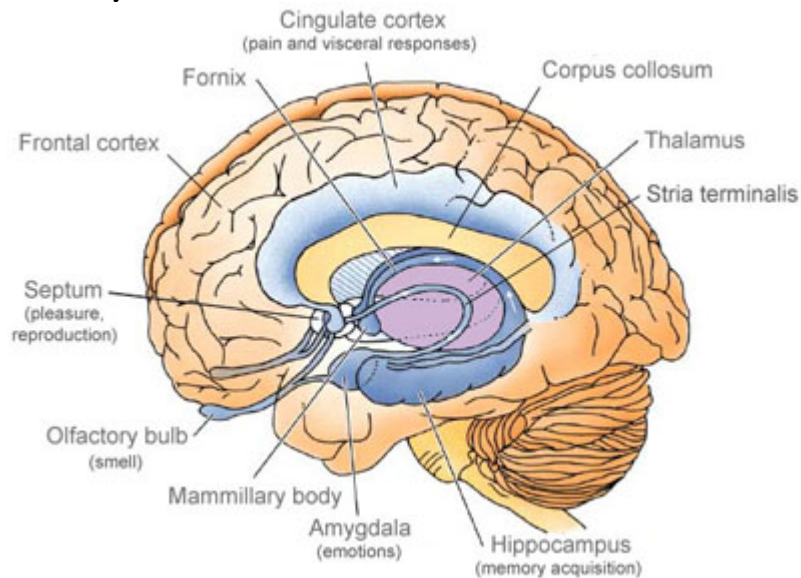


Neuroanatomy

Limbic system



The **limbic system** (or Paleomammalian brain) is a set of brain structures including the hippocampus, amygdala, anterior thalamic nuclei, septum, limbic cortex and fornix, which seemingly support a variety of functions including emotion, behavior, long term memory, and olfaction. The term "limbic" comes from the Latin *limbus*, for "border" or "edge".

Amygdala

The amygdala is an almond shaped mass of nuclei located deep within the temporal lobe of the brain. It is a limbic system structure that is involved in many of our emotions and motivations, particularly those that are related to survival. The amygdala is involved in the processing of emotions such as fear, anger and pleasure. The amygdala is also responsible for determining what memories are stored and where the memories are stored in the brain. It is thought that this determination is based on how huge an emotional response an event invokes.

Function:

- Arousal
- Autonomic Responses Associated with Fear
- Emotional Responses
- Hormonal Secretions
- Memory

Hippocampus

The hippocampus is the part of the brain that is involved in memory forming, organizing, and storing. It is a limbic system structure that is particularly important in forming new memories and connecting emotions and senses, such as smell and sound, to memories. The hippocampus is a horseshoe shaped paired structure, with one hippocampus located in the left brain hemisphere and the other in the right hemisphere. The hippocampus acts as a memory indexer by sending memories out to the appropriate part of the cerebral hemisphere for long-term storage and retrieving them when necessary.

Function:

- Consolidation of new memories
- Emotional Responses
- Navigation

- Spatial Orientation

Bovine Spongiform Encephalopathy or Mad Cow

Bovine Spongiform Encephalopathy (BSE), commonly known as **mad-cow disease**, is a fatal neurodegenerative disease in cattle that causes a spongy degeneration in the brain and spinal cord. BSE has a long incubation period, about 30 months to 8 years, usually affecting adult cattle at a peak age onset of four to five years, all breeds being equally susceptible. In the United Kingdom, the country worst affected, more than 180,000 cattle have been infected and 4.4 million slaughtered during the eradication program.

The disease may be most easily transmitted to human beings by eating food contaminated with the brain, spinal cord or digestive tract of infected carcasses. However, it should also be noted that the infectious agent, although most highly concentrated in nervous tissue, can be found in virtually all tissues throughout the body, including blood. In humans, it is known as *new variant Creutzfeldt-Jakob disease* (vCJD or nvCJD), and by October 2009, it had killed 166 people in the United Kingdom, and 44 elsewhere. Between 460,000 and 482,000 BSE-infected animals had entered the human food chain before controls on high-risk offal were introduced in 1989.

Alzheimer's Disease

Alzheimer's disease (AD), also known in medical literature as **Alzheimer disease**, is the most common form of dementia. There is no cure for the disease, which worsens as it progresses, and eventually leads to death.

Most often, AD is diagnosed in people over 65 years of age, although the less-prevalent early-onset Alzheimer's can occur much earlier. In 2006, there were 26.6 million sufferers worldwide. Alzheimer's is predicted to affect 1 in 85 people globally by 2050.

