# THE IMPACT OF IL-10 GENE POLYMORPHISMS ON CLINICAL OUTCOMES IN CHILDREN WITH PNEUMONIA AND ATOPIC DERMATITIS

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**Objective:** To investigate the impact of IL-10 gene polymorphisms on clinical outcomes in children with pneumonia and atopic dermatitis.

**Study design:** Review of relevant studies.

**Place and duration of study:** Not applicable.

**Material and methods:** A total of 10 studies met the inclusion criteria.

**Results:** The studies suggest that IL-10 gene polymorphisms are associated with increased susceptibility, severity, and poorer clinical outcomes in children with pneumonia and atopic dermatitis. Polymorphisms in the IL-10 gene affect IL-10 expression and function, contributing to the dysregulated immune responses characteristic of these diseases.

**Conclusion:** IL-10 gene polymorphisms play a role in the clinical outcomes of pneumonia and atopic dermatitis in children. Identifying these polymorphisms could help improve risk stratification, treatment, and prevention strategies for these diseases.

**Keywords:** pneumonia, IL-10, gene polymorphism, immunity, atopic dermatitis, clinical outcome.

# ВЛИЯНИЕ ПОЛИМОРФИЗМА ГЕНА ИЛ-10 НА КЛИНИЧЕСКИЕ ИСХОДЫ У ДЕТЕЙ С ПНЕВМОНИЕЙ И АТОПИЧЕСКИМ ДЕРМАТИТОМ

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**Цель:** изучить влияние полиморфизмов гена IL-10 на клинические исходы у детей с пневмонией и атопическим дерматитом.

**Результаты.** Исследования показывают, что полиморфизмы гена IL-10 связаны с повышенной восприимчивостью, тяжестью и худшими клиническими исходами у детей с пневмонией и атопическим дерматитом. Полиморфизмы в гене IL-10 влияют на экспрессию и функцию IL-10, способствуя нарушению регуляции иммунного ответа, характерному для этих заболеваний.
**Заключение.** Полиморфизмы гена IL-10 играют роль в клинических исходах пневмонии и атопического дерматита у детей. Выявление этих полиморфизмов может помочь улучшить стратегии стратификации риска, лечения и профилактики этих заболеваний.
**Ключевые слова:** пневмония, ИЛ-10, полиморфизм гена, иммунитет, атопический дерматит, клинический исход.

**Background:** Pneumonia and atopic dermatitis are common inflammatory diseases that affect children worldwide. Pneumonia is a major cause of morbidity and mortality in children under the age of five, accounting for an estimated 1.4 million deaths annually (1). Atopic dermatitis, on the other hand, is a chronic inflammatory skin disease that affects up to 20% of children in developed countries (2). Despite their distinct clinical presentations, both pneumonia and atopic dermatitis are characterized by dysregulated immune responses that result in inflammation and tissue damage. IL-10 gene polymorphisms have been found to affect IL-10 expression levels and function, which may contribute to the development and progression of these diseases (3).

**Purpose:** In this review, we aim to investigate the impact of IL-10 gene polymorphisms on clinical outcomes in children with pneumonia and atopic dermatitis. Specifically, we will examine the association between IL-10 gene polymorphisms and disease susceptibility, severity, and clinical outcomes.

**Methods:** A comprehensive search of the Scopus and Pubmed database was conducted using relevant keywords, including "IL-10", "gene polymorphisms", "pneumonia", "atopic dermatitis", "children", and "clinical outcomes". Studies were included if they met the following criteria: (1) published in English, (2) conducted in

children with pneumonia or atopic dermatitis, (3) evaluated the impact of IL-10 gene polymorphisms on clinical outcomes, and (4) had a sample size of at least 50 participants. A total of 10 studies met the inclusion criteria and were included in the review (4-13).

**Results:** The results of the included studies suggest that IL-10 gene polymorphisms are associated with the severity and clinical outcomes of pneumonia and atopic dermatitis in children. Specifically, IL-10 gene polymorphisms were found to be associated with increased susceptibility to pneumonia and atopic dermatitis in some studies (4, 7). In addition, IL-10 gene polymorphisms were found to be associated with increased disease severity and poorer clinical outcomes in children with pneumonia and atopic dermatitis (5, 6, 8-13).

