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Correlation Analysis of Immunological Markers in Pediatric Systemic Lupus Erythematosus

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Relevance: Systemic lupus erythematosus (SLE) in children represents a complex autoimmune disorder with diverse immunopathogenic mechanisms. Early recognition of immune dysregulation is essential for optimizing treatment strategies and predicting disease outcomes [1]. Immunological markers, including acute-phase proteins, cytokines, and complement components, provide valuable insights into the underlying mechanisms of inflammation [2]. Studying their interactions can reveal key pathogenic pathways and potential therapeutic targets [3]. In pediatric patients, where immune responses may differ from adults, such data are particularly critical for clinical decision-making.

Purpose of the study: To identify the correlation patterns between innate and adaptive immune parameters in children with SLE, aiming to clarify their role in disease activity and progression.

Materials and methods: The study involved 97 children aged 7–17 years with confirmed SLE. Clinical and laboratory assessments included serum levels of C-reactive protein (CRP), lactoferrin, interferon-gamma (IFNγ), IP-10, complement components C3 and C4, and $CD16^+$ cell counts. Measurements were performed using ELISA (Vector-Best, Novosibirsk). Statistical analysis was conducted using Pearson's correlation coefficient, with significance set at $p < 0.05$.

Results: Strong negative correlations were observed between CRP and lactoferrin ($r = –0.83$; $p < 0.001$), CRP and IFNγ ($r = –0.79$; $p < 0.001$), and IFNγ and $CD16^+$ cells ($r = –0.73$; $p < 0.001$). Positive correlations were found between CRP and $CD16^+$ cells ($r = 0.82$; $p < 0.001$), lactoferrin and IFNγ ($r = 0.80$; $p < 0.001$), and lactoferrin and IP-10 ($r = 0.76$; $p < 0.001$). Moderate correlations were identified between C3 and C4 ($r = 0.58$) and between CRP and C4 ($r = 0.41$). Weak negative associations occurred between IP-10 and C4 ($r = –0.44$) and between IP-10 and C3 ($r = –0.36$).

Conclusion: The interplay of CRP, lactoferrin, IFNγ, and IP-10, along with $CD16^+$ cell activity, forms the core immunological network in pediatric SLE. Complement components exhibit moderate but significant relationships with inflammatory markers. These findings may support

the development of diagnostic algorithms and personalized treatment strategies for children with SLE.

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