Juvenile Idiopathic Arthritis

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Juvenile idiopathic arthritis (JIA) is chronic swelling in the joints of children and affects 1 in 1000 children in the UK. JIA is defined as joint inflammation commencing before the age of 16, of duration greater than 6 weeks and of unknown origin. Complex genetic and environmental influences contribute to JIA onset. A number of subtypes of JIA exist based on the ILAR (International League of Associations for Rheumatology) criteria. It should be noted that not all these childhood subtypes occur in adult inflammatory arthritis.

JIA: a collection of conditions

Systemic JIA is somewhat distinct from the other JIA subtypes and is characterised by a daily fever peaking at over 39°C and rash. Two additional subtypes are defined on the number of joints affected during the first six months of disease: oligoarthritis patients have arthritis in 1 to 4 joints whereas polyarthritis patients have five or more joints affected. Additional classifications clarify whether an oligoarthritis patient has an increased number of affected joints after this six-month interval. Patients with oligoarthritis typically have swollen, painful knees and ankles. It should be noted that further subtypes exist and are not discussed here.

Immune system dysfunction in JIA

Given the heterogeneity between and within subtypes it is perhaps unsurprising that a number of different alterations of the immune system have been characterised. In systemic arthritis, levels of the proinflammatory cytokine **IL-6** are raised in the circulation and increase further with the peak of disease. Recent small trials have shown that a monoclonal antibody blocking the IL-6 receptor has had a favourable outcome in reducing the clinical symptoms in systemic arthritis. **Regulatory T cells** (Tregs) turn off the immune response of other T cells and it has been shown that a higher number of Tregs are found in the joint fluid of JIA patients with the mild form of oligoarticular arthritis, whereas lower numbers are present in the more severe form of oligoarticular arthritis, where more joints are involved.

Treatment for JIA

The main treatments for JIA are removal of fluid by joint aspiration and injection of steroids into the affected joints, and the antifolate drug methotrexate to which approximately 65% of patients respond. For patients who respond poorly to methotrexate treatment, several treatments also exist to block different proinflammatory cytokines (specifically **TNF alpha**, **IL-1**, **IL-6**) and research is in progress to aim for personalised medicine of selecting the most appropriate treatment for each patient at clinical presentation.