

Toll-like Receptors in Pathogenesis of Neurodegenerative Diseases and their Therapeutic Potential

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Abstract

Toll-like receptors (TLRs) are a family of pattern-recognition receptors (PRRs) triggered by pathogen-derived and tissue-damage-related ligands. TLRs were previously believed to only be expressed in immune cells. However, it is now confirmed that they are ubiquitously expressed in cells within the body including neurons, astrocytes, and microglia of the central nervous system (CNS). Activation of TLRs is capable of inducing immunologic and inflammatory responses to injury or infection of CNS. This response is self-limiting that usually resolves once the infection has been eradicated or the tissue damage has been repaired. However, the persistence of inflammation-inducing insults or a failure in normal resolution mechanisms may result in overwhelming inflammation which may induce neurodegeneration. This implies that TLRs may play a role in mediating the link between inflammation and neurodegenerative diseases namely Alzheimer's disease (AD), Parkinson's disease (PD), and amyotrophic lateral sclerosis (ALS). So, new therapeutic approaches that specifically target TLRs may be developed by better understanding TLR expression mechanisms in the CNS and their connections to particular neurodegenerative disorders. Therefore, this review paper discussed the role of TLRs in neurodegenerative diseases.

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