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Infectious Agents and Autoimmunity

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ABSTRACT

There has been a long-standing interest in identifying an infectious etiology for rheumatoid arthritis (RA). Despite enormous investigative effort in the past decades, an infectious etiology has not been identifying. Epstein-Barr virus, Parvovirus B19 and retroviruses are considered by some investigators to be the primary candidates. Bacteria may also play a role in RA such as Lyme arthritis. I'll focus on the role of *Porphyromonas gingivalis* (Pg) in RA. Several studies indicate an epidemiologic association between Rheumatoid Arthritis (RA) and Periodontitis (PD) even after adjusting for risk factor of smoking. The aim of the study was to investigate the immune response to Arginine-gingipain (RgpA) of *Porphyromonas gingivalis* in PD and RA and the immunization using these peptides as antigens in the Collagen-Induced Arthritis (CIA) animal model.

Hemagglutinin domain (HD), HA4 of sub-hemagglutinin domain and catalytic domain (CD) of RgpA of *Porphyromonas gingivalis* were cloned, respectively. The recombinant proteins of HD, CD and HA4 were used as antigens for ELISA and animal study.

Thirty-six SD rats were divided in to six groups and were received subcutaneous injection with Incomplete Freund's Adjuvant (IFA), emulsified heat-killed Pg, emulsified HD, CD and H4 of RgpA, respectively every week for 28 days. After vaccination, rats were intradermally injected with bovine type II collagen to develop CIA. Clinical parameters including articular index and incidence rate were evaluated. SD rats were euthanized with CO_2 on day 46 and the serum and synovial tissue were collected to determine the TNF-α, IL-1β, IL-17, CXCL-1 and MMP-9 by ELISA and qPCR.

Our results showed that CD of RgpA of *P. gingivalis* had potent humoral immune response in CIA model. Vaccination with catalytic domain of RgpA of *P. gingivalis* can protect from the development of CIA animal model. Furthermore, the results indicate there is a close relationship between Pg and arthritis. We suggest that the subdomains of Pg may provide prophylactic intervention for the therapy of CIA.

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