Th1/Th2 cytokines in patients with systemic lupus erythematosus: is tumor necrosis factor α protective?

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Abstract

Objectives
To determine the circulating levels of Th1 and Th2 cytokines in patients with systemic lupus erythematosus (SLE) and to elucidate their association with disease activity and autoimmune response.

Methods
We included 52 patients and 25 healthy controls. Serum levels of tumor necrosis factor (TNF) α, interferon (IFN) γ, interferon (IFN) γ, interleukin (IL)-12p70, IL-10, and IL-4, as well as anti-DNA, -Ro, -La, -RNP, and -Sm antibodies were determined by enzyme-linked immunosorbent assay. Disease activity was recorded according to the Systemic Lupus Erythematosus Disease Activity Index (SLEDAI) and classified as very active (SLEDAI ≥ 13), moderately active (SLEDAI: 3–12), or inactive (SLEDAI ≤ 2).

Results
The mean age of the patients was 34.2 ± 12.6 years, and the mean duration of disease was 4.9 ± 7.6 years. Twelve patients (23%), 20 patients (34.5%), and 20 patients (34.5%) had highly, moderately, and inactive SLE, respectively. Levels of IFN-γ, TNF-α, and IL-12 were significantly higher in patients than in healthy controls (P < .03), as well as the IL-12/IL-10, IL-12/IL-4, IFN/IL-10, IFN/IL-4, TNF/IL-10, and TNF/IL-4 ratios (P < .01), suggesting a major participation of Th1 over Th2 cytokines. Nevertheless, a direct correlation between Th1 (IFN-γ and TNF-α) and Th2 (IL-4 and IL-10) cytokines was observed in patients (r > .5, P < .01), indicating a mutual Th1-Th2 participation. TNF-α levels and the TNF/IL-10 ratio were higher in patients with inactive disease compared with patients with very active disease and controls (P < .04). IL-12 levels and IL-12/IL-4, as well as IL-12/IL-10, ratios were higher in patients with very active disease than in those with inactive SLE and controls (P < .01). IL-10 levels were associated with anti-DNA, anti-Ro, and anti-La response (P < .01).

Conclusion
Our results suggest that TNF-α could be a protective factor in SLE patients, whereas IL-12p70 participates in disease activity and IL-10 influences the autoimmune response (autoantibody production).

Keywords:
Systemic lupus erythematosus, cytokines, TNF-α, IL-10, IL-12, autoantibodies, SLEDAI