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2014-1-BE02-KA201-000432

Protocol Reference Number: 062

Developed by: Catholic Education Flanders (BE)

Title

Human brain biochemistry

Sources

Made by Wim Peeters (DNI) inspired by a picture of the summary of a talk given by Gene Thomson-Grove (Ljubljana, September 2015, see below) on the human brain and hormones that are present in the brain at certain moments due to certain events.

Purpose of the protocol

To make people feel more comfortable in a given situation where they are challenged. To give them insight in their own and others' reactions in situations which are not always very familiar. To make people aware that biochemical reactions take place in human's brains that in fact make people feel or react as they do.

Materials

Before using this protocol as a facilitator or teacher, a study of the content is necessary. Here below some first basic information, however, further study is advisable.

On CORTISOL Wikipedia says "In the early [fasting](#) state, cortisol stimulates [gluconeogenesis](#) (the formation of glucose), and activates anti-stress and anti-inflammatory pathways." (extracted from <https://en.wikipedia.org/wiki/Cortisol> on 20160309)

On DOPAMINE Wikipedia says "The brain includes several distinct [dopamine pathways](#), one of which plays a major role in [reward-motivated behavior](#). Most types of reward increase the level of dopamine in the brain, and most [addictive](#) drugs increase dopamine neuronal activity." (extracted from <https://en.wikipedia.org/wiki/Dopamine> on 20160309)

On OXYTOCIN Wikipedia says "It plays a role in social bonding, [sexual reproduction](#) in both sexes, and during and after [childbirth](#).^[6] This helps with birth, [bonding with the baby](#), and [milk production](#).." (extracted from <https://en.wikipedia.org/wiki/Oxytocin> on 20160309)

On ADRENALINE Wikipedia says "It plays an important role in the [fight-or-flight response](#) by increasing blood flow to muscles, output of the heart, [pupil dilation](#), and [blood sugar](#).^{[6][7]} (extracted from https://en.wikipedia.org/wiki/Epinephrine#Adrenaline_junkie on 20160309)

PS on AMYGDALA: "Shown in research to perform a primary role in the processing of [memory](#), [decision-making](#), and [emotional reactions](#), the amygdalae are considered part of the [limbic system](#).^[9] (extracted from <https://en.wikipedia.org/wiki/Amygdala> on 20160309)

Also look at www.medicinenet.com for definitions, however without any further explanation.

Much more information can be found on the internet and other sources.



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Time

25 - 30 min. all together

Roles

Facilitator who prepares well and learns the basics on the information given above

Whole group participates, group building activity

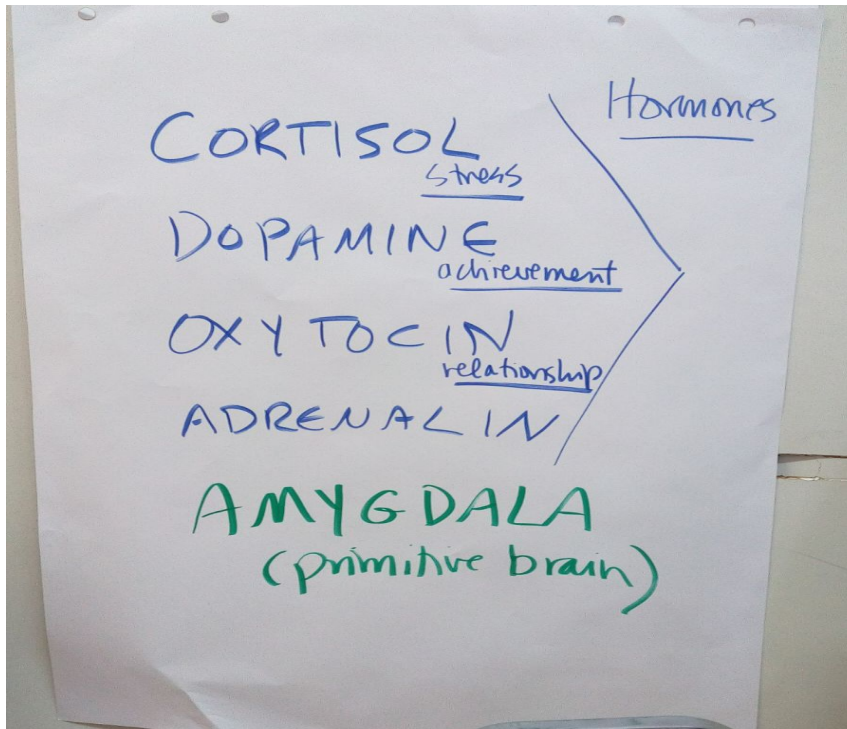
Divide the group in subgroups, depending on the size and context. Given the process it is possible to do that randomly

Process

The facilitator first explains briefly about the human brain biochemistry: the hormones produced in different situations.

Then the facilitator asks all participants to give an example of a situation in the class room that could cause the production of CORTISOL, DOPAMINE, OXYTOCIN, ADRENALIN? (All members one example of each, one sentence, 5 min thinking, 5 min to tell to each other)

A situation or event described by the participants can be triggered by an external cause (accident, incident) or by the class management of the teacher. Split the cause of the event of the examples in two categories: A = external, teacher cannot help or influence B = teacher plays a role in it. Label all the examples in the group with A or B. (6 min)



Focus on the teachers' role:

- Both CORTISOL and ADRENALIN aim at basic instinct survival: this means no learning takes place anymore. How can a teacher avoid that these are produced in the learners' brains?

- DOPAMIN is produced when something is achieved (success experience) and OXYTOCIN (which also breaks down cortisol) when relationships are encouraged. How can a teacher contribute to the production of both in the learners' brains?

- The facilitator asks for a number of good examples of the above mentioned cases.
- The facilitator also gives feedback at the very end of the protocol, asking people to what extend they were aware of this scientific brain research and which conclusions can be drawn from



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this kind of knowledge for their daily class practice and for the PLC.

References

Websites that give a short explanation:

<https://en.wikipedia.org/wiki/Cortisol> (also look at cortisone)

<https://en.wikipedia.org/wiki/Dopamine>

https://en.wikipedia.org/wiki/Epinephrine#Adrenaline_junkie

<https://en.wikipedia.org/wiki/Oxytocin>

Website that is more specialized:

www.medicinenet.com

Exemplification

- Ask the teachers if they have more understanding for some difficult situations with learners

- Ask teachers if certain pedagogical strategy can be linked to the biochemistry knowhow

Wim: most of the participants appreciated that they got a deeper insight in processes in the class, with learners that they recognize and describe