Disables inhibitory neurons (those sending an “off” signal) resulting in excessive muscle contraction.

Tetanus Toxin
Caramboxin
Arsenic

Overstimulates glutamate receptors, effectively producing a state similar to that of an excessive level of glutamate.

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Long term inhibition of neuron growth; short term increase of intra-cellular Ca2+ levels; this in turn can induce cell death.

LD₅₀ = 2 ng/kg
LD₅₀ = 2 x 10⁷ ng/kg
LD₅₀ = 8.3 x 10⁹ ng/kg

Ammonia
Induces swelling of astrocytes (cells that protect neurons) which slows brain function.
LD₅₀ = 3.5 x 10⁷ ng/kg

Ethanol
Reduces the stability of membranes, which can prevent neurotransmitters release and binding, disabling communication between neurons.
LD₅₀ = 8.3 x 10⁹ ng/kg

Glutamate
Is an endogenous neurotransmitter, responsible for the transmission of an excitatory signal to the postsynaptic neuron.
When present in excess, glutamate induces a calcium flux into the neuron; this can lead to swelling and necrosis.
LD₅₀ = 1.7 x 10⁷ ng/kg

Glutamate Receptor
○ Calcium (Ca²⁺) Channel
○ Glutamate (Neurotransmitter)
○ GABA (Inhibitory Neurotransmitter)
○ Astrocyte (Protective cell)

Cellular membrane

Point of initiation of toxin effect

The Central Nervous System (CNS) is composed of the brain and spinal cord; it coordinates thoughts, memory and other complex processes, such as the body’s reaction to stimuli. A synapse is the gap between two nerve cells (neurons) through which chemical signalling molecules (neurotransmitters) pass to ensure communication between nerve endings. There are several types of neurotransmitters; excitatory such as glutamate (in the brain) and acetylcholine (in the muscle and in the brain) or inhibitory, such as gamma-aminobutyric acid (GABA; present in the brain). There are three types of neurons: motor-, sensory- and inter-neurons. Sensory neurons are present in eyes, nose, skin and ears; they relay information about the environment to the CNS. Motor neurons send information to the muscles and glands; controlling movement and reaction. Interneurons are cells that connect other neurons.