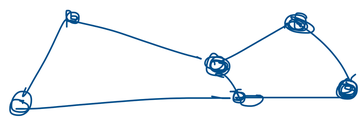
What is an emotional circuit?

Friday, 21 November 2025 6:40 PM

Brain contains a tiny neuron circuit to represent emotions.
Most important brain regions are :-

1. Amygdala - fear / threat detection
2. Prefrontal cortex (PFC) - Emotional regulation
3. Hippocampus - memory + emotional contex



like a mini - circuit (It has multiple of them)

Basic circuit Planed → Stimulus → Amygdala - like Neuron (A) → PFC - like Neuron (B)

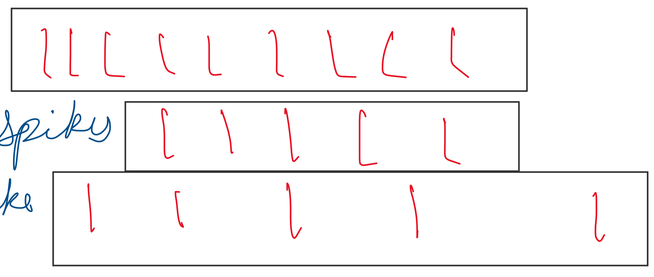
Break down

1. Neuron A (Amygdala - like) - Detects Emotion "Signal"

We will send diffent signals to A to create diffrent spike patterns

Example:

- Strong input (fear) → Rapid Spike
- Moderate input (excitement) → rythmic spiky
- Weak input (calm) → Slow spike



2. Neuron B (PFC - like) - Controls / Shapes the Response

It recives the signals from Neuron A and regulates emotions

3. Synaptic Connection Between A → B

If Signal is Strong (fear)

Neuron A spikes strongly influuing nuron B: Stronger emotional response, stress / anxiety - like behaviour

If Signal is weak (calm)

Neuron B barely responds: ignores emotional noise, calm behavior

If Signal changes over time

Learning Behavior, emotion adapts depending on experience

Behavior Patterns

- Calm State: Smooth pattern, low rate. Small input to Neuron A

A: | | |

B: | |

- Stress Anxcity: Large input to A, A fires rapidly, B tries to regulate But gets overwhelmed, Pattern becoms irregular

A: | | | | | | | |

B: | | | | |

- Fear: Sudden strong inputs (burst)

A: | | | | | | |

B: | | | |

- Excitement: Steady Input

A: | | | |

B: | | | |

Summary

Incoming:

- Neuron A (input neuron)
- Neuron B (output neuron)

Output:

- Diffrent emotional inputs → diffrent firing of A
- A's firing affects B
- Together their spike trains encode emotional state