



Neuroscience of Addiction

[Source: TH](#)

Why in News?

During the **Brain Awareness Week (March 10-16)**, a study revealed that addiction involves a **complex neural circuit** in the brain affecting **craving, emotional regulation, and decision-making**.

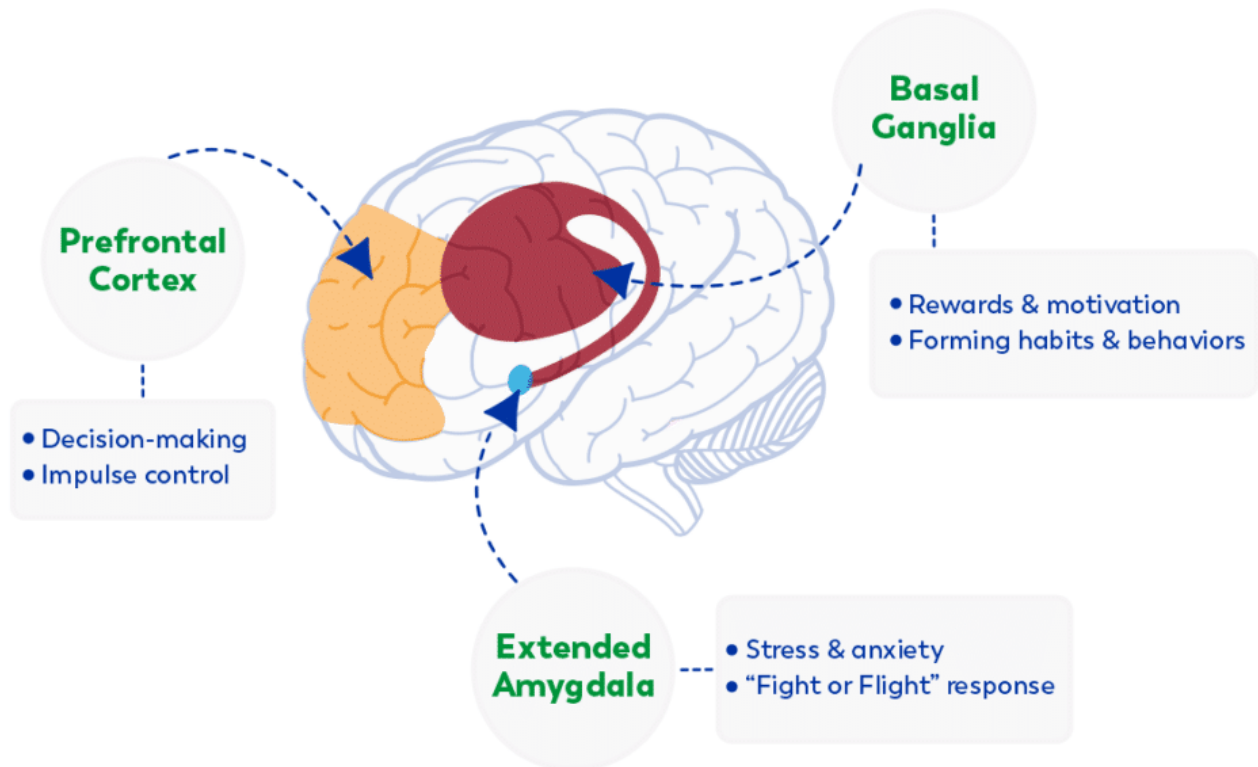
- It underscores addiction as a **chronic brain condition** rather than a **moral failing**, paving the way for more effective treatment strategies.

How Does Neuroscience Explain Addiction?

- **Role of Brain in Addiction:** The study highlights **3 key brain regions** involved in addiction i.e., **basal ganglia, extended amygdala, and prefrontal cortex**.
 - **Basal Ganglia:** It teaches the brain to **repeat pleasurable activities**, whether from food, social interaction, or addictive substances.
 - It works with neurotransmitters like **dopamine and serotonin** to reinforce pleasurable behaviors.
 - **Extended Amygdala:** It triggers **anxiety, irritability, and unease** when substance use stops, pushing **continued use despite harm**.
 - **Prefrontal Cortex:** It explains why **substance use continues** despite knowing its harmful effects, a key trait of addiction.
 - The prefrontal cortex, which handles decision-making, time management, and prioritization, **completes the triad**.

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Brain Regions Affected by Addiction

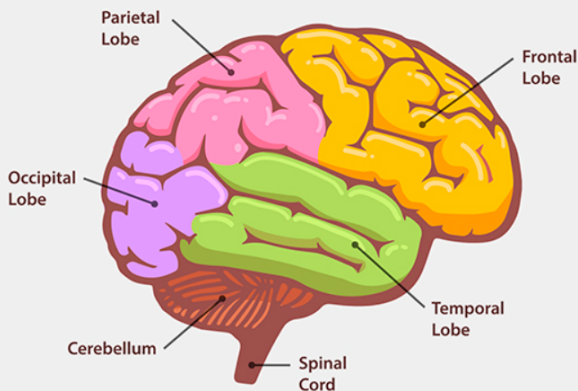


- **Vulnerability to Adolescents:** Adolescence represents a **critical "at-risk period"** for substance use because the **brain is still developing**.
 - The prefrontal cortex, which controls **impulses and decision-making, matures last**. This makes teens **more vulnerable to addiction**.
- **Other Reasons of Addiction:**
 - **Genetic Predisposition:** Some individuals are **biologically more prone** to addiction.
 - **Psychological Factors:** **Trauma, stress, and mental health disorders** increase vulnerability.
 - **Environmental Influences:** Family history, **peer pressure**, and socioeconomic conditions play a significant role.
 - **Age of First Use:** **Earlier exposure** increases the risk of long-term dependency.

Note:

- **Brain imaging (E.g., MRI)** has helped in identifying **structural and biochemical changes** caused by addiction.
- **Cognitive-behavioral therapies (CBT)** and neurofeedback techniques are helping in rewiring the brain for recovery.

BRAIN PARTS



- **Parietal Lobe:** Processes sensory information, such as touch and spatial perception.
- **Frontal Lobe:** Controls higher cognitive functions and voluntary movement.
- **Temporal Lobe:** Handles hearing, memory, and processing auditory information.
- **Occipital Lobe:** Processes visual information for color, shape, and motion perception.
- **Spinal Cord:** Communication channel between the brain and the body for motor and sensory functions.
- **Cerebellum:** Coordinates balance, posture, and precise muscle movements.

What is Brain Awareness Week (BAW)?

- **About:** It is celebrated annually in the **third week of March** highlighting the role of brain science in understanding **biology, preventing diseases, and improving healthcare**.
 - It is organised annually by **Dana Foundation**, a **private philanthropic organization** in New York that is dedicated to **advancing neurosciences**.
- **Journey:**

Journey of Brain Awareness Week

Dana Alliance initiates Brain Awareness Week

1995

First Brain Awareness Week celebrated

1996

Launch of the BRAIN Initiative by US President Barak Obama

2013

Expansion to 45 countries and 32 U.S. states

2021



- **Purpose and Participation:** Educates the public on brain **functions, disorders, and research advancements**.

Read More: [Working of Anaesthetic Drugs in the Brain](#)

