

Resources

BOOKS

Jacobs, David S., et al. *Laboratory Test Handbook*. 4th ed. New York: Lexi-Comp Inc., 1996.

Pagana, Kathleen Deska. *Mosby's Manual of Diagnostic and Laboratory Tests*. St. Louis: Mosby, Inc., 1998.

Janis O. Flores

Adrenogenital syndrome see **Adrenal virilism**

Adrenoleukodystrophy

Definition

Adrenoleukodystrophy is a rare genetic disease characterized by a loss of myelin surrounding nerve cells in the brain and progressive adrenal gland dysfunction.

Description

Adrenoleukodystrophy (ALD) is a member of a group of diseases, leukodystrophies, that cause damage to the myelin sheath of nerve cells. Approximately one in 100,000 people is affected by ALD. There are three basic forms of ALD: childhood, adult-onset, and neonatal. The childhood form of the disease is the classical form and is the most severe. Childhood ALD is progressive and usually leads to total disability or **death**. It affects only boys because the genetic defect is sex-linked (carried on the X chromosome). Onset usually occurs between ages four and ten and can include many different symptoms, not all of which appear together. The most common symptoms are behavioral problems and poor memory. Other symptoms frequently seen are loss of vision, seizures, poorly articulated speech, difficulty swallowing, deafness, problems with gait and coordination, **fatigue**, increased skin pigmentation, and progressive **dementia**.

The adult-onset form of the disease, also called adrenomyeloneuropathy, is milder, progresses slowly, is usually associated with a normal life span, and usually appears between ages 21-35. Symptoms may include progressive stiffness, weakness, or **paralysis** of the lower limbs and loss of coordination. Brain function deterioration may also be seen. Women who are carriers of the disease occasionally experience the same symptoms, as well as others, including ataxia, hypertonia (excessive muscle tone), mild **peripheral neuropathy**, and urinary problems. The neonatal form affects both male and female infants and may produce **mental retardation**, facial abnormalities, seizures, retinal degeneration, poor

KEY TERMS

Amniocentesis—The collection of amniotic fluid through a needle inserted through the abdomen. Used to collect fetal cells for genetic analysis.

Ataxia—Loss of coordination of muscular movement.

Hypertonia—Having excessive muscular tone.

Myelin—A layer that encloses nerve cells and some axons and is made largely of lipids and lipoproteins.

Neuropathy—A disease or abnormality of the peripheral nerves.

muscle tone, enlarged liver, and adrenal dysfunction. Neonatal ALD usually progresses rapidly.

Causes and symptoms

The genetic defect in ALD causes a decrease in the ability to degrade very long chain fatty acids. These build up in the adrenal glands, brain, plasma, and fibroblasts. The build-up of very long chain fatty acids interferes with the ability of the adrenal gland to convert cholesterol into steroids and causes demyelination of nerves in the white matter of the brain. Demyelinated nerve cells are unable to function properly.

Diagnosis

Diagnosis is made based on observed symptoms, a biochemical test, and a family history. The biochemical test detects elevated levels of very long chain fatty acids in samples from **amniocentesis**, chorionic villi, plasma, red blood cells, or fibroblasts. A family history may indicate the likelihood of ALD because the disease is carried on the X-chromosome by the female lineage of families.

Treatment

Treatment for all forms of ALD consists of treating the symptoms and supporting the patient with physical therapy, psychological counseling, and special education in some cases. There is no cure for this disease, and there are no drugs that can reverse demyelination of nerve and brain cells. Dietary measures consist of reducing the intake of foods high in fat, which are a source of very long chain fatty acids. A mixture called Lorenzo's Oil has been shown to reduce the level of long chain fatty acids if used long term; however, the rate of myelin loss

is unaffected. Experimental **bone marrow transplantation** has not been very effective.

Prognosis

Prognosis for childhood and neonatal ALD patients is poor because of the progressive myelin degeneration. Death usually occurs between one and ten years after onset of symptoms.

Prevention

Since ALD is a genetic disease, prevention is largely limited to **genetic counseling** and fetal monitoring through amniocentesis or **chorionic villus sampling**.

Resources

BOOKS

Berkow, Robert. *Merck Manual of Medical Information*. Whitehouse Station, NJ: Merck Research Laboratories, 1997.

John T. Lohr, PhD

Adrenomyeloneuropathy see **Adrenoleukodystrophy**

Adult respiratory distress syndrome

Definition

Adult **respiratory distress syndrome** (ARDS), also called acute respiratory distress syndrome, is a type of lung (pulmonary) failure that may result from any disease that causes large amounts of fluid to collect in the lungs. ARDS is not itself a specific disease, but a syndrome, a group of symptoms and signs that make up one of the most important forms of lung or **respiratory failure**. It can develop quite suddenly in persons whose lungs have been perfectly normal. Very often ARDS is a true medical emergency. The basic fault is a breakdown of the barrier, or membrane, that normally keeps fluid from leaking out of the small blood vessels of the lung into the breathing sacs (the alveoli).

Description

Another name for ARDS is shock lung. Its formal name is misleading, because children, as well as adults, may be affected. In the lungs the smallest blood vessels, or capillaries, make contact with the alveoli, tiny air sacs at the tips of the smallest breathing tubes (the bronchi).

This is the all-important site where oxygen passes from air that is inhaled to the blood, which carries it to all parts of the body. Any form of lung injury that damages this point of contact, called the alveolo-capillary junction, will allow blood and tissue fluid to leak into the alveoli, eventually filling them so that air cannot enter. The result is the type of breathing distress called ARDS. ARDS is one of the major causes of excess fluid in the lungs, the other being **heart failure**.

Along with fluid there is a marked increase in inflamed cells in the lungs. There also is debris left over from damaged lung cells, and fibrin, a semi-solid material derived from blood in the tissues. Typically these materials join together with large molