

## THE KEY OF EMOTIONS: AMYGDALA

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### **Abstract**

*The amygdala is one of two almond-shaped formations, belonging to a group of interconnected structures of grey matter called limbic system, situated in both sides of the thalamus, immediately beneath the cerebrum. It was recently discovered with some experiments, where some patients were monitored with magnetic resonance during the view of certain different images and the answer of certain stimuli. So they could see that not only the amygdala was activated by "good and bad" stimuli, but that was also less or more activated depending on the subject examined. The road of the research on this mysterious part of the brain is still long and full of ideas that one day may revolutionize the neuroscience and answer to the question: who are we?*

**Key words:** amygdala, limbic system, primitive instinct;

### **INTRODUCTION**

The amygdala or corpus amygdaloideum (plural: amygdalae; Latin from Greek, ἀμυγδαλή, amygdalē, 'almond', 'tonsil') is one of two almond-shaped formations, belonging to a group of interconnected structures of grey matter (mainly hippocampus and hypothalamus) called limbic system, situated in both sides of the thalamus, immediately beneath the cerebrum.

Amygdala is also known as the head quarter of emotions, one of the most ancient part of the brain which allows the survivor of humans and animals and, consequently, their evolution, according with Darwin's natural selection theory. (Eleftheriou, 2013)

### **MATERIAL AND METHOD**

The amygdala can be considered as the first tool of the man (and animals), because it is the head quarter of emotions, memory and everything regards the survival of the owner. (Whalen, Phelps, 2009)

It also have a role in evolution, according to Darwin's natural selection theory. Actually the studies about this mysterious organ are not

finished, scientists are still trying to understand it at 360°. (Volz et al., 1990).

An interesting clue which showed the need to look for a deep knowledge of the limbic system was the case of Phineas Gage. Phineas Gage was an American railway worker, who became famous for an accident which surprised the scientific community. The 13th of September 1848 he was inserting an explosive powder inside a rock which was blocking the passage of the construction of the new railway. Meanwhile he was pushing the explosive inside the hole with an iron rod, accidentally the powder exploded, shooting with a high force the rod on the face of Gage. (Macmillan, 2002)

It perforated his skull, entering from the left cheek and exiting from the top of the head. Gage was surprising alive, but its personality changed totally, becoming aggressive, irascible and extremely impolite. (Neylan, 1999) (García-Molina, 2012).

This change of behavior is due to a damage to the connection with the limbic system, in fact it affected his emotional and relational personality, turning off all of his inhibitory brakes on the verbal plane and he was unable to evaluate the risks of his actions. This episode changed a lot the clinical comprehension of the parts of the brain depth to emotion and personality. Unfortunately, in the XX century, it led to barbarous practices as prefrontal lobotomy and so on, to try to treat mental and behavior disturbances. (Jurado Barba, 2007)

## **RESULTS AND DISCUSSION**

Nowadays, there are a lot of theories and studies on this particular structure which basically fights with our “rational brain” to let us survive, sometimes fooling us, making us believe in imaginary fears or other emotions. Yes, because amygdala is not activated just with fear, or negative emotions, but with all the emotions, depending on the intensity, not on the type. (Barden et al., 1981) (Mekeres et al., 2017)

It was recently discovered with some experiments, where some patients were monitored with MR during the view of certain different images and the answer of certain stimuli. In this manner they could see that not only the amygdala was activated by “good and bad” stimuli, but that was also less or more activated depending on the subject exanimated. (Radoš, Judaš, Kostović, 2006) (Sánchez Navarro, Román, 2004)

To make it simple: what is good for someone could be bad or neutral for someone else or vice versa, because in amygdala are stored all the personal emotive experience of every single individual, which, with amygdala's suggestions, decides how to make decisions, basing also on the control that this person has on his primitive instinct. (Salovey, Mayer, 1990)

Sometimes the activation of amygdala could be dangerous, because it can be activated in case of "imaginary feelings", fighting with our rational brain, going from the simple and common phobias, to cases of mental illness, like in schizophrenia. (Shinnick-Gallagher, 2003) (Davis, Whalen, 2001)

An extreme control on these impulses is made successfully by Tibetan monks, which is reached with years and years of deep meditation training. A lesion in the amygdala will make the person not able to understand which decision to take, because is not able to compare the pros and cons of a decision, risking also the life. (Torras, Portell, I., Morgado, 2001)

As the hyperactivity of the amygdala is linked to anxiety, depression and maybe also to chronic pain diseases, medicine has an unexplored wide field to work on. (Bobillier et al. 1976).

## CONCLUSIONS

In conclusion we can say that we are what amygdala wants us to be because it rules our instinct, saving us from the danger and making us feeling emotions, either positive and negative, which build up our interpersonal relationship, and our personality, making one person different to another.

The road of the research on this mysterious part of the brain is still long and full of ideas that one day may revolutionize the neuroscience and answer to the question: who are we?

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