

# Scientists prove low cost arthritis drug can effectively treat blood cancer sufferers

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A simple arthritis drug could be an effective, low cost solution to treat patients with blood cancers such as polycythemia vera (PV) and essential thrombocythemia (ET), a breakthrough study by the University of

Sheffield has shown.

Led by Dr. Martin Zeidler, from the University of Sheffield's Department of Biomedical Science and Dr. Sebastian Francis from the Department of Haematology at the Royal Hallamshire Hospital, as well as the Universities of Oxford and Cambridge, the study results show that methotrexate (MTX) – a drug on the World Health Organisation list of essential medicines that is commonly used to treat rheumatoid [arthritis](#) —significantly reduces the symptoms associated with the disease.

Every year around 6,000 people in the UK are diagnosed with either PV or ET, related [blood cancers](#) that cause an overproduction of red blood cells (PV) or blood-clotting platelets (ET). Patients often suffer with itching, headaches, weight loss, fatigue and night sweats.

Although current treatments are usually able to control the increased blood counts, they provide little relief from sometimes debilitating symptoms that can often have a significant impact on quality of life.

Building on previous Medical Research Council-funded work in the Zeidler lab that identified methotrexate as an inhibitor of the JAK/STAT signaling pathway, this study examined hospital records to identify existing ET and PV patients already taking methotrexate for other diseases.

Despite the small numbers involved and the presence of background rheumatoid arthritis, these patients reported significantly lower symptom scores than patients not taking methotrexate.

The misregulation of the JAK/STAT signaling pathway in humans is central to the development of Myeloproliferative neoplasms (MPNs), the collective term for progressive blood cancers like ET and PV and is also central to many inflammatory processes such as those associated with

rheumatoid arthritis.

Lab-based results showed that low doses of methotrexate acted as a powerful suppressor of JAK/STAT pathway activation—even in cells carrying the mutated gene responsible for MPNs in patients.

Dr. Zeidler said: "While we still need to undertake a clinical trial to validate these findings, our results are very encouraging and suggest that a simple drug that has been used for nearly 40 years to treat arthritis can provide significant relief to blood cancer sufferers.

"Patients we tested showed a pronounced improvement in symptoms, something conventional treatments have been unable to provide.

"Given the very low cost of MTX, this research could offer an effective therapy on a budget accessible to healthcare systems throughout the world—marking a potentially substantial clinical and health economic benefit."

An 81 year old PV patient based in California commented:

"Methotrexate seemed to do a very nice job of controlling itching and night sweats. My subjective experience of MTX was of a PV holiday."

MTX has been used for 40 years to treat inflammatory diseases including rheumatoid arthritis, Crohn's [disease](#) and psoriasis. Even though the mechanisms by which MTX acts in these diseases had not previously been understood, the safety and effectiveness of MTX is well documented and many millions of patients regularly take the drug. Diseases such as [rheumatoid arthritis](#) all feature [inflammatory processes](#) driven by JAK/STAT activity and the effectiveness of MTX in these inflammatory diseases may well be a consequence of its ability to dampen the JAK/STAT pathway.

The results of the study have been published in the *British Journal of Haematology*.

Provided by University of Sheffield

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