

SPOTLIGHT ON RESEARCH

2012 National Research Program  **ARTHRTIS FOUNDATION**
Take Control. We Can Help.™

WINTER 2011-2012

Combating Arthritis

For more than six decades, the Arthritis Foundation has dedicated itself to finding the causes and effective treatments for osteoarthritis, rheumatoid arthritis and juvenile arthritis. Now, the Arthritis Foundation is championing the development of personalized medicine for people with arthritis to ensure that they receive the most appropriate interventions for their specific disease. The ultimate goal is to find a cure.

BY JO CAVALLO

The statistics are staggering. According to a study by the Centers for Disease Control and Prevention, 50 million American adults now suffer from arthritis, an increase of four million in just four years. By 2030, that number is expected to climb to 67 million. What's more, the study also found that nearly half of those sufferers (over 21 million) have limitations in their daily activities because of their illness. The impact of the disease on the United States economy is equally devastating with costs from lost productivity and direct medical spending soaring to \$128 billion each year.

Since 1948, the Arthritis Foundation has sought to uncover the causes of osteoarthritis (OA), rheumatoid arthritis (RA) and juvenile arthritis (JA) and to fund targeted research to develop more effective and safer drugs, with the ultimate goal of finding cures for these debilitating diseases. During that time the Foundation has supported the training of more than 1,300 postdoctoral fellows in arthritis research and funded over \$411 million in arthritis research.

The accomplishments from the Foundation's early efforts include the discovery that arthritis is an autoimmune disease; improvements in joint replacement surgeries; and the discovery of the first anti-inflammatory drugs. The Foundation was also instrumental in the establishment of the National Institute of Arthritis and Musculoskeletal and Skin Diseases, which supports research in a

broad range of diseases that cause arthritis. Subsequently, the Foundation led the effort to identify genes that are linked with the development of RA. This work has been extended to search for genes linked to the development of OA and JA. These studies provide the foundation needed to identify who is at risk for contracting these diseases and for determining the most effective treatments based on the patient's own genetic biomarkers—an approach now referred to as personalized medicine.

Most recently, research activities of the Foundation have focused specifically on the most urgent needs of people with arthritis. For example, the sponsorship of research to find ways to direct drugs directly to joints; discover more effective interventions for pain; and learn how to rebuild damaged joints through the use of stem cells.

"We want advances in biomedical science and drug discovery to reach the hands of patients as quickly as possible," says John Klippel, MD, President and CEO of the Arthritis Foundation. "I see the Arthritis Foundation very much as a catalyst in stimulating innovation and in moving research forward so that people with arthritis can benefit from the research as quickly as possible."

Some examples of the Foundation's partnerships include a new initiative with the National Institutes of Health to facilitate the discovery of biomarkers in OA and the Department of Defense to investigate the impact arthritis has on soldiers' joints. Information from these studies can be applied to the general population with benefit to all who suffer from arthritis.

Funding Objectives

Although the Foundation is working with these agencies to facilitate research in these areas, it continues to fund most arthritis research

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on its own and the need for private support has never been greater. “We’re at a critical juncture in the funding of biomedical research in arthritis and there is a real sense of urgency for the Foundation to rededicate its efforts to fund arthritis researchers,” says Dr. Klippel.

The Foundation’s national objectives include:

- Setting the national arthritis research agenda and aligning efforts behind it

- Driving the achievement of goals that can produce major benefits for people with arthritis within the next five years
- Continuing to develop the next generation of arthritis research leadership

The following pages detail the Foundation’s Flagship Initiatives for RA, JA and OA and how your donations will help us get closer to the cure for these diseases. For donation information, see page 4.

Rheumatoid Arthritis (RA) affects more than 1.3 million people in the U.S. Rheumatoid arthritis is an autoimmune disease in which the body’s own immune system mistakenly attacks healthy tissue. While the disease causes pain and inflammation of the joints and surrounding tissues, it can also affect other organs in the body.

Although effective drugs already exist in the treatment of RA, physicians are not yet able to identify which patients will benefit most from a specific drug, oftentimes leading to a hit-and-miss approach in treatment. A delay in effective treatment can make the disease more difficult to control and result in irreversible joint damage and permanent disability. Scientists led by John Hardin, MD, Vice President for Research for the Arthritis Foundation, are focusing on ascertaining how to achieve personal-

ized medicine for each patient with RA. To date, scientists have been able to isolate 32 genes that correlate to RA onset, but those genes only account for about 20 percent of the cases of RA, so additional research needs to take place to learn what other genes are involved, as well as the role the environment plays in the development of RA.

