

# Rheumatoid Arthritis



Rheumatoid arthritis is an inflammatory disease affecting about 1.3 million adults, and causes pain, swelling, stiffness, and loss of function in the joints. Several features make it different from other kinds of arthritis – such as generally occurring in a symmetrical pattern. This means that if one knee or hand is involved, the other one also is. The disease often affects the wrist joints and the finger joints closest to the hand, but it can also affect other parts of the body besides the joints.

Rheumatoid arthritis (RA) occurs in all races and ethnic groups. The cause of the disease is not known, but it is believed to be an autoimmune disease (an illness that occurs when the body mistakenly detects its own tissue as foreign and attacks itself). Although the disease often begins in middle age and occurs with increased frequency in older people, children and young adults also develop it. Like some other forms of arthritis, rheumatoid arthritis occurs much more frequently in women than in men.

## Yesterday

- Treatments for the pain, swelling, dysfunction and disability resulting from the inflammation and joint deformity of RA were limited to aspirin, colloidal gold and steroids.
- Although they relieved symptoms, steroids did not retard disease progression and had serious side effects including hypertension, diabetes, osteoporosis and cataracts. Similarly, aspirin and gold had limited effectiveness and significant side effects.
- Drugs such as methotrexate and cyclosporine were also used, but they were insufficient in some patients, ineffective in other patients, and had intolerable side effects.
- Patients with RA had a 10-20 year shortened lifespan due to infection, premature atherosclerosis, cancer and other causes.
- During this period, treatment evolved to include non-steroidal anti-inflammatory medicines that reduce swelling and pain, but do not influence the deforming progression of the disease.

## Today

- Diagnosis of RA, to distinguish it from other inflammatory diseases, has improved with the identification of highly-specific antibodies (proteins made by the immune system that are normally used to fight invading pathogens, such as bacteria and viruses) and autoantibodies, which mistakenly detect the body's own tissues as foreign.



**Subcutaneous nodules from rheumatoid arthritis**  
Photo courtesy of J. Cush, 2002

- Research in animal models of arthritis and on tissue from patients undergoing joint replacement, provided remarkable insight into the disease process. Additionally, better characterization of the inflammatory process led to the identification of several molecules to be targeted for novel drug development.
- Many biologics—drugs in the form of biological molecules, such as antibodies—have become available. Because of the specific targeting, the biologics have helped many RA patients for whom other treatments were inadequate, with fewer side

effects. Biologics have also been shown to be safe and effective for many pediatric arthritis patients.

- Several of the biologics in wide use for RA block the activity of molecules involved in inflammation and immune-system regulation, such as tumor necrosis factor alpha (TNF- $\alpha$ ) and interleukin 6 (IL-6).

## Tomorrow

Ongoing NIH-funded studies are identifying the genetic and molecular details that contribute to the variation in RA across the patient population, which may affect responses to the growing number of RA treatments. These findings are already helping to match appropriate drugs for the management of individual patients.

- A larger arsenal of autoantibodies and other immune system molecules may be used for early diagnosis of specific RA subtypes, and determination of the disease severity. This would allow therapeutic intervention before irreversible tissue damage occurs, and personalization of treatments.
- Identification and better understanding of genetic, developmental, environmental, and other triggers that initiate disease in susceptible individuals will lead to preemptive strategies.
- New insights into the nervous system's processing of pain signals in chronic diseases will produce improved interventions for alleviating pain in RA patients.
- Participation of patients in clinical research is one of the best ways to advance new knowledge and contribute to the development of new treatments.

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