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REVIEW

Identification of rheumatoid arthritis biomarkers based on single nucleotide polymorphisms and haplotype blocks: A systematic review and meta-analysis

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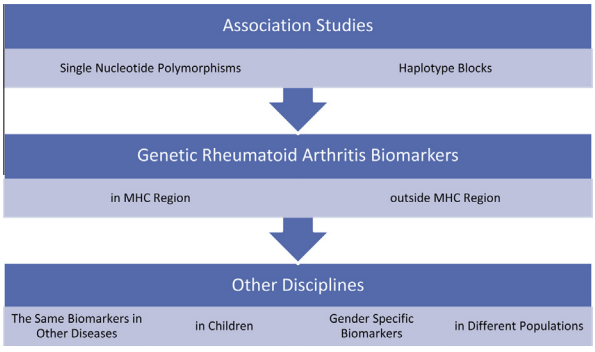
GRAPHICAL ABSTRACT



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ABSTRACT

Genetics of autoimmune diseases represent a growing domain with surpassing biomarker results with rapid progress. The exact cause of Rheumatoid Arthritis (RA) is unknown, but it is thought to have both a genetic and an environmental bases. Genetic biomarkers are capable of changing the supervision of RA by allowing not only the detection of susceptible individuals, but also early diagnosis, evaluation of disease severity, selection of therapy, and monitoring of response to therapy. This review is concerned with not only the genetic biomarkers of RA but also the methods of identifying them. Many of the identified genetic biomarkers of RA were identified in populations of European and Asian ancestries. The study of additional human populations may yield novel results. Most of the researchers in the field of identifying RA biomarkers use single nucleotide polymorphism (SNP) approaches to express the significance of their results. Although, haplotype block methods are expected to play a complementary role in the future of that field.

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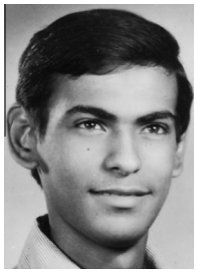

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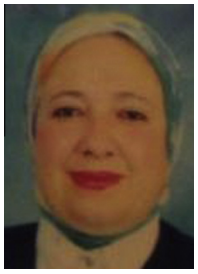

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Introduction

RA is an autoimmune disease that causes chronic inflammation of the joints and other areas of the body. RA is characterized by periods of disease development and attenuation. RA tends to affect multiple joints usually, but not always, in symmetrical patterns [1].

The US and UK populations are affected by RA disease with 1% approximately. In some other ethnicities, such as China, Japan and some black populations in rural South Africa, assessment of the spread of the disease is as low as 0.2–0.3%. The affected women are approximately twice the affected men. It most often starts within the range of 45–55 years of age [2].

The precise etiology of RA has not been established yet. The cause of RA is a very active area of the worldwide research. It is believed that the tendency to develop RA may be genetically inherited. Also, environmental factors, such as smoking tobacco, may cause the malfunction of the immune system in susceptible individuals [3].

There is no singular test for diagnosing RA. Instead, RA diagnosis is based on a combination of (1) the presentation of the joints involved, (2) the characteristic joint stiffness in the morning, (3) positive rheumatoid factor (RF) and citrulline antibody, and (4) the findings of rheumatoid nodules and radiographic changes. There is no known specific cure for RA. To date, the goal of treatment in RA is to (a) reduce joint inflammation and pain, (b) maximize joint function, and (c)