## Abstract

Periodontitis, also known as gum disease, is an inflammatory condition that affects the tissues that surround and support the teeth. It is one of the most commonly overlooked oral health conditions. Periodontitis is a gateway disease and significantly increases the risks of developing other serious health problems such as cardiovascular disease, diabetes, and neurodegeneration. One of the health problems that has piqued the interest of researchers in particular is Alzheimer's Disease (AD). Animal models of infection support this connection, providing insights into how oral infection may lead to brain colonization and neuronal damage. This review explores the evidence from both mouse and human studies, highlighting the complexity behind periodontal disease and prevention, neuroinflammation caused by components in Periodontitis, and how these components could potentially serve as an inhibitor for neurotoxins to treat neurodegeneration in Alzheimer's disease. The study designed small-molecule inhibitors to target one of the toxic proteases called *gingipains* and block neurotoxicity as potential treatment.