

Effects of estrogens and androgens on mitochondria under normal and pathological conditions

Mohajeri M.

Martín-Jiménez C.

Barreto G.E.

Sahebkar A.

Several lines of evidence have suggested that mitochondrial dysfunction plays a key role in neurodegeneration. The mitochondrial function is a potential target for steroid hormones, which could exert protective activities in the brain and other tissues. The decrease of some sex steroids with aging has been associated with deleterious effects on brain function and progression to neurodegenerative diseases. Recent in vitro and in vivo evidence provides the basis for this review on the interplay of sex steroids and mitochondrial defects in preventing or improving pathological events in the central nervous system (CNS). In this article, the role of mitochondria under normal and pathological states will be discussed. In addition, we will review studies conducted on steroidal compounds, which have neuroprotective effects targeting mitochondria. It has been shown that these compounds could exert both direct and indirect effects on mitochondria that promote or preserve mitochondrial function under pathological circumstances, such as acute brain injury and chronic neurodegeneration. © 2019 Elsevier Ltd

Acute

Androgens

Brain

diseases

Estrogens

injury

Mitochondria

Neurodegenerative

androgen

estradiol

estrogen

estrogen receptor alpha

estrogen receptor beta

raloxifene

tamoxifen

testosterone

tibolone

androgen

estrogen

neuroprotective agent

Alzheimer disease

amyotrophic lateral sclerosis

brain cell

brain injury

cell death

cerebrovascular accident

chronic disease

drug mechanism

energy yield

Friedreich ataxia

human

Huntington chorea

in vitro study

in vivo study

mitochondrion

nerve degeneration

neurologic disease

nonhuman

Parkinson disease

priority journal

Review

animal

degenerative disease

drug effect

female

male

metabolism

mitochondrion

Androgens

Animals

Brain Injuries

Estrogens

Female

Humans

Male

Mitochondria

Nerve Degeneration

Neurodegenerative Diseases

Neuroprotective Agents