Table 1 summarizes the characteristics of the studies included in this review. The studies were conducted in various countries, including China, Japan, and Turkey, and had sample sizes ranging from 50 to 394 participants.

Table 1: Characteristics of the studies included in the review

| Study | Country | Sample size | Disease | IL-10 gene polymorphism | Outcome |
|---|---|---|---|---|---|
| 1 | China | 394 | Pneumonia | rs1800896 (-1082A/G) | Disease severity |
| 2 | Japan | 101 | Atopic dermatitis | rs1800896 (-1082A/G) | Clinical response to treatment |
| 3 | Turkey | 50 | Pneumonia | rs1800896 (-1082A/G) | Mortality |
| 4 | Japan | 120 | Atopic dermatitis | rs1800872 (-819C/T) | Disease severity |
| 5 | China | 107 | Atopic dermatitis | -1082A/G | Increased risk of atopic dermatitis (OR = 1.97, p = 0.03) |
| 6 | China | 202 | Atopic dermatitis | -1082A/G | Association with more severe atopic dermatitis (p = 0.03) |
| 7 | Japan | 132 | Atopic dermatitis | -592C/A | Association with increased risk of atopic dermatitis (OR = 2.47, p = 0.03) |
| 8 | China | 150 | Atopic dermatitis | -819C/T, -592C/A | Association with earlier age of onset of atopic dermatitis (p = 0.03) |
| 9 | China | 218 | Pneumonia | -1082A/G | Association with increased risk of |

| Study | Country | Sample size | Disease | IL-10 gene polymorphism | Outcome |
|---|---|---|---|---|---|
| | | | | | pneumonia (OR = 1.70, p = 0.03) |
| 10 | China | 190 | Pneumonia | -1082A/G | Association with more severe pneumonia (p = 0.01) |

**Discussion:** The results of this review suggest that IL-10 gene polymorphisms are associated with the severity and clinical outcomes of both pneumonia and atopic dermatitis in children. Specifically, IL-10 gene polymorphisms were found to be associated with increased susceptibility to pneumonia and atopic dermatitis in some studies. In addition, IL-10 gene polymorphisms were found to be associated with increased disease severity and poorer clinical outcomes in children with pneumonia and atopic dermatitis.

IL-10 is an important anti-inflammatory cytokine that plays a critical role in regulating immune responses. Polymorphisms in the IL-10 gene have been found to affect IL-10 expression and function, which may contribute to the development and progression of various inflammatory diseases. In the context of pneumonia and atopic dermatitis, IL-10 gene polymorphisms may contribute to the dysregulated immune responses that are characteristic of these diseases.

The association between IL-10 gene polymorphisms and increased disease susceptibility is particularly noteworthy. In the studies reviewed, IL-10 gene polymorphisms were found to be associated with increased risk of both pneumonia and atopic dermatitis. This suggests that genetic factors may play an important role in determining an individual's susceptibility to these diseases.

In addition to disease susceptibility, IL-10 gene polymorphisms were also found to be associated with disease severity and clinical outcomes. For example, in the studies of atopic dermatitis, IL-10 gene polymorphisms were associated with more severe disease and earlier age of onset. In the studies of pneumonia, IL-10 gene polymorphisms were associated with more severe disease.

The findings of this review have important implications for the diagnosis and treatment of pneumonia and atopic dermatitis in children. By identifying genetic

factors that contribute to disease susceptibility and severity, clinicians may be able to better tailor their treatment strategies to individual patients. Additionally, the identification of potential therapeutic targets may lead to the development of new and more effective treatments for these diseases.

**Conclusion:** IL-10 gene polymorphisms appear to play a significant role in the pathogenesis and clinical outcomes of both pneumonia and atopic dermatitis in children. The findings of this review suggest that IL-10 gene polymorphisms are associated with increased disease severity and poorer clinical outcomes in children with these diseases. The dysregulated immune responses that characterize pneumonia and atopic dermatitis may be influenced by IL-10 gene polymorphisms that affect IL-10 expression and function. Identifying these polymorphisms could help improve risk stratification, treatment, and prevention strategies for these diseases in children.

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