ARTHRITIS FOUNDATION®
Take Control. We Can Help.™

www.arthritis.org
800-283-7800

The Immune System and Your Arthritis

WHAT IS THE IMMUNE SYSTEM?

The immune system is your body's natural defense against infections, such as bacteria and viruses. Through a well-orchestrated reaction, your body attacks and destroys invading infectious organisms. When working properly, the immune system protects you from infections that might otherwise make you sick or even take your life.

As scientists try to learn how the immune system works, they have been able to piece together a general picture of a highly detailed and sophisticated process. Ongoing research is providing more information about how the immune system works and what happens when it does not function properly.

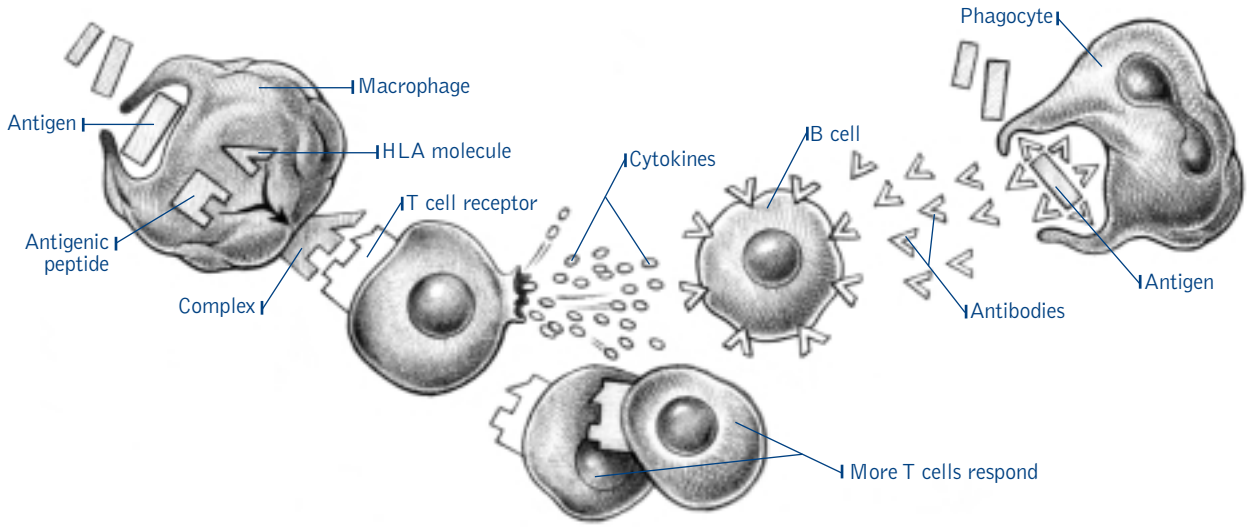
THE IMMUNE PROCESS

In general, the immune process works like this: An infectious agent enters the body. Maybe it's a cold virus that gets in through your nose or a bacterium that enters your bloodstream when you step on a nail. Your immune system is constantly on alert to detect and destroy an infection before it causes damage. Whatever the infection, your immune system recognizes it as a foreign body called an antigen. And antigens must be eliminated.

Your body's first line of defense is a group of specialized immune cells called macrophages. These cells roam the bloodstream, mucus and other bodily fluids keeping watch for foreign antigens. When an invader enters, a macrophage engulfs it. Enzymes inside the macrophage break the antigen into small pieces called antigenic peptides. Sometimes this process alone is enough to get rid of the invader. However, in most cases, other cells of the immune system must join the fight.

But before these other cells can begin their work, the antigenic peptides must unite with a human leukocyte antigen (HLA) molecule inside the macrophage. The HLA molecule moves to the outside of the macrophage once it's bound to the peptide, forming a complex.

Meanwhile, white blood cells called T lymphocytes (or more simply, T cells) have struc-



The immune system has many components to help carry out the elaborate steps of the immune process.

tures called T- cell receptors on their surfaces that recognize and interact with the antigenic peptide/HLA complex.

Once attached to the complex, T cells send chemical signals called cytokines, which help to bring in more T cells, and alert another type of lymphocyte called B cells to produce antibodies. The antibodies are set free into the body to find and bind to more antigens so the foreign invaders won't be able to multiply and make you sick. In the final step of this process, a scavenger cell called a phagocyte removes the antigen from the body.

