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Amygdala and hippocampus pdf

6.1 Amygdala - General amygdala considerations are an integrated center of emotion, emotional behavior, and motivation. If the brain is turned upside down, the end of the continuous structure with the hippocampus is called uncus. If you peel away the uncus you will expose the amygdala that abuts the anterior hippocampus. Just like the hippocampus, major pathways communicate in two parts and contain both affluent fiber. Figure 6.1 the relationship of the amygdala to some other brain structures. 6.2 Entrance to the amygdala-shaped 6.2 inputs or afferents to the amygdala via the estria terminal, ventricular amygdala-voicing pathway, olfactory steria, and directly from temporal lobe structures. As was the case with the hippocampus, the fibers carrying input into the amygdala are in practically all cases associated with fibers carrying output from the amygdala. The amygdala receives inputs from all senses as well as visceral inputs. Since the amygdala is so important in emotional learning it is no surprise that visceral inputs are a major source of input. Visceral entrances come from the hypothalamus, septal region, orbital cortex, and parabrachial nucleus. Olfactory sensory information comes from the olfactory lamp. Hearing, vision and somatosensory information comes from temporal and anterior ingolate curtis. Figure 6.3 outputs or a vefer from the amygdala through the estria terminal, ventricular amygdalaphage pathway, and direct pathways. 6.3 Major output pathways of the amygdala ventricular amygdala, the Stria terminalis pathway directly to the hippocampus directly into the entorhinal cortex directly into the dorsal nucleus of the 6.4-ventricle of the amygdalatophazhystric pathway. The fugal term comes from the word fuge-to drive away—as in fugitive. This pathway continues into the anterior olfactory nucleus, anterior perforated material, pyriform cortex, orbitofrontal cortex, anterior ingolate cortex, and ventricular striatum. Ventricular estrium contains part of caudate, putamen, and nucleus septi accumbens (the nucleus that reclines on the septum). Prediction of ventricular striatum are bonds in a basal ganglia circuit that are important in stimulus-response-related learning. The ventricular amygdalaposic pathway is also connected to the hypothalamus and septal nucleus, but the major connection of the amygdala to the hypothalamus and septal nucleus is through the striatum terminal. The path of ventricular amygdalafuj is important because it is a link that causes motivation and drives, through the limbic system, can affect responses. It is also a link that follows the answers learned. In this case, this is the link that causes mobile learning. This is where the answers are associated with appetizing and strict consequences, which are rewards and punishments. Three simplizations: similar estoria terminals in Function, and place as fornix for the hippocampus pathway. So through analogy it can be said that the estheria-to-amygdala terminal is as fornix to the hippocampus. Esria is a Latin word that means line, groove, or band. Related to the striated word. Ssteria terminals are only connected to sub-curtice structures. (Binding to cortical structures is through ventricular amygdalafog pathway.) The estria terminal overlaps with the ventricular amygdalaposic pathway, in which it also binds to the septal and hypothalamus nuclei, forming a ring. More on similarities to fornix: Like fornix, the estoria terminal has pre-ship and post-trainer branches in conjunction with the anterior ecters. The branch goes to the Septal area before work. That's exactly what fornix does. The post-vacamic branch goes to the hypothalamus. That's exactly what fornix does. While branching after terminal fornix projects to the pyramidal bodies of the hypothalamus, the branch after mastering the striae terminalis projects into the sub-nucleus and ventricular-internal nucleus of the hypothalamus. As with fornix, some fibers enter the anterior cruciate cross towards the side. As is the case with the relationship between the two hippocampus through the anterior camper, these two amygdalas communicate with each other through the anterior camper. Ssteria terminals also offer projects to Ulanola, which is part of the epithalamus. The central nucleus of the amygdala produces autonomous components of emotions (for example, changes in heart rate, blood pressure, and breathing) primarily through the output pathways to the lateral hypothalamus and brainstem. The central nucleus of the amygdala also produces a conscious understanding of emotions primarily through the ventricular amygdalafogel outlet pathway to the anterior ingolate cortex, the orbitofrontal cortex, and the prefrontal cortex. 6.5 More in amygdala stimulation function causes intense sensations, such as aggression or fear. The irritating injuries of temporal lobe epilepsy have the effect of stimulating the amygdala. In its severe form, irritational injuries of temporal lobe epilepsy can cause panic attacks. Panic attacks briefly repeat episodes of terror that produce a sense of impending catastrophe without a clearly identifiable cause. PET scans have shown an increase in blood flow to the parahypocampal gyri, which begins with the right parahypocampal gyros. Similar but decreased blood flow occurs during anxiety attacks. Destructive injuries such as amygdala abelation cause an opposite effect to the irritable damages of temporal lobe epilepsy. Destructive amygdala damage causes tumm in animals, and the relaxation of placid in humans is identified as flat. Amygdala snizal can occur as a result Auerbach-Vith disease where calcium precipitates in the amygdala. If the disease occurs early in life, these patients with bilateral amygdala injuries cannot discriminate emotions in facial states, but their ability to identify faces remains. The anatomical area for facial recognition and memory in the multifaceted association area is the infratuporial cortex. This is a good example of how emotions communicate in one area (amygdala) with perception in another area (the infratuporial cortex) to create a intense memory with emotional charge. Figure 6.4 fMRI results show amygdala activity in normal observation of facial states from happy to afraid. Flatness of effect is one of the symptoms of Clover-Bussi syndrome that was mentioned earlier in which the entire lobes of the monkeys were removed. In fact, only amygdala injuries were shown to be primarily responsible for the flatness of the impact. This effect eventually led to the technique of psychiatric prefrontal lobotum surgery. Remember the film with Jack