

# Regulation of astroglia by gonadal steroid hormones under physiological and pathological conditions

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In the last years there has been a considerable advance in the knowledge on the regulation of astrocytes by sex steroids under physiological and pathological conditions. By the activation of a variety of nuclear and membrane receptors, sex steroid hormones regulate the functions of astrocytes and their communication with other cell types in the central nervous system. Under physiological conditions astrocytes participate in the neuroendocrine and behavioral actions of gonadal steroids, as well as in the hormonal control of brain tissue homeostasis. Under pathological conditions astrocytes mediate, at least partially, the neuroprotective effects of gonadal steroid hormones; given that sex steroids modulate reactive astrogliosis and reduce the release of pro-inflammatory molecules by these cells. Given the side effects that sex steroids may have when administered systemically, a number of synthetic agonists of the receptors for gonadal steroid hormones in the nervous system have been developed, and may be considered for clinical use after brain injury as potential enhancers of the neuroprotective astrocytic functions. © 2016 Elsevier Ltd

Estradiol

Progesterone

Reactive astrocytes

Sex differences

Steroid

Testosterone

androgen receptor

estradiol

estrogen receptor

progesterone

progesterone receptor

selective estrogen receptor modulator

selective tissue estrogenic activity regulator

sex hormone

steroid hormone

steroid hormone receptor blocking agent

testosterone

unclassified drug

sex hormone

astrocyte

astrocytosis

brain

brain damage

cells by body anatomy

central nervous system

disease control

human

macroglia

neurobiology

neuroprotection

priority journal

Review

sex difference

agonists

animal

Brain Injuries

drug effects

metabolism

physiology

Animals

Astrocytes

Brain Injuries

Gonadal Steroid Hormones

Humans

Neuroprotection