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Th9 cells in synovial fluid of rheumatoid arthritis positively correlate with disease activity

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Background: CD4+ Helper T-cell subsets have replenished our understanding of adaptive immunity in human and in animal models of disease. Th1, Th2, and the interleukin-17 producing population, Th17 have been extensively studied in rheumatoid arthritis and other autoimmune diseases. The cytokine IL-9 has been regarded as a Th2 cytokine that makes multifocal contributions to allergic disease. Recent reports suggest that under certain conditions relevant to chronic diseases (in presence of IL-4 and TGF-β), a distinct population of IL-9-producing 'Th9' helper T cells can exist. These cells have been reported to lose the typical Th2 transcription factor GATA3. IL-9 producing Th9 cells have been recently studied in EAE mice model. This has established their function as an autoreactive helper T cell which exacerbates disease activity besides IFN-γ producing (Th1) and IL-17A producing (Th17) cells. Th9 cells are not extensively studied in human rheumatoid arthritis. Therefore their role in this disease is not described yet.

Methods: We investigated IL9 producing CD4+ Th9 cells in limited number of patients (n=15, Mean Age 50±10.6) with active rheumatoid arthritis using multicolor FACS based intracellular cytokine staining.

Results: We have observed that Th9 cell frequency is significantly increased at the local disease site (synovial fluid) as compared to autologous peripheral blood.

Conclusion: Th9 cells might be playing a significant role in disease exacerbations in RA. Th9 cell frequency of synovial fluid was positively correlated ($r=0.7$; $P<0.004$; Mean ± SEM) with DAS28-ESR scoring of disease activity by applying Spearman's rank correlation. Further in-loco investigation is required to understand the possible function of Th9 in Rheumatoid arthritis.

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