

# Excitotoxicity in the pathogenesis of neurological and psychiatric disorders:

## Therapeutic implications

Olloquequi J.

Cornejo-Córdova E.

Verdaguer E.

Soriano F.X.

Binvignat O.

Auladell C.

Camins A.

Neurological and psychiatric disorders are leading contributors to the global disease burden, having a serious impact on the quality of life of both patients and their relatives. Although the molecular events underlying these heterogeneous diseases remain poorly understood, some studies have raised the idea of common mechanisms involved. In excitotoxicity, there is an excessive activation of glutamate receptors by excitatory amino acids, leading to neuronal damage. Thus, the excessive release of glutamate can lead to a dysregulation of Ca<sup>2+</sup> homeostasis, triggering the production of free radicals and oxidative stress, mitochondrial dysfunction and eventually cell death. Although there is a consensus in considering excitotoxicity as a hallmark in most neurodegenerative diseases, increasing evidence points to the relevant role of this pathological mechanism in other illnesses affecting the central nervous system. Consequently, antagonists of glutamate receptors are used in current treatments or in clinical trials in both neurological and psychiatric disorders. However, drugs modulating other aspects of the excitotoxic mechanism could be more beneficial. This review discusses how excitotoxicity is involved in the pathogenesis of different neurological and psychiatric disorders and the promising strategies targeting the excitotoxic insult. © 2018, © The Author(s) 2018.

Alzheimer's disease

autism spectrum disorder

depression

Glutamate

stroke

acetylcysteine

calcium ion

cycloserine

fludrocortisone

free radical

glutamate receptor

glutamic acid

ketamine

memantine

n methyl dextro aspartic acid receptor blocking agent

neu 2000kwl

riluzole

tissue plasminogen activator

unclassified drug

ursodeoxycholic acid

glutamate receptor

glutamic acid

Alzheimer disease

amyotrophic lateral sclerosis

autism

brain ischemia

cell death

depression

disorders of mitochondrial functions

drug targeting

excitotoxicity

human

mental disease

neurologic disease

nonhuman

oxidative stress

Parkinson disease

pathogenesis

priority journal

Review

schizophrenia

signal transduction

animal

mental disease

metabolism

nerve cell

neurologic disease

pathology

Animals

Glutamic Acid

Humans

Mental Disorders

Nervous System Diseases

Neurons

