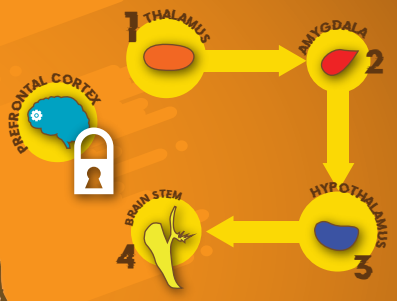
PRACTICAL parenting

HOW THE BRAIN FUNCTIONS WHEN STRESSED



PREFONTAL CORTEX

(Thinking brain)

- The ability to think, reason and communicate effectively is inhibited

THALAMUS

- Sensory relay station
- Sends information to the amygdala and cerebral cortex

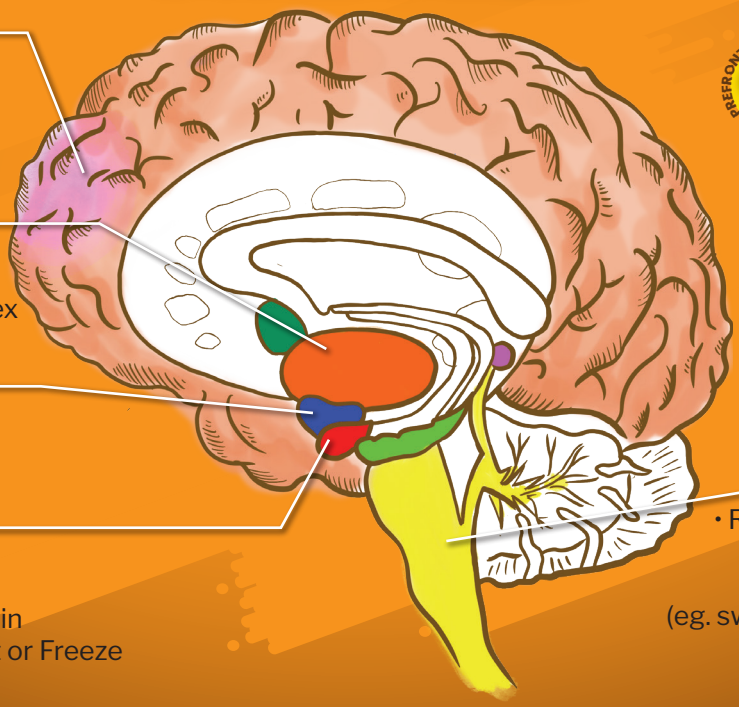
HYPOTHALAMUS

- Relays information to the brain stem (ANS)

AMYGDALA

(Lymbic / Emotion brain)

- Processes emotions
- The alarm system of the brain and assists with Fight, Flight or Freeze



BRAIN STEM

(Reptilian brain)

- Relays information to the ANS
- Heightens the involuntary actions of the body

(eg. sweating, heart rate, breathing)

HOW THE BRAIN FUNCTIONS DURING *Sleep*

PREFONTAL CORTEX

- Thinking brain (language)
- Reasoning (right or wrong)
- Shuts down (inactive)

BASAL FOREBRAIN

- Releases **Adenosine**
- Supports sleep

THALAMUS

- Sensory station
- Tuned out during deep sleep
- REM becomes active

HYPOTHALAMUS

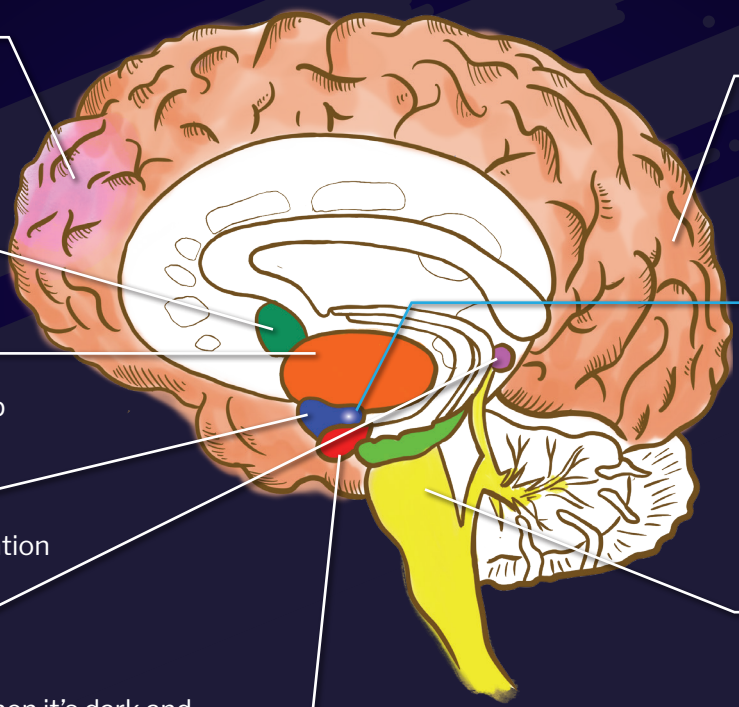
- Receives and sends information to the nervous system (brain stem)