Women get RA more often than men and although the exact causes of RA are unknown, infection, genes and hormonal changes may be linked to the disease.

RHEUMATOID ARTHRITIS FLAGSHIP INITIATIVE

Goal: To achieve personalized treatment for people with RA, by:

- Gaining an understanding of the most effective uses of existing drugs
- Developing new drugs that are safer and more effective
- Improving drug accessibility
- Developing the ability to identify who is at risk for contracting RA
- Determining how to tailor treatments to each individual’s disease characteristics

Plan:

- Developing large-scale patient registries to correlate genetic profile and clinical presentation with treatment outcome to identify biomarkers that predict how individual patients will respond to specific single-agent medications and drug combinations
- Determining how to tailor treatments to each individual’s disease characteristics

TIMETABLE FOR RESULTS

With investments in the Rheumatoid Arthritis Flagship Initiative, the Foundation predicts this timetable for results.

2012

Patient registry data collection began in 2011 and continues

2014

Initiate whole genome scans; expand genetic database

2016

Genes linked with clinical outcomes and responses to treatments

2020

Genetic profiles are used to tailor individual treatment

DID YOU KNOW?

- Smoking may play a role in one-third of severe cases of RA
- RA can affect people at any age
- RA is a chronic disease that is characterized by periods of disease flares and remissions
- Chronic inflammation of RA can cause permanent joint deformity
- Treatment for RA usually consists of a combination of rest and exercise, joint protection, medications and surgery

Juvenile Arthritis (JA) is a general term for all types of arthritis that occur in children, including juvenile idiopathic arthritis (JIA), lupus, myositis and dermatomyositis. JA is one of the most common diseases found in children, affecting about 300,000 adolescents and children under the age of 16.

The term juvenile idiopathic arthritis actually encompasses several diseases all of which are different from adult onset rheumatoid arthritis, and all the subtypes may be biologically different as well. The three main subtypes of JIA are oligoarticular (formerly known as pauciarticular), which typically affects four or fewer joints, usually the knees, ankles or elbows. The most common subtype of JIA, oligoarticular is diagnosed in about 50 percent of all children with juvenile arthritis. About 30 percent of children are diagnosed with polyarticular JIA in which five or more smaller joints, such as the hands and feet, are affected, although large joints can be affected as well. Generally, polyarticular JIA is found more often in girls than in boys. The third subtype is systemic onset JIA in which the whole body is affected. The least common form of JIA, systemic juvenile arthritis affects

about 20 percent of children with JIA and can cause spikes in fever, rash and inflammation of internal organs such as the heart, liver, spleen and lymph nodes.

An incurable autoimmune disease, JIA can have a devastating, long-term impact on children, producing severe joint and tissue damage and even prohibit bone development and growth, greatly affecting the quality of life of patients. About half the children afflicted with JIA will outgrow their disease and about half will continue to have arthritis for the rest of their lives. If inadequately treated, this type of JIA can result in lifelong severe joint problems.

Since 2001, the Arthritis Foundation has helped fund the Childhood Arthritis & Rheumatology Research Alliance (CARRA), a national network of pediatric rheumatologists dedicated to basic, translational and clinical research in JIA.

JUVENILE ARTHRITIS FLAGSHIP INITIATIVE

Goal: To achieve rapid, personalized treatment for JA, by;

- Gaining an understanding of the most effective uses of existing drugs
- Developing new drugs that are safer and better for children
- Improving drug accessibility
- Identifying who is at risk for JA
- Creating strategies to rapidly reduce or prevent the effects of JA

Plan:

- Ensuring that all children with JA are enrolled in the CARRA registry and specialized care
- Conducting research to understand genetic and other factors that relate to JA and individual responses to treatment
- Developing personalized medicine approaches

TIMETABLE FOR RESULTS

With investments in the Juvenile Arthritis Flagship Initiative, the Foundation predicts this timetable for results.

2012

CARRA data collection registry continues

2014

Initiate whole genome scans and comparison of treatments with disease outcomes; best treatment practices identified; genetic database expanded

2016

Genes linked with clinical outcomes and responses to treatment

2020

Genetic profiles are used to tailor treatment to individuals (personalized medicine)

DID YOU KNOW?