Nicholson, one flew over the cuckoo's nest. The prefrontal cortex enters the amygdala. As this input intensified, a flatness of impact was produced, which was thought to be desirable in schizophrenic patients who were aggressively violent or emotionally disturbed. The amygdala combines many different sensory inputs. Like the hippocampus, it combines external and internal stimuli. every modality has an entrance sense . It's integrated with somatosensory and visceral input where you get your gut reaction. The connection between the prefrontal cortex, the septal region, the hypothalamus, and the amygdala likely gives us our gut feelings, those mental feelings, about what is good and what is bad. It's also where memory and emotions are combined. When the reward is particularly sweet, those behaviors and associations may last a lifetime. Likewise, the blow and humiliation of punishment may be remembered for a long time as well. 6.6 Fear conditioning: An example of the role of amygdala in learning is another example of emotions associated with some perceptual experience of fear conditioning. In this example, the sensory experience of hearing is not visual like the feeling of faces. Much of what we know about the amygdala and its role in emotional learning and memory comes from the conditioning of fear, mostly but not done exclusively with animals. This is an example of classic conditioning or pavloy conditioning. In classic experiments conducted by Pavlov just after the turn of the century, a neutral stimulus—a bell—sounded and placed in the dog's mouth after a short-distance food powder—unconditional stimuli. After a few pairs including the dog salivate into the bell sound. A very important aspect of classical conditioning is that it is the pairing between the two stimuli. No response is needed to get a reward. In fear An organism hears a voice or sees visual stimuli. A few seconds later he receives a slight shock. Reactions include freezing, increased blood pressure and heart rate, and it gets twitchy—easily shocking. Figure 6.5 Animals showing conditional fear. Figure 6.6 (up) and 6.7 (bottom) pathways conditioning fear and emotional information. Pathways from thalamus to amygdala are especially important in emotional learning. The output pathways of the central nucleus of the amygdala create extensive connections with the brainstem for emotional responses and extensive communication with cortical regions through nucleus bazalis. Cholinergic predictions are thought to take place from the nucleus of the bazalis to the cortex. The chart below offers additional information about amygdala-controlled outputs during fear conditioning. Figure 6.8 expresses different emotional responses by the amygdala. Some fear conditioning pathways have been discovered and this is a hot research topic in neuroscience. If the pathway of the auditory cortex, for example, is hazeled, the conditioning of the underlying fear is unchanged, but discrimination changes. In the discrimination procedure, one voice is paired with shock and the other is not paired with shock. Animals had to rely solely on thalamus and amygdala to learn and could not learn discrimination; apparently two stimuli were indescesible. Therefore, cortex is not required for the conditioning of simple fear; instead allows us to recognize an object by vision or sound - to interpret the environment. In this way, pathways from sensory thalamus only provide a raw understanding of the universe, but because they involve only one neural bond, they are fast paths. Why could it matter quickly? We need a rapid response to potential danger the thalamus—amygdala pathway provides us with this and may also prepare the amygdala to get much more highly processed information from the cortex. On the other hand, pathways from the stratum provide accurate and accurate representations of the environment. Because these pathways have several neural bonds that are slow to compare. If for example we have a slim curl shape behind a tree it would be much better to jump back and later detect those garden hoses from failure to quickly jump back if it was a snake. There was plenty of later time to reflect that it was foolish to be terrified in our own safe garden where there were no snakes. Cortical paths versus sub-cortical conditioning of fear. The fear of producing visual stimuli is quickly processed by thalamus and this information is passed on to the amygdala (red) generating a quick (green) response to risk. Thalamus also passes information to the cortex to make more detailed (and slower) judgments about the potentially real danger. Amygdala involved in enjoyable emotion As well as emotional learning of fear. Consider learning a tool. Unlike classical conditioning in which two stimuli are paired, instrumental conditioning responses are learned following rewards and stimulus-response associations. This way there are three events: one stimulus, response, and reward. It is known that all three placental combinations are learned in instrumental conditioning. Where the amygdala arrives is that the traits of the resolatral nuclei of the amygdala impair the association of stimulants and rewarding characteristics of food. This amygdala memory system acts as an example of memory systems in general. The establishment of memories is a function of the entire network, not any single component. The amygdala is involved in a kind of primitive emotional memory, a memory most likely preserved by evolution. According to the memory systems diagram (e.g., Nolte, p.577), declared memory is mediated by the hippocampus and cortex. But like cortex, hippocampal complications have little effect on the conditioning of fear except in discrimination of environmental stimuli. The study of patients with amygdala, hippocampus, or both clearly shows the distinct roles of these two structures in memory. These patients were shown slides of green, blue, yellow or red. After some colors, loud and scary horns explode. Automated responses (via GSR recording) were recorded to determine learning. Amygdala patients were not conditioned in the colors after that long horn. But when asked how many colors were presented and the horn followed, their call was correct. It is that they have had explicit memory about events. On the other hand, hippocampal patients showed learning and conditioning in the colors after that horn, but could not remember which one they were. It is that they have had implicit memory about events. Patients with both types of onions showed no conditioning and had no explicit memory of which colors were followed by horns. The learning and memory season will explain more about explicit memory and hippocampus. Hippocampus.