

Porphyromonas gingivalis interactions with Dendritic Cells and Polymorphonuclear Leukocytes

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Abstract:

The oral mucosal pathogen *Porphyromonas gingivalis* (Pg) is an obligate anaerobe believed to have a novel mechanism by which it invades and persists in the dendritic cells (DCs) of its host. Polymorphonuclear leukocytes (PMNs) are first-responders to bacterial infection of mucosal surfaces. PMNs and DCs are thought to interact and form conjugates with the supposed purpose of extending the life of the associated PMNs, and enhancing the microbicidal abilities of DCs. This association, mediated by the C-type lectin receptor DC-SIGN on DCs and the Mac-1 (CD11b) surface marker on PMNs, may be competitively hindered by Pg. In order to fully understand the implications of DC-PMN association, the way each of these cells interacts with Pg individually must be clarified. Survival assays of the Pg with each cell type indicate bacterial survival after uptake by DCs, but no viability after uptake by PMNs. PMNs isolated from peripheral human blood were co-cultured with monocyte-derived dendritic cells, Raji cell line B cells that are either DC-SIGN+ or DC-SIGN-, and myeloid DCs also isolated from human blood, with or without the presence of Pg. A possible competitive inhibition of cell conjugation by Pg may give this bacteria an evolutionary advantage for survival, remaining viable as it is perhaps trafficked via DCs to various systemic areas of chronic inflammatory disease. This system may elucidate the mechanisms by which chronic periodontitis-associated bacteremia is epidemiologically linked with other inflammatory conditions, such as atherosclerosis.