- JA is one of the most common chronic childhood diseases, occurring nearly as often as juvenile diabetes
- JA refers to any form of arthritis or an arthritis-related condition that develops in children or adolescents under age 16
- There are about 827,000 doctor visits each year related to JA
- There are 83,000 emergency room visits each year due to JA
- There is no known cause of JA

Osteoarthritis (OA), a degenerative joint disease, is the most common form of arthritis, affecting more than 27 million people in the U.S.—more than any other joint disease. To date, the Arthritis Foundation has awarded more than \$150 million dollars in OA research.

Currently, each year about one million people undergo joint replacement surgery, most of whom have OA. By 2030 that figure is expected to skyrocket to three million. In addition to the huge cost burden OA places on society—upwards of \$60 billion a year—there are not enough orthopedic surgeons to

take care of the projected increasing number of OA patients, so a better approach to treat the disease needs to be found.

Although the exact causes of OA are unknown, advancing age—about half of those over age 65 have osteoarthritis—obesity and joint injury are all contributing factors for disease onset.

OSTEOARTHRITIS FLAGSHIP INITIATIVE

Goal: To create the ability to stop OA from developing and find more effective therapies to treat the disease, by:

- Determining predictors and causes of OA
- Identifying who is at risk for developing OA and why
- Detecting OA at its earliest stage before the effects of the disease are present
- Identifying treatment interventions to stop disease progression

Plan:

- Utilizing new magnetic resonance imaging technology that can detect the early onset of OA, before there is joint damage
- Using the research knowledge gained in identifying biomarkers that contribute to OA onset
- Developing targeted treatments for OA

TIMETABLE FOR RESULTS

With investments in the Osteoarthritis Flagship Initiative, the Foundation predicts this timetable for results.

2013

Biomarkers for OA are identified; intervention trials to validate selected biomarkers begin and existing drug compounds are tested for their ability to modulate OA biomarkers

2018

Compounds that might alter the outcome of OA are identified; clinical trials of selected compounds are launched

2023

Medications to slow or stop progression of presymptomatic OA are available for FDA review

DID YOU KNOW?

- OA typically affects certain joints such as the hips, hands, knees, lower back and neck
- OA is characterized by the breakdown of cartilage, which can cause stiffness and pain
- After the age of 50, more women are affected by OA than men
- Loss of joint function as a result of OA is a major cause of work disability and reduced quality of life

DONATE NOW

HOW YOU CAN MAKE HISTORY

The Flagship Initiatives for osteoarthritis, rheumatoid arthritis and juvenile arthritis detailed on the previous pages can't be accomplished without your financial support. By becoming our partner in working to understand why arthritis develops, who is at risk for developing the disease and what are the most effective treatments to stop arthritis progression, you help ensure that the ultimate goal of finding a cure will be realized.

Here's how you can help make history in bringing an end to arthritis:

Named Flagship Funds

Under this program, donors making a commitment of \$1 million or more can establish Flagship Funds that support all of the activities outlined in each of the Flagship Initiatives on the previous pages, including:

- Investigations directed at answering the key questions into the causes of OA, RA and JA; discovering the biomarkers responsible for disease onset; and developing targeted treatment based on each patient's genetic factors to maximize treatment effectiveness
- The launching of research conferences so scientists can share information, report study findings and accelerate progress
- The building of core infrastructure elements, including having the necessary staff required to support the peer review operational process; tracking the progress of funded research projects; and reporting the progress being made in the research program to our supporters, volunteers and staff
- Increasing our advocacy efforts to mobilize both public and private involvement in additional funding for our three Flagship Initiative objectives

Named Innovative Research Funds

Donors making commitments of \$250,000 or more can establish Innovative Research Grants to support research goals in our three Flagship Initiatives, including:

- Identifying the genetic biomarkers responsible for the development of OA, RA and JA
- Making personalized medicine for people with OA, RA and JA a reality
- Defining the standard of care for children with JA

Named Research Career Development Funds

The future of arthritis research depends on the constant infusion of new talent and ideas. To attract the best and brightest minds to the field, the Arthritis Foundation has established Research Career Development Funds, a program that assists young scientists with outstanding potential in establishing lifelong careers in arthritis research. With commitments of \$150,000 or more, donors can establish named Research Career Development Funds.

General Contributions

With annual support of \$10,000 or more, donors make it possible to contribute to programs in the Flagship Initiatives wherever the need is greatest.

To make a donation, click here Spotlightnewsletter.kintera.org. To request more information about our National Research Program or to make a comment about this newsletter, e-mail us at Spotlight@arthritis.org.