PINEAL GLAND

- Receives signal from **SCN** when it's dark and starts increasing the production of **Melatonin**

AMYGDALA

- Aroused during REM and increasingly active



OCCIPITAL LOBE

- The part of the Cerebral Cortex that processes and interprets information for dreams

SCN

- Affects the sleep/wake cycle

GABA

- Muscle relaxant
- Boosts sleep

BRAIN STEM

- Works together with hypothalamus to produce GABA
- Sends signals during REM to relax muscles so not to act out during dreams

PRACTICAL parenting

GLOSSARY OF TERMS

ADENOSINE:
Melatonin is not the only chemical that determines our sleep schedule. Adenosine also plays an important role: it slows down the activity of neurons. It gradually builds up in our bodies when we are awake and makes us feel sleepy by the end of the day. Then, when we sleep, adenosine molecules break down, so the cycle can start all over again. Our neurons, or nerve cells, are embedded with adenosine receptors. When adenosine binds to these receptors, a variety of proteins that inhibit neurons are released. This suppression of nerve cell activity is what causes the feeling of drowsiness.

AMYGDALA (LIMBIC/ EMOTION BRAIN):
Processes emotions and assists in the Fight, Flight or Freeze. It is seen as the alarm/ warning system when feeling threat.

ANS (AUTONOMIC NERVOUS SYSTEM):
The autonomic nervous system is a control system that acts largely unconsciously and regulates bodily functions such as the heart rate, digestion, respiratory rate, pupillary response, urination, and sexual arousal.

BRAIN STEM (ANIMAL/ REPTILIAN BRAIN):
Relays information to the ANS in the body as fight or flight, secreting adrenaline into the body to be reactive and behaviour can be out of control, eg: sweating, increased breathing, increased heart rate, dizziness, tense muscles.

CIRCADIAN RHYTHM:
Your circadian rhythm is basically a 24-hour internal clock that is running in the background of your brain and cycles between sleepiness and alertness at regular intervals. It's also known as your sleep/wake cycle.

A part of your hypothalamus (a portion of your brain) controls your circadian rhythm. That said, outside factors like lightness and darkness can also impact it. When it's dark at night, your eyes send a signal to the hypothalamus that it's time to feel tired. Your brain, in turn, sends a signal to your body to release melatonin, which makes your body tired. That's why your circadian rhythm tends to coincide with the cycle of daytime and nighttime

GAMMA-AMINOBUTYRIC ACID (GABA):
An inhibitory transmitter is produced in the limbic system and brain stem, it's a chemical that facilitates communication among brain cells. GABA inhibits neural activity, GABA facilitates sleep, muscle relaxation, reduces mental and physical stress, lowers anxiety, and creates a calmness of mood.

> *Dr Michael Breus (2018): "I call GABA the brakes of the brain. GABA is the body's most important inhibitory neurotransmitter, which means it lowers the activity of neural cells in the brain and central nervous system, having the effect of moving the brain and the body into lower gear."*

HYPOTHALAMUS:
Regulates the Autonomic Nervous System (ANS). Sends information of symptoms of fear, anger and sadness to the ANS found within the brainstem.

MELATONIN:
A hormone that is produced within the pineal gland, which is located within the brain's two hemispheres. The pineal gland receives signals from the SCN and increases production of the hormone melatonin, which helps put you to sleep once the lights go down.

PREFRONTAL CORTEX (THINKING BRAIN):
Responsible for thinking, reasoning and language.

SUPRACHIASMATIC NUCLEUS (SCN):
Known as the "Master Body Clock", found in the hypothalamus as a group of nerve cells that act as control centers affecting sleep and arousal. These cells receive information about light exposure directly from the eyes and control your behavioural rhythm, therefore sending a signal to release melatonin.

THALAMUS:
It's the sensory relay station that sends information to the amygdala and cerebral cortex. Sends images, sounds and other sensations to the cerebral cortex where it processes and interprets the information and amygdala will process information as threatening or not.