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Rheumatoid Arthritis Research

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Rheumatoid arthritis is an autoimmune disorder that can affect the joints and organs in the body, which usually presents with a flare up of symptoms followed by a period of remission.

In recent decades, scientific research in the area of autoimmune diseases such as rheumatoid arthritis has progressed at an exciting pace. Our broadened understanding of the disease pathophysiology has led to improvements in diagnosis and treatment techniques.

However, there remains a lot to be uncovered. For example, the precise cause of the condition and a possible cure are still not clear. Additionally, current treatments are associated with significant side effects that could ideally be minimized.

Therefore, there is a need for future research to deepen our understanding of the disease and begin to introduce targeted therapies that maximize efficacy with fewer side effects.

Genetic Research

The genetic factors that predispose an individual to develop rheumatoid arthritis or have faster progression of symptoms are of great interest in current research. To date, several genetic biomarkers have been identified but more extensive work in this area would allow the genetic causes to become better understood.

A single nucleotide polymorphism (SNP) variation in the PTPN22 gene that is linked to the activation of T-cells has already been linked to an increased risk of rheumatoid arthritis. Individuals with variations in one or both of the gene copies are at risk of over-reactive T-cells in the immune system, which can lead to inflammation and associated tissue damage.

Additionally, a SNP variation in the STAT4 gene has also been found to increase the risk of rheumatoid arthritis and lupus erythematosus, another autoimmune condition. This gene is involved in the regulation and activation of certain immune cells thought to be linked to the disease.

The suggestion of an inherited familial link has been further supported by studies of identical twins with the same genetic makeup with birth. If one of the twins is affected, the other has a markedly increased risk of the disease, in respect to the general population.

The genome-wide association approach has broadened the possibilities of genetic research, as 300,00 – 500,000 single nucleotide polymorphisms can be analyzed simultaneously. This has led to the identification of TRAF1-C5 on chromosome 9, although the influence of this gene variation is still being established.

Pathophysiology

The cadherin-11 molecule of the synovium cells is believed to play a critical role in the damage of joint in rheumatoid arthritis. The molecules cause the cells to aggregate together and erode the cartilage that can lead to permanent joint destruction. Studies conducted on mice found that blocking cadherin-11 was able to prevent cartilage destruction and a similar disease to the rheumatoid arthritis experienced by humans. Based on these findings, the following progression is to identify an agent that is able to block the effect of this molecule in affected individuals.

Additionally, some research has pointed to reduced rates of apoptosis in patients with rheumatoid arthritis, leading to cell proliferation and destruction of the joints. Mice studies have supported this notion, by showing that a lack of apoptosis-mediating proteins led to the development of arthritis.

Emerging Treatments

As our understanding of the pathophysiology of rheumatoid arthritis continues to progress, we are getting closer to the discovery and implementation of new therapies to manage the disease.

For example, tofacitinib is a new drug for rheumatoid arthritis that was approved for treatment in 2012 that targets both JAK1 and JAK3 with functional selectivity over JAK2. This family was initially discovered in the 1990s and was

later discovered to be linked to severe immunodeficiency. Based on this knowledge, it was proposed as a treatment for rheumatoid arthritis as it could reduce the tissue damage and inflammation related to an autoimmune response.

As research in the field continues, there is hope for new treatments in the future, including the transplantation of stem cells. Additionally, imaging techniques such as magnetic resonance imaging (MRI) and computed tomography (CT) scans open up the path to continued knowledge and solutions.

References

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- <http://www.arthritisresearchuk.org/research/grant-tracker-items/2013/valued-activities-roles-and-hand-function-testing-two-assessments-developed-from-patients-perspective.aspx>
- <http://www.arthritisresearchuk.org/research/grant-tracker-items/2013/is-a-molecule-called-vegf-a-new-target-for-the-treatment-of-rheumatoid-arthritis.aspx>

Further Reading

- [What is Rheumatoid Arthritis?](#)
- [What Causes Rheumatoid Arthritis?](#)
- [Rheumatoid Arthritis Symptoms](#)
- [Rheumatoid Arthritis Diagnosis](#)
- [Rheumatoid Factor Test](#)
- [Knee Rheumatoid Arthritis](#)
- [Total Knee Replacement and Rheumatoid Arthritis](#)
- [Hip Rheumatoid Arthritis](#)
- [Rheumatoid Arthritis and Feet](#)
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Last Updated: Apr 14, 2016