Cellular biomarkers of disease onset, progression and response to treatment for rheumatoid arthritis

Rheumatoid arthritis (RA) is an autoimmune disease which causes inflammation, pain, swelling and stiffness in the joints. This can rapidly damage cartilage and bone, leading to significant joint destruction and functional disability. Currently we cannot predict who will develop severe, erosive disease, or who will respond to treatment. As the treatments are very expensive, 'trial and error' is not cost effective. Introduced early, biological therapies consistently produce better long-term outcomes, limiting joint damage and disability and allowing employment. Our research focuses on people with, or at risk of, RA. We seek to understand the evolution of RA and identify cellular/soluble biomarkers to predict disease onset and potential new targets for therapy.

Identifying those at risk of developing RA remains problematic. Not all the individuals whose blood contains autoantibodies (ACPA) go on to develop RA, and we have not yet identified blood or cellular biomarkers that can accurately predict it. RA patients and at-risk individuals with ACPA have taken part in a study of blood monocytes as potential biomarkers under Professor Ursula Fearon at Trinity Biomedical Sciences Institute with the Centre for Arthritis and Rheumatic Diseases at St Vincent's University Hospital (www.rheumatologytcd.com). Monocytes are involved in joint inflammation, and detecting them early may indicate that RA symptoms are likely to set in.

"This research will lead to a better understanding of disease onset and progression."

Professor Ursula Fearon
Professor of Molecular Rheumatology
Trinity College Dublin

We studied the hyper-inflammatory and hyper-metabolic nature of these monocytes, and showed how they migrate to the joints and set off further inflammation there. Identifying these cells at a pre-disease stage may therefore help us predict the onset of RA and start treatment early (which saves both cost and suffering), and also suggest new lines of treatment through metabolic reprogramming of cells.