To better understand how the immune process works, refer to the illustration above.

WHAT IS AUTOIMMUNITY?

Normally, the immune process is reserved for the viruses, bacteria or any other infectious agents that threaten your health. But if a glitch occurs, the very system designed to protect you can instead turn against you.

When the immune system doesn't work properly, it cannot tell the difference between its own cells and foreign cells. Instead of fighting foreign antigens, the cells of the immune system or the antibodies it produces may attack your body's own cells by mistake.

This process is known as autoimmunity (auto = self). The attackers are known as autoreactive lymphocytes or autoantibodies. This faulty immune system response contributes to various autoimmune diseases, including several forms of arthritis.

AUTOIMMUNE DISEASES

There are many examples of autoimmune diseases, such as lupus, myositis and rheumatoid arthritis (RA). This brochure will focus on what happens in the immune system of someone with RA.

Some parts of the immune system are overactive in people with RA. For example, lymphocytes gather in the lining of the affected joints in people with RA. The resulting inflammation contributes to cartilage damage and bone erosion. However, sometimes cartilage damage and bone erosion can occur without obvious inflammation. (See figures 1 and 2 to compare a healthy joint to a joint affected by RA.) Most people with RA also have an autoantibody called rheumatoid factor.

In addition, certain cytokines – proteins that serve as chemical messengers between cells – have been identified as key players in the inflamma-

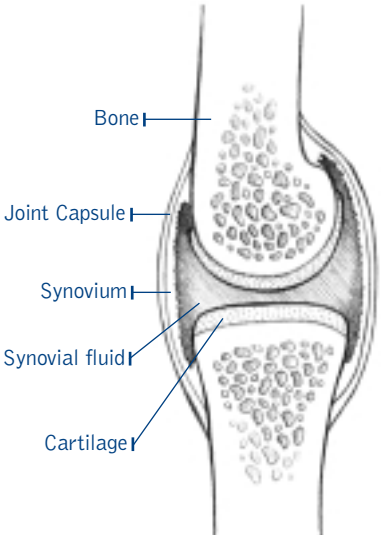


FIGURE 1 – Healthy Joint

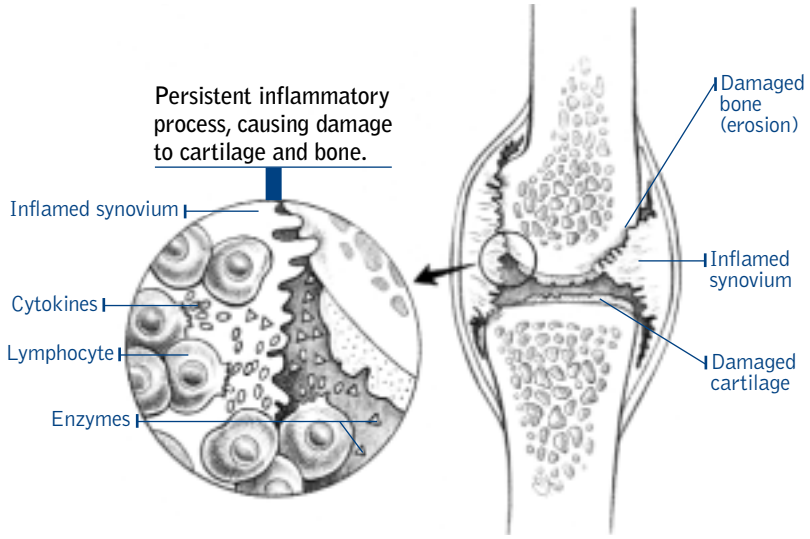


FIGURE 2 – Joint With Rheumatoid Arthritis

tory response and disease progression seen in RA. Scientists believe the cytokines known as *tumor necrosis factor* (TNF) and interleukin 1 (IL-1) contribute to the pain and swelling that occurs in inflamed joints. In people with RA, these pro-inflammatory forces outweigh the mechanisms attempting to keep the inflammation in check.

No one knows what causes an autoimmune disease, but several factors probably are involved. These may include viruses and environmental factors, certain chemicals and some drugs, all of which may damage or alter body cells. Sex hormones may play a role, because most autoimmune diseases are far more common in women than in men. Heredity also is involved.

