

# Examining TLR4 influences of B cell response

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Chronic inflammation, which is at the root of multiple diseases, links periodontal disease to increased incidence of cardiovascular disease.

The activation of Toll-Like Receptors, which are essential components of the immune response to certain pathogens, promotes [chronic inflammation](#) in periodontal disease. Of these receptors TLR4 is one of a family of receptors that provides critical links between immune stimulants produced by microorganisms and the host response. It stands out because it plays a key role in systemic inflammation by stimulating a type of white blood [cells](#) produced in bone marrow. Known as B cells they are the cornerstone of the body's antibody production system. The ability of pathogens that chronically infect the mouth to induce TLR4 responses indicates that TLR4 plays a role in the relationship between periodontal disease and cardiovascular disease.

The link between TLR4 activity and periodontal disease, and the importance of B cells in oral immunity prompted a team of Boston University School of Medicine (BUSM) researchers, led by Barbara Nikolajczyk, an associate professor of microbiology and medicine, and her co-investigator, Lisa Gnaley-Leal, an assistant professor of medicine and microbiology, to question whether B cells respond to chronic periodontal disease infection through TLR4.

Tests compared B cells from human blood collected from both healthy volunteers and patients with aggressive periodontitis but no other known disease. The study, published in the [Journal of Leukocyte Biology](#),

showed that people with periodontal disease had a higher percentage of peripheral blood and tissue B cells that expressed TLR4. These TLR4-expressing B cells harbored significant changes in the pathways located downstream of TLR4, including unexpected decreases in inflammatory gene expression. Decreased inflammatory [gene expression](#) in TLR4-expressing B cells is highly likely to alter the immune responses of periodontal disease patients during inflammation as compared to healthy individuals.

The study highlights two fundamentally different responses by TLR4-expressing cells from [periodontal disease](#) patients: activation of monocytes, a type of white blood cell that ingests bacteria and tissue debris, versus inactivation of B cells.

"Overall, these findings demonstrated that the proposed strategy of regulating systemic inflammation disease by regulating TLR4 expression/activation must account for this newly identified source of TLR4 activity, [B cells](#)," the study states.

Source: Boston University Medical Center

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