

BEHAVIOUR AND EMOTION

Can you name and identify the brain region that plays a key role in emotion?

- How is this brain region involved in learned fear?
 - *The amygdala- processes information and memory about emotional events*
 - *Associates events with fear, recognises fear in others*

Can you name four diffuse modulatory systems?

- How do they work?

Many functions of the brain are modulated by collections of neurons in the brain. These systems of neuron have a wide range of effect on other neuron in other parts of the brain. One neuron can synapse with over 100,000 other neurons by releasing its neurotransmitter into the extracellular fluid, not just confining it to 1 synaptic cleft. These systems fine tune the brains functions.

What are the key structure/s involved in each system?

What neurotransmitter does each system use?

What brain functions does each system modulate?

1. NORADRENERGIC

- *Locus coeruleus*
- *Transmits noradrenaline*
- *Modulates attention, arousal and circadian rhythm*

2. DOPAMINERGIC

- *Ventral tegmental area and the substantia nigra*
- *Transmits dopamine*
- *Modulates the initiation of movement, assigning value to reinforced behaviour*

3. SEROTONERGIC

- *Raphe nuclei*
- *Transmits serotonin*
- *Modulates mood, emotional behaviour, circadian rhythm*

4. CHOLINERGIC

- *Basal forebrain and brainstem areas*
- *Transmits acetylcholine*
- *Modulates arousal, learning and memory & circadian rhythm*

Can you describe how methamphetamine and ecstasy affect the diffuse modulatory systems?

- *Methamphetamine: primarily affects the dopaminergic system by providing an acute increase of dopamine in the brain)*
- *Methamphetamine breaks down the synaptic vesicles, causing the neurotransmitter, dopamine, to become free within the axon terminals. Neurotransmitters are highly toxic to neurons, meaning that dopaminergic neurons will start to degenerate.*

AUTOIMMUNE DISORDERS + CHRONIC FATIGUE

Multiple sclerosis:

Can you name and describe the hallmark pathology and pathophysiology?

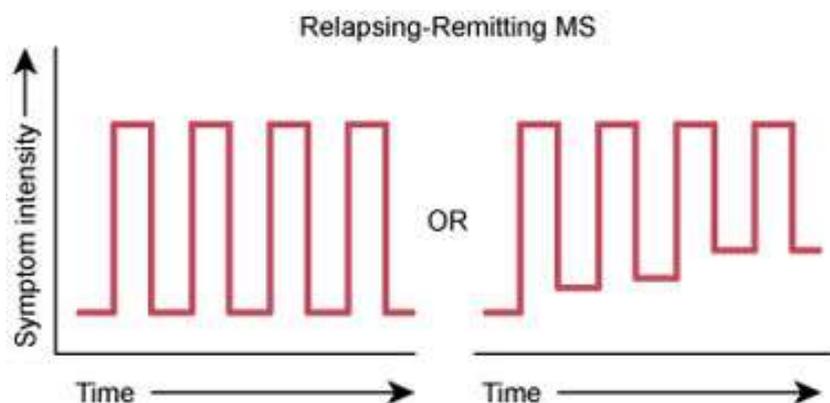
- *Myelin in the CNS is destroyed, and the oligodendrocytes fail to regenerate properly. This results in the formation of scar tissue/plaques, the failure of axon to conduct AP's and damage to the axon.*

How is multiple sclerosis diagnosed?

- *Frequency/type of symptoms*
- *Presence of lesions/plaques in the brain scan (MRI)*
- *Increased immunoglobulin the CSF*
- *Delayed conduction of visual, auditory and somatosensory evoked responses.*

Can you name and describe the most common disease courses?

- *The most common type of disease course for MS is relapsing/remitting which occurs in 85% of cases. This is where symptoms come on suddenly for a period of time from the normal state and disappear back to the normal state for the same period of time, over the course of the disorder (relapsing, and remitting constantly). In some cases, the normal state may worsen each time the symptoms remit.*



Guillain-Barré syndrome:

Can you name and describe the hallmark pathology?

- *Pathology and pathophysiology is not well understood*
- *Antibodies bind to myelin, MAC, nerve injury, macrophages invade myelin to clean up debris*

Can you describe a proposed pathophysiological mechanism?

- *As above*