

Research Agenda

Arthritis Foundation Research Program 2008

Leading the Way

Research holds the key to tomorrow's advances in preventing, controlling and curing arthritis and provides hope for a future free of arthritis pain for the 46 million men, women and children with doctor-diagnosed arthritis. Although much more work remains, Arthritis Foundation-funded researchers are making significant progress.

Prevention

- Vaccines to prevent Lyme disease are being developed. An education intervention for schools is being created for use in conjunction with a program to reduce habitats for mice and ticks in residential areas.
- Risk factors for osteoarthritis (including obesity, inactivity and knee malalignment) have been identified and programs to help people prevent the disease's devastating effects are being developed.
- A high rate of cardiovascular disease in people with rheumatoid arthritis (RA) and lupus has been demonstrated. Scientists highlight the need for people to monitor their heart health and manage risk factors.

Control

- Self-management and physical activity have been proven to improve quality of life for people with arthritis.
- Discoveries about the immune system and inflammation led to breakthrough drugs that have potential, with early treatment, to induce disease remission.
- New imaging techniques and biomarker tests show promise in detecting early signs of disease, allowing for early treatment.

Toward Cures

- Basic science research has led to the identification of new targets for arthritis therapy.
- Identification of genetic risk factors is leading to earlier diagnosis, prediction of disease course and new therapies to block the effects of harmful genes.
- Cutting-edge microarray technology is leading to vaccine-like therapy that could turn off a malfunctioning immune response.
- Innovative bioengineered materials are being developed that can resurface worn cartilage or replace missing tissue.

Facts & Figures:

- The Arthritis Foundation is the largest private nonprofit supporter of arthritis research in the world:
 - Approximately \$400 million contributed to research since 1948.
 - Nearly \$13 million distributed in the 2007 research year.
 - Annually fund 200 to 300 researchers in 100 institutions nationwide.
- The Foundation's rigorous, impartial peer review process ensures that only the best quality science in the country gets funded.
- The Foundation fills a critical niche unmet by government and industry:
 - Support for the training and career development of young researchers brings new researchers into the field.
 - Funding for high-risk, innovative projects fosters new ideas that could become tomorrow's treatments and possible cures.
- Every year, research projects judged to be meritorious go unfunded due to a lack of funds.

Our Dream for the Future

Given adequate funding, we predict that in the next 10 to 25 years:

- Genetic studies will identify specific genes associated with the different types of arthritis, leading to genetic testing and therapy directed at the products of genes.
- Epidemiologic studies will clarify many of the risk factors and triggers that initiate arthritis.
- Diagnosis before the onset of symptoms will be possible using biomarkers and imaging tests.
- Treatment will be highly individualized, using very specific biologic agents and gene therapy.
- Early diagnosis and individualized treatment will increase the incidence of remissions and reduce complications, disability and premature death.
- Vaccines will be developed to prevent some forms of arthritis.
- Joint reconstruction and tissue engineering will replace defective cartilage and resurface joints.

Making a Difference...

In Rheumatoid Arthritis

Rheumatoid arthritis (RA) affects 1.3 million Americans, including nearly 1 million women. In RA, the body's immune system attacks itself, resulting in chronic inflammation that affects multiple organ systems in the body. In 2007, the Arthritis Foundation funded more than 95 studies related to RA, representing a total commitment of approximately \$6 million. Arthritis Foundation-funded research is improving the lives of people with RA by:

- Increasing our understanding of bone biology, laying the basis for new therapies to prevent disabling bone destruction.
- Increasing our understanding of genetic and environmental factors in the development of RA.
- Identifying how immune cells and inflammatory molecules contribute to joint damage, which has led to the development and testing of targeted therapies to block their effects.
- Creating substances that can replace damaged joint tissue, or help the body rebuild healthy tissue.
- Providing insights and testing tools that can be used to detect RA early, predict disease severity and help ensure the most appropriate treatment.
- Evaluating exercise and coping interventions to help people with RA take control and improve their quality of life.

In Osteoarthritis

Osteoarthritis (OA) is the most common form of arthritis, affecting nearly 27 million Americans. In OA, the cartilage that cushions the ends of the bones erodes away, leading to progressive changes in the bone and supporting tissues. OA can result in debilitating pain and stiffness, loss of mobility and function, and eventually disability. In 2007, the Arthritis Foundation funded 55 studies related to OA, representing a total commitment of approximately \$3.5 million. Arthritis Foundation-funded research is improving the lives of people with OA and those at risk by:

- Increasing our understanding of genetic and mechanical factors that contribute to OA, which may lead to new prevention strategies.
- Providing greater insights into the basic mechanisms responsible for cartilage breakdown in OA, laying the basis for new therapies to prevent and repair cartilage damage.
- Engineering tissue and other biomaterials to rebuild or replace cartilage and to improve joint replacement implants for those with irreparable damage.
- Evaluating exercise and coping interventions to help people with OA reduce their pain and improve function.
- Developing imaging tools and lab tests to detect OA early so that treatment can be started before significant damage occurs.

In Juvenile Arthritis

Juvenile arthritis (JA) is a general term for arthritis and related conditions that occur by age 16, and affects nearly 300,000 children in the United States. The most common form of arthritis in children is juvenile idiopathic arthritis (also called juvenile rheumatoid arthritis), which is characterized by chronic joint inflammation and can also affect multiple organs, such as the eyes, heart lining and lymph nodes. In 2007, the Arthritis Foundation funded 15 grants and contracts related to JA, representing a total commitment of approximately \$1.2 million. Arthritis Foundation-funded research is improving the lives of children with JA and their families by:

- Identifying risk factors that predict more severe disease to help guide treatment and better inform families of what the future might hold for their children.
- Evaluating the effectiveness of different behavioral approaches, such as online support groups and physical activity programs to improve function and quality of life of children with arthritis and their families.
- Providing data about the costs and long-term effectiveness of therapies to help families and their doctors make informed decisions.
- Supporting the Childhood Arthritis and Rheumatology Research Alliance (CARRA), a multicenter collaboration that will increase the number of children who participate in clinical research studies, which will reduce the time it takes to achieve valid results.
- Clarifying the role of genetic factors, which will help doctors diagnose the various forms of JA more quickly and could lead to new approaches to treatment or even prevention.
- Increasing understanding of how the immune system malfunctions in JA, which could lead to more effective, targeted therapies.