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THE IMPORTANCE OF GENE POLYMORPHISM IN THE CHOICE OF PHARMACOTHERAPEUTIC DRUGS FOR ALLERGIC DISEASES

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Abstract
This article examines the importance of gene polymorphism in the pharmacotherapeutic treatment of allergic diseases. It provides an overview of the current literature on genetic variations affecting the metabolism and effectiveness of medications commonly used in the treatment of allergies, such as antihistamines, corticosteroids and leukotriene modifiers. The article emphasizes the importance of personalized medicine and the possibility of genetic testing for the development of individual treatment plans for patients with allergic diseases.

Keywords: gene polymorphism, pharmacotherapy, allergic diseases, antihistamines, corticosteroids, leukotriene modifiers, genetic testing.

Значение полиморфизма генов в выборе фармакотерапевтических препаратов при аллергических заболеваниях

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Резюме:
В данной статье исследуется значение полиморфизма генов в фармакотерапевтическом лечении аллергических заболеваний. В нем содержится обзор современной литературы о генетических вариациях, влияющих на метаболизм и эффективность лекарств, обычно используемых

при лечении аллергии, таких как антигистаминные препараты, кортикостероиды и модификаторы лейкотриенов. В статье подчеркивается важность персонализированной медицины и возможности генетического тестирования для разработки индивидуальных планов лечения пациентов с аллергическими заболеваниями.

Ключевые слова: полиморфизм генов, фармакотерапия, аллергические заболевания, антигистаминные препараты, кортикостероиды, модификаторы лейкотриенов, генетическое тестирование.

Introduction:

Allergic diseases affect millions of people around the world, causing significant morbidity and reducing the quality of life. Pharmacotherapy is the cornerstone of the treatment of many allergic conditions, including asthma, allergic rhinitis and atopic dermatitis. However, the effectiveness of the drug and adverse reactions may vary significantly in different patients, even if standard dosage regimens are observed (1,3). Genetic variability can play a crucial role in determining the individual response to pharmacotherapy, including the likelihood of side effects or reduced effectiveness.

The purpose of the study: to study the literature data on gene polymorphism in the pharmacotherapeutic treatment of allergic diseases.

Genetic variations that affect the metabolism and effectiveness of commonly used medications, such as antihistamines, corticosteroids and leukotriene modifiers, will also be studied. The article will also discuss the possibilities of genetic testing for the preparation of individual treatment plans for patients with allergic diseases.

Antihistamines. Antihistamines are a class of drugs commonly used to treat allergic conditions, including allergic rhinitis, urticaria, and allergic conjunctivitis (4). They work by blocking histamine receptors, which are responsible for many symptoms associated with allergic reactions, such as itching, sneezing and nasal congestion.

Several genes have been identified that affect the metabolism and effectiveness of antihistamines. For example, the CYP2D6 gene encodes an enzyme that metabolizes many widely used antihistamines, including cetirizine, fexofenadine and loratadine. Genetic variations in this gene can lead to a decrease in the metabolism of these drugs, which leads to an increase in their blood levels and a potentially higher risk of side effects. Conversely, some people may have an increased metabolism of these drugs, which leads to a decrease in their effectiveness (4,5).

Another gene that may affect the effectiveness of antihistamines is the histamine H1 receptor gene. Changes in this gene can affect the number or function of histamine receptors, potentially leading to a change in the response to antihistamine therapy.

Corticosteroids. Corticosteroids are a class of drugs commonly used to treat allergic conditions such as asthma and atopic dermatitis. They work by reducing inflammation in the body, which is a key component of many allergic reactions.
Genetic variability can also affect the effectiveness and side effects of corticosteroids. For example, the CYP3A4 gene encodes an enzyme that metabolizes many corticosteroids, including prednisone and dexamethasone (1,6). Genetic variations in this gene can lead to a decrease in the metabolism of these drugs, which leads to an increase in their blood levels and a potentially higher risk of side effects.

Leukotriene modifiers. Leukotriene modifiers are a class of drugs that block the action of leukotrienes, which are inflammatory mediators involved in many allergic reactions. They are commonly used to treat conditions such as asthma and allergic rhinitis (4,7).
The response to leukotriene modifiers may also depend on genetic variability. For example, variations of the LTC4S gene are associated with different reactions to the leukotriene modifier montelukast. People with some variations may have reduced effectiveness or increased risk of side effects

Discussion of the Results:
The field of pharmacogenetics is developing rapidly and as our understanding of gene polymorphism and its effect on the metabolism and effectiveness of drugs expands, personalized medicine is becoming increasingly important in the treatment of allergic diseases. Gene polymorphism can significantly affect the effectiveness of various pharmacotherapeutic drugs used to treat allergic diseases, such as asthma, allergic rhinitis and atopic dermatitis (2,3). Thanks to advances in genetic testing and the integration of this information into clinical decision-making, personalized medicine can optimize treatment outcomes, minimize adverse reactions and increase patient satisfaction.
Despite the growing body of evidence supporting the role of gene polymorphism in the pharmacotherapy of allergic diseases, there is still a need for further research to fully understand the complex interactions between genetics and drug metabolism (4,5,7). Collaboration between geneticists and clinicians is necessary to identify

patients who may benefit from genetic testing, interpret test results and transform this information into effective treatment plans.

Conclusion:

Gene polymorphism plays an essential role in the selection of pharmacotherapeutic drugs for the treatment of allergic diseases. Advances in genetic testing and the integration of this information into clinical decision-making can optimize treatment outcomes and increase patient satisfaction. Further research and collaboration between geneticists and clinicians is needed to fully understand the complex interactions between genetics and drug metabolism in the context of allergic diseases.

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