

Arthritis study reveals why gender bias is all in the genes

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Researchers have pieced together new genetic clues to the arthritis puzzle in a study that brings potential treatments closer to reality and could also provide insights into why more women than men succumb to the disabling condition.

Rheumatoid arthritis – which affects more than 400,000 people in the UK and about 1% of the world's population – is a complicated disease: lifestyle and [environmental factors](#), such as smoking, diet, pregnancy and infection are thought to play a role, but it is also known that a person's [genetic makeup](#) influences their [susceptibility](#) to the condition.

Scientists at the Arthritis Research UK Epidemiology Unit at The University of Manchester have discovered 14 new genes that can lead to rheumatoid arthritis, adding to the 32 other genes they had already identified; the team believes it has now discovered the vast majority of disease-causing genes for the condition.

The Manchester researchers' latest study, published in the journal *Nature Genetics*, has identified genes specific to the female X-chromosome – which could explain why three times more women than men present with the disease.

First author Dr Stephen Eyre said: "This work will have a great impact on the clinical treatment of arthritis; we have already found three genes that are targets for drugs, leaving a further 43 genes with the potential for drug development, helping the third of patients who fail to respond

well to current medications.

"Although patients who first present at clinic have similar symptoms, it is likely that their route to developing disease has involved a varied path. The genetic findings can help divide patients into smaller groups with more similar types of rheumatoid arthritis and assist in the allocation of therapies and [disease management](#)."

The Manchester team used advanced technology and a large collection of international samples to identify the new [genes](#) and move a step closer to being able to improve the lives of rheumatoid arthritis sufferers.

Professor Jane Worthington, study lead based at the NIHR Manchester Musculoskeletal Biomedical Research Unit, said: "This groundbreaking study brought together scientists from around the world and involved the use of DNA samples from more than 27,000 patients with rheumatoid arthritis and healthy controls. As a result of our findings, we now know that genetic variations at over 45 regions of the genome determine susceptibility to this form of arthritis.

"We observed remarkable similarities with genetic markers associated with other autoimmune diseases. Our future work will focus on understanding how the simple genetic changes alter normal biological processes and lead to disease. Ultimately, this will help us to develop novel therapies and improved targeting of existing drugs."

Professor Alan Silman, medical director of Arthritis Research UK, said: "This large genetics study has added a significant amount to the current knowledge of the genetic basis of rheumatoid arthritis. We hope that this research will lead to a greater understanding of the disease and allow us to develop targeted drug treatments for the half-a-million people currently living with rheumatoid arthritis.

"This is the first time that a genetic association has been established between rheumatoid [arthritis](#) and the [X chromosome](#). This could provide a useful clue in helping us to understand why [rheumatoid arthritis](#) is three times more likely to occur in women."

More information: 'High-density genetic mapping identifies new susceptibility loci for rheumatoid arthritis,' *Nature Genetics*, 2012.

Provided by University of Manchester

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