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Translocator Protein in Brain Tissue and Neurodegeneration

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Translocator Protein in Brain Tissue and Neurodegeneration*

Kayla Bland; Rochelle Hines, PhD; and Dustin Hines, PhD

Abstract

Neurodegenerative disorders, such as Alzheimer's Disease, effect over 50 million Americans a year, and despite the high prevalence, the pathogenesis of these diseases remains unclear. However, researchers have noticed a dramatic up-regulation of a protein called translocator protein (TSPO) under neurodegenerative and neuro-inflammatory conditions. While TSPO expression is prevalent in the brain, it is still unclear as to what exact types of cells TSPO is expressed in, and what mechanisms result in increased expression. Regulating the expression or function of TSPO is believed to have an impact on neurodegenerative processes, but definitive evidence of this is also limited. To advance our understanding we will examine what cells TSPO is expressed in, and reveal what effects TSPO agonists and antagonists will have on brain activity patterns using electroencephalography. Some research has found that certain TSPO ligands have potential to be therapeutic agents for neurodegeneration, neuro-inflammation and neurotrauma. Therefore, localization of TSPO in brain tissue and investigation of the mechanism by which it becomes activated, may allow for the development of novel treatments for neurodegenerative issues such as Alzheimer's.

KEYWORDS: Translocator protein; neurodegeneration; neuro-inflammation; neurotrauma; Alzheimer's Disease

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Neurodegenerative disorders, such as Alzheimer's Disease, effect over 50 million Americans a year, and despite the high prevalence, the pathogenesis of these diseases remains unclear. However, researchers have noticed a dramatic up-regulation of a protein called translocator protein (TSPO) under neurodegenerative and neuro-inflammatory conditions. While TSPO expression is prevalent in the brain, it is still unclear as to what exact types of cells TSPO is expressed in, and what mechanisms result in increased expression. Regulating the expression or function of TSPO is believed to have an impact on neurodegenerative processes, but definitive evidence of this is also limited. To advance our understanding we will examine what cells TSPO is expressed in, and reveal what effects TSPO agonists and antagonists will have on brain activity patterns using electroencephalography. Some research has found that certain TSPO ligands have potential to be therapeutic agents for neurodegeneration, neuro-inflammation and neurotrauma. Therefore, localization of TSPO in brain tissue and investigation of the mechanism by which it becomes activated, may allow for the development of novel treatments for neurodegenerative issues such as Alzheimer's.

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