DISERTASI

PENGARUH *TISSUE INHIBITOR METALLOPROTEINASE-1* TERHADAP MANIFESTASI KLINIS MENCIT MODEL RINITIS ALERGI :

KAJIAN TERHADAP KADAR IMUNOGLOBULIN E, INTERLEUKIN-2, INTERLEUKIN-5, DAN EKSPRESI FOXP3 SEL T REGULATOR

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ABSTRAK

PENGARUH *TISSUE INHIBITOR METALLOPROTEINASE-1* TERHADAP MANIFESTASI KLINIS MENCIT MODEL RINITIS ALERGI :

KAJIAN TERHADAP KADAR IMUNOGLOBULIN E, INTERLEUKIN-2, INTERLEUKIN-5, DAN EKSPRESI FOXP3 SEL T REGULATOR

Pendahuluan: Rinitis alergi (RA) merupakan salah satu penyakit yang paling sering ditemukan di seluruh dunia. Rinitis Alergi ditandai dengan ketidakseimbangan respon imun Th2 dan penurunan fungsi sel T-regulator (Treg) yang diekspresikan oleh marker FOXP3. *Tissue Inhibitor of Metalloproteinase-1* (TIMP-1) diketahui memiliki peran dalam remodeling jaringan dan potensi imunomodulasi, namun pengaruhnya terhadap RA belum sepenuhnya jelas. Penelitian ini bertujuan untuk menganalisis pengaruh pemberian TIMP-1 terhadap manifestasi klinis mencit model rinitis alergi dengan kajian khusus terhadap IgE spesifik-OVA, IL-2, IL-5, dan ekspresi FOXP3 sel Treg.
Metode: Penelitian eksperimental ini menggunakan mencit *Balb/c* yang dibagi menjadi empat kelompok: Kontrol Normal (K1), Kontrol RA (K2), RA + TIMP-1 10 µg/kg (P1), dan RA + TIMP-1 20 µg/kg (P2). Mencit diinduksi dengan ovalbumin untuk membuat model RA. Parameter yang diukur meliputi frekuensi bersin, menggosok hidung, kadar IgE spesifik-OVA, IL-2, IL-5, serta ekspresi FOXP3. Kadar IgE spesifik-OVA, IL-2 dan IL-5 diperiksa dengan metode ELISA. Ekspresi FOXP3 pada jaringan mukosa hidung dan limpa menggunakan pemeriksaan imunohistokimia.
Hasil: Pemberian TIMP-1 secara bermakna menurunkan frekuensi bersin, menggosok hidung, dan kadar IgE spesifik-OVA pada dosis 20 µg/kg. Rerata ekspresi FOXP3 pada kelompok K2 lebih rendah dibandingkan K1, dan terjadi peningkatan ekspresi pada kelompok P1 (TIMP-1 10 µg/kg). Secara statistik, perbedaan ekspresi FOXP3 antar kelompok tidak bermakna. Kadar IL-2 dan IL-5 antar kelompok juga tidak ditemukan perbedaan bermakna.
Kesimpulan: TIMP-1 dosis 20 µg/kg efektif dalam memperbaiki manifestasi klinis dan menurunkan kadar IgE pada mencit model RA. Studi lebih lanjut diperlukan untuk mengoptimalkan potensi terapeutik TIMP-1 terhadap RA.

Kata Kunci: Rinitis Alergi, TIMP-1, FOXP3, IgE, Imunomodulator.

ABSTRACT

THE EFFECT OF TISSUE INHIBITOR METALLOPROTEINASE-1 ON CLINICAL MANIFESTATIONS IN A MOUSE MODEL OF ALLERGIC RHINITIS :

AN ANALYSIS OF IMMUNOGLOBULIN E, INTERLEUKIN-2, AND INTERLEUKIN-5 LEVELS, AND REGULATORY T-CELL FOXP3 EXPRESSION

Introduction: *Allergic rhinitis (AR) is one of the most common diseases worldwide. Allergic rhinitis is characterized by an imbalance in the Th2 immune response and decreased function of T-regulatory cells (Tregs), which are expressed by the FOXP3 marker. Tissue Inhibitor of Metalloproteinase-1 (TIMP-1) is known to play a role in tissue remodeling and immunomodulatory potential, but its effect on AR is not fully understood. This study aims to analyze the effect of TIMP-1 administration on the clinical manifestations of a mouse model of allergic rhinitis, with a specific focus on OVA-specific IgE, IL-2, IL-5, and FOXP3 expression in Treg cells.*

Methods: *This experimental study used Balb/c mice divided into four groups: Normal Control (K1), AR Control (K2), AR + TIMP-1 10 µg/kg (P1), and AR + TIMP-1 20 µg/kg (P2). Mice were induced with ovalbumin to create the AR model. Parameters measured included frequency of sneezing and nose rubbing, OVA-specific IgE levels, IL-2, IL-5, and FOXP3 expression. OVA-specific IgE, IL-2, and IL-5 levels were examined using ELISA. FOXP3 expression in nasal mucosal and spleen was determined using immunohistochemistry.*

Results: *TIMP-1 administration significantly reduced sneezing, nose rubbing, and OVA-specific IgE levels at the 20 µg/kg dose. The mean FOXP3 expression in the K2 group was lower than in K1, and there was an increase in expression in the P1 group (TIMP-1 10 µg/kg). Statistically, the difference in FOXP3 expression between groups was not significant. There were also no significant differences in IL-2 and IL-5 levels between groups.*

Conclusion: *TIMP-1 at a dose of 20 µg/kg was effective in improving clinical manifestations and reducing IgE levels in AR model mice. Further studies are needed to optimize the therapeutic potential of TIMP-1 against AR.*

Keywords: *Allergic Rhinitis, TIMP-1, FOXP3, IgE, Immunomodulator.*