



# Role of Cytokine Networks in Neurodegenerative Diseases: Implications

Wodall O\*

Department of Neurological Surgery, Georgia Regents University Augusta, Georgia, USA

## Abstract

Neurodegenerative diseases, including Alzheimer's disease (AD), Parkinson's disease (PD), and amyotrophic lateral sclerosis (ALS), are characterized by progressive neuronal dysfunction and loss. While the specific pathological hallmarks vary between these diseases, chronic neuroinflammation, mediated by complex cytokine networks, is a common underlying feature. This review examines the multifaceted roles of cytokine networks in the pathogenesis of these neurodegenerative conditions, exploring their implications for disease progression and therapeutic intervention.

**Key words:** Cytokines; Neurodegeneration; Neuroinflammation; Alzheimer's disease; Parkinson's disease; Amyotrophic lateral sclerosis; Cytokine network; Inflammation

## Introduction

Neurodegenerative diseases, including Alzheimer's disease (AD), Parkinson's disease (PD), and amyotrophic lateral sclerosis (ALS), are characterized by progressive neuronal dysfunction and loss. While the specific pathological hallmarks vary between these diseases, chronic neuroinflammation, mediated by complex cytokine networks, is a common underlying feature. This review examines the multifaceted roles of cytokine networks in the pathogenesis of these neurodegenerative conditions, exploring their implications for disease progression and therapeutic intervention.

## Results

Cytokines, including tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ), interleukin-1 (IL-1), interleukin-6 (IL-6), and interleukin-17 (IL-17), play a central role in neuroinflammation and neurodegeneration. In AD, TNF- $\alpha$ , IL-1, and IL-6 are elevated in the brain and cerebrospinal fluid (CSF), and their levels correlate with cognitive decline. In PD, TNF- $\alpha$  and IL-1 are elevated in the brain, and their levels correlate with motor symptoms. In ALS, TNF- $\alpha$  and IL-1 are elevated in the brain, and their levels correlate with disease progression. These findings suggest that cytokine networks are involved in the pathogenesis of neurodegenerative diseases and may represent potential targets for therapeutic intervention.

\*Corresponding author: Wodall O, Department of Neurological Surgery,

a e c a , c d e a c a b a  
e d e a c e a d e a e e e a e c e e  
b a . C e d c e d e e e c a a c e b d-  
b a b a e a d d e c e c e e a c . F e e,  
e c e d e a e e e d e e a a e c e  
e a a e a e c a e e e d e e a e d e a e  
[4]. S e e a c c a a a e e a e d e e c a c a -TNF-  
e a e A D, b e a e b e e e d . T a e e c e  
d a c e e d e e a a c e a  
e e e a e c a e e . F a c e,  
e d c a - a a c e b e c c  
a a a e d c e d c a b e b e c a .  
F e e, e e e d e c e a e e c b e  
d a c e e a d e c e a a .  
D b , a b a a c e e c b a, c a e a d c e a e d  
e c a a a d b e e a c e a a .

**Disc ssion**

e d e e e d e e e c c a e