Research & Reviews: Neuroscience

Classification and Mechanism of Seizures

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Perspective

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DESCRIPTION

A seizure, also referred to as an epileptic seizure, is a period of symptoms brought on by abnormally high or synchronized neuronal activity in the brain. The effects on the outside range from uncontrollable shaking movements affecting a large portion of the body and consciousness loss (tonic-clonic seizure) to controlled shaking movements affecting a smaller portion of the body with varying degrees of consciousness (focal seizure) to a subtle momentary loss of awareness (absence seizure). These episodes typically last less than two minutes, and it takes some time for things to get back to normal. It's possible to lose bladder control. Both provoked and unprovoked seizures are possible.

Provoked seizures

Provoked seizures are those that are brought on by a transient occurrence such low blood sugar, alcohol withdrawal, drug abuse in combination with alcohol, low blood sodium, fever, brain infection, or concussion.

Unprovoked seizures

Unprovoked seizures take place without a known or treatable cause, making repeated seizures likely. Stress or a lack of sleep may make unprovoked seizures worse. Fainting, nonepileptic psychogenic seizures, and tremor are among the conditions that mimic epileptic seizures but are not epileptic convulsions. Generalized seizures can be classified into six different categories: tonic-clonic, tonic, clonic, myoclonic, absence, and atonic seizures. Each one involves a loss of consciousness, and they all frequently occur suddenly.

Generalized seizures can be classified into six different categories; Each one involves a loss of consciousness, and they all frequently occur suddenly.

Tonic-clonic: Seizures are characterized by limb contraction, followed by extension, and an extended back arch lasting 10–30 seconds. As the chest muscles tense, a cry may be audible. Then the limbs start to shake collectively. It could take the person 10 to 30 minutes to go back to normal after the shaking stops.

Tonic: Muscles contract continuously during tonic seizures. If breathing is difficult, the person might get blue.

Clonic: Unanimous limb shaking is a feature of clonic seizures.

Myoclonic: Muscle spasms associated with myoclonic seizures can be localized or widespread throughout the body.

Absence: Simple absence seizures may merely include a less head turn or eye blink. While there may also be a period of post-ictal confusion, the subject frequently does not lose consciousness and may resume regular activities immediately after the seizure finishes.

Atonic: Atonic seizures Atonic seizures entail a longer-than-one-second lack of muscular activation. Usually, this affects both sides of the body bilaterally.

Electrical activity in the brain is typically non-synchronous. Due to issues in the brain, a group of neurons starts abnormally, excessively, and synchronously during epileptic seizures. This causes a paroxysmal depolarizing shift, a wave of depolarization. A "seizure focus" is a region where seizures may start because of euronal hyper-excitability. Another mechanism of epilepsy after brain damage could be the upregulation of excitatory circuits or the downregulation of inhibitory pathways. Epileptogenesis is the term for the processes that cause these secondary epilepsies. Blood-brain barrier breakdown could potentially play a role in the cause. Although disruption of the blood-brain barrier alone does appear to lead to epileptogenesis, it has also been linked to an increase in seizure activity. In addition, it has been linked to chronic epileptic disorders in tests where chemical substances were used to increase barrier permeability. When blood arteries are damaged, fluid may seep into the space between cells and activate epileptic seizures preliminary research into blood protein levels in the brain following.

While generalized seizures start in both hemispheres of the brain, focal seizures start in just one. While some seizures seem to have minimal impact, some seizure types have the potential to alter brain structure. Specific brain alterations such as gliosis, neuronal loss, and atrophy are associated with epilepsy, however it is unclear if epilepsy causes these changes or whether these changes lead to epilepsy.