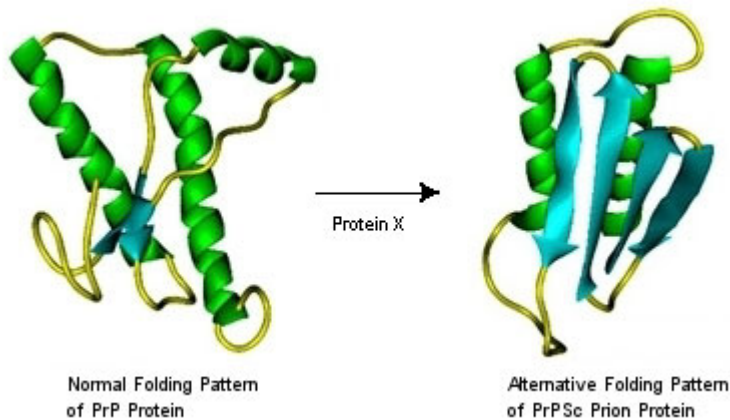
Although Alzheimer's disease develops differently for every individual, there are many common symptoms. Early symptoms are often mistakenly thought to be 'age-related' concerns, or manifestations of stress. In the early stages, the most common symptom is difficulty in remembering recent events. When AD is suspected, the diagnosis is usually confirmed with tests that evaluate behavior and thinking abilities, often followed by a brain scan if available.

As the disease advances, symptoms can include confusion, irritability and aggression, mood swings, trouble with language, and long-term memory loss. As the sufferer declines they often withdraw from family and society. Gradually, bodily functions are lost, ultimately leading to death. Since the disease is different for each individual, predicting how it will affect the person is difficult. AD develops for an unknown and variable amount of time before becoming fully apparent, and it can progress undiagnosed for years. On average, the life expectancy following diagnosis is approximately seven years. Fewer than three percent of individuals live more than fourteen years after diagnosis.

The cause and progression of Alzheimer's disease are not well understood. Research indicates that the disease is associated with plaques and tangles in the brain. Current treatments only help with the symptoms of the disease. There are no available treatments that stop or reverse the progression of the disease. As of 2012, more than 1000 clinical trials have been or are being conducted to find ways to treat the disease, but it is unknown if any of the tested treatments will work. Mental stimulation, exercise, and a balanced diet have

been suggested as *possible* ways to delay symptoms in healthy older individuals, but they have not been proven as effective.

Prions



A **prion** /'pri:ɒn/ is an infectious agent composed of protein in a misfolded form. This is in contrast to all other known infectious agents (virus/bacteria/fungus/parasite) which must contain nucleic acids (either DNA, RNA, or both). The word *prion*, coined in 1982 by Stanley B. Prusiner, is a portmanteau derived from the words *protein* and *infection*. Prions are responsible for the transmissible spongiform encephalopathies in a variety of mammals, including bovine spongiform encephalopathy (BSE, also known as "mad cow disease") in cattle and Creutzfeldt–Jakob disease (CJD) in humans. All known prion diseases affect the structure of the brain or other neural tissue and all are currently untreatable and universally fatal.

Post-traumatic stress disorder PTSD

Post-traumatic stress disorder is a type of anxiety disorder. It can occur after you've seen or experienced a traumatic event that involved the threat of injury or death.

Causes, incidence, and risk factors

PTSD can occur at any age. It can follow a natural disaster such as a flood or fire, or events such as:

- Assault
- Domestic abuse
- Prison stay
- Rape
- Terrorism
- War

For example, the terrorist attacks of September 11, 2001 may have caused PTSD in some people who were involved, in people who saw the disaster, and in people who lost relatives and friends.

Veterans returning home from a war often have PTSD.

The cause of PTSD is unknown. Psychological, genetic, physical, and social factors are involved. PTSD changes the body's response to stress. It affects the stress hormones and chemicals that carry information between the nerves (neurotransmitters).

It is not known why traumatic events cause PTSD in some people but not others. Having a history of trauma may increase your risk for getting PTSD after a recent traumatic event.

Symptoms

Symptoms of PTSD fall into three main categories:

1. "Reliving" the event, which disturbs day-to-day activity

- Flashback episodes, where the event seems to be happening again and again
- Repeated upsetting memories of the event
- Repeated nightmares of the event
- Strong, uncomfortable reactions to situations that remind you of the event

2. Avoidance

- Emotional "numbing," or feeling as though you don't care about anything
- Feeling detached
- Being unable to remember important aspects of the trauma
- Having a lack of interest in normal activities
- Showing less of your moods
- Avoiding places, people, or thoughts that remind you of the event
- Feeling like you have no future

3. Arousal

- Difficulty concentrating
- Startling easily
- Having an exaggerated response to things that startle you
- Feeling more aware (hypervigilance)
- Feeling irritable or having outbursts of anger
- Having trouble falling or staying asleep

You might feel guilt about the event (including "survivor guilt"). You might also have some of the following symptoms, which are typical of anxiety, stress, and tension:

- Agitation or excitability
- Dizziness
- Fainting

- Feeling your heart beat in your chest
- Headache

Dopamine

Dopamine is a neurotransmitter that helps control the brain's reward and pleasure centers. Dopamine also helps regulate movement and emotional responses, and it enables us not only to see rewards, but to take action to move toward them. Dopamine deficiency results in Parkinson's Disease, and people with low dopamine activity may be more prone to addiction. The presence of a certain kind of dopamine receptor is also associated with sensation-seeking.