

# Inverse Relationship Between Alzheimer's Disease and Cancer: How Immune Checkpoints Might Explain the Mechanisms Underlying Age-Related Diseases

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## Abstract

Alzheimer's disease (AD) is the most prevalent neurodegenerative disease in the adult population. There is evidence of an inverse epidemiological relationship between AD and cancer, another prevalent age-related disease. This has led to hypothesize that there could be a common biological mechanism, deregulated in opposite directions that might explain the phenomenon of mutual protection. The immunological system and its regulatory checkpoints are good candidates to explain why having survived a cancer could protect from developing AD. During cancerous growth, the neoplastic cells induce immune tolerance to block the host's immunity system that would prevent tumor growth. This has led to the development of drugs that block distinct immune checkpoints, such as Programmed Death 1 (PD-1) and its major ligand PD-L1, that have shown great promise in treating diverse types of cancer. We propose that in those individuals who survived a cancer, the immune system is left in a state of diminished tolerance or proinflammatory systemic milieu, after its successful attempt to fight the cancer, that protects them from developing AD.

## Palabras clave

**Palabras clave de autor:** [Alzheimer's disease](#); [cancer](#); [immune checkpoint](#); [inflammation](#)

**KeyWords Plus:** [REGULATORY T-CELLS](#); [MILD COGNITIVE IMPAIRMENT](#); [LONG-TERM SURVIVAL](#); [OXIDATIVE DEATH](#); [INNATE IMMUNITY](#); [INFLAMMATORY CELLS](#); [TUMOR-ANTIGENS](#); [SKIN-CANCER](#); [IFN-GAMMA](#); [IN-VIVO](#)

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