TREATING AUTOIMMUNE DISEASES

Many types of therapies are used to treat autoimmune diseases. For arthritis and arthritis-related conditions, traditional treatments include nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen and naproxen; glucocorticoids, such as cortisone and prednisone; and disease-modifying antirheumatic drugs (DMARDs), such as methotrexate.

Unlike traditional arthritis medications, which broadly suppress immune function, biologic response modifiers used to treat RA specifically block the immune system components that cause the inflammation or damage associated with the disease.

Advances in Biotechnology

Researchers have made a lot of progress over the past several years in understanding rheumatoid arthritis and how the disease affects a person's body. This knowledge has led to the development of the class of treatment known as biologic response modifiers.

Etanercept (*Enbrel*), the first biologic response modifier approved by the Food and Drug Administration (FDA) to treat rheumatoid arthritis, works by blocking the activity of tumor necrosis factor, one of the major cytokines involved in RA.

Infliximab (*Remicade*), also recently approved by the FDA to treat RA, uses a monoclonal antibody, a specifically engineered version of the body's infection fighters, to fight TNF.

Another biologic response modifier, which has not yet received FDA approval, called recombinant human interleukin-1 receptor antagonist (IL-1Ra), works by blocking IL-1. IL-1 is another cytokine in the body that plays a role in driving inflammation and causing joint damage.

Biologic response modifiers offer a new approach to the treatment of RA. As scientists

learn more about how the immune system works, they may develop more specific and powerful agents to battle autoimmune diseases such as rheumatoid arthritis.

Services

- Arthritis Self-Help Course – Learn how to take control of your own care in this six-week (15-hour) class.
- Warm-water exercise program – Join in the fun of a six- to 10-week exercise program in a heated pool.
- Land exercise program – Move easier in several levels of exercise classes, or exercise at home by purchasing an Arthritis Foundation exercise videotape.
- Support groups and clubs – Share your successes and challenges with others, and get tips on how to overcome problems caused by arthritis.

THE ARTHRITIS FOUNDATION

The mission of the Arthritis Foundation is to improve lives through leadership in the prevention, control and cure of arthritis and related diseases.

The Arthritis Foundation supports research with the greatest potential for advances and has invested more than $320 million in these efforts since its inception in 1948. Additionally, the Arthritis Foundation supports key public policy and advocacy efforts at a local and national level in order to make a difference on behalf of 70 million people living with arthritis.

As your partner in taking greater control of arthritis, the Arthritis Foundation also offers a large number of programs and services nationwide to make life with arthritis easier and less painful and to help you become an active partner in your own health care.

Contact us at (800) 283-7800 or visit us on the Web at www.arthritis.org to become an Arthritis Advocate or to find out how you can become involved.

The Arthritis Foundation acknowledges with appreciation James O'Dell, MD, University of Nebraska Medical Center, Omaha; David A. Fox, MD, University of Michigan Medical Center, Ann Arbor; and Laura Robbins, DSW, Hospital for Special Surgery, New York, for their assistance with this brochure.

For more information: The Arthritis Foundation offers a wide variety of books, brochures and videos about different forms of arthritis, treatment and self-management techniques to help you take control of your arthritis. To order any of these products, become an Arthritis Foundation member or to subscribe to the Arthritis Foundation's award-winning consumer health magazine, *Arthritis Today*, call (800) 283-7800. Call or visit our Web site (www.arthritis.org) to find out how you can take control of your arthritis and start living better today!

This brochure has been reviewed by the AMERICAN COLLEGE OF RHEUMATOLOGY.

AMERICAN COLLEGE OF RHEUMATOLOGY
EDUCATION • TREATMENT • RESEARCH

MISSION STATEMENT:
The mission of the Arthritis Foundation is to improve lives through leadership in the prevention, control and cure of arthritis and related diseases.

ASSOCIATION OF RHEUMATOLOGY HEALTH PROFESSIONALS
A DIVISION OF THE AMERICAN COLLEGE OF RHEUMATOLOGY

ARTHRITIS FOUNDATION®
Take Control. We Can Help.™

www.arthritis.org
800-283-7800