Neuroprotective effects of the catalytic subunit of telomerase: A potential therapeutic target in the central nervous system

González-Giraldo Y.

Forero D.A.

Echeverria V.

Gonzalez J.

Ávila-Rodriguez M.

Garcia-Segura L.M.

Barreto G.E.

Senescence plays an important role in neurodegenerative diseases and involves key molecular changes induced by several mechanisms such as oxidative stress, telomere shortening and DNA damage. Potential therapeutic strategies directed to counteract these molecular changes are of great interest for the prevention of the neurodegenerative process. Telomerase is a ribonucleoprotein composed of a catalytic subunit (TERT) and a RNA subunit (TERC). It is known that the telomerase is involved in the maintenance of telomere length and is a highly expressed protein in embryonic stages and decreases in adult cells. In the last decade, a growing number of studies have shown that TERT has neuroprotective effects in cellular and animal models after a brain injury. Significantly, differences in TERT expression between controls and patients with major depressive disorder have been observed. More recently, TERT has been associated with the decrease in reactive oxygen species and DNA protection in mitochondria of neurons. In this review, we highlight the role of TERT in some neurodegenerative disorders and discuss some studies focusing on this protein as a potential target for neuroprotective therapies.

Neuroprotection

Oxidative stress

Senescence

Telomerase

Telomeres

ags 499

cotinine

estradiol

montelukast

neuroprotective agent

nicotine

raloxifene

tamoxifen

telomerase

tibolone

unclassified drug

neuroprotective agent

reactive oxygen metabolite

telomerase

astrocyte

brain nerve cell

cell aging

cellular distribution

central nervous system

degenerative disease

enzyme active site

enzyme activity

genetic variability

human

hypoxic ischemic encephalopathy

microglia

mitochondrial targeting signal

neuroprotection

nonhuman

oxidative stress

pleiotropy

protein expression

protein localization

protein phosphorylation

protein targeting

Review

senescence

telomere

telomere homeostasis

telomere shortening

aging

animal

central nervous system

DNA damage

drug effects

genetics

metabolism

Neurodegenerative Diseases

physiology

Aging

Animals

Central Nervous System

DNA Damage

Humans

Neurodegenerative Diseases

Neuroprotective Agents

Oxidative Stress

Reactive Oxygen Species

Telomerase

Telomere

Telomere Shortening