



INVESTIGATION OF THE POTENTIAL ROLES OF IL-9 CYTOKINE IN THE REGULATION OF ATP ADENOSINE METABOLISM

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GRADUATION DATE: 04.02.2026

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THESIS ABSTRACT

In this study, the regulatory role of IL-9 in purinergic signaling pathways and its impact on T-cell responses were investigated. Analyses performed on peripheral blood mononuclear cells isolated from healthy individuals demonstrated that IL-9 enhances CD39 and CD73 expression, thereby accelerating the conversion of ATP to adenosine. This mechanism contributed to the formation of an immunosuppressive microenvironment in T cells. IL-9 was also shown to suppress pro-inflammatory responses, and these effects were reversed by CD39/CD73 inhibition. Overall, the findings identify IL-9 as a unique regulator shaping immunometabolic balance.

APPLICATION AREAS OF THE THESIS RESULTS

The findings demonstrate that the IL-9–CD39/CD73–ATP/adenosine axis can be targeted to modulate immune responses in pathologies such as chronic inflammation, autoimmune diseases, and cancer. Accordingly, this study provides a direct scientific foundation for the development of IL-9-based diagnostic biomarkers and next-generation immunotherapeutic strategies.

ACADEMIC ACTIVITIES

- Kizmaz, M. A.**, Simsek, A., Bozkurt, T., Iskin, A. E., & Budak, F. (2026). IL-9 orchestrates immune regulation through CD39/CD73 dependent metabolic reprogramming. *International Immunopharmacology*, 173, 116303. (Tez makalesi).
- Kizmaz, M. A.**, Simsek, A., Bozkurt, T., Cagan, E., Dombaz, F., Tezcan, G., ... & Budak, F. (2023). Effector memory T cell subset CD45RA–CCR7–CD27–CD28– EM3 increases in direct proportion to the disease severity of COVID - 19. *Scandinavian journal of immunology*, 97(1), e13217.
- Kizmaz, M. A.**, Simsek, A., Aymak, F., Akalin, E. H., Oral, H. B., & Budak, F. (2023). The Prevalence of HLA-B* 57 Serotype Associated with Hypersensitivity Reactions in the Treatment of HIV Infection in the Turkish Population. *Current HIV research*, 21(4), 254-258.

KEY WORDS

- ✓ Immunometabolism
- ✓ ATP–adenosine metabolism
- ✓ Purinergic signaling
- ✓ IL-9
- ✓ CD39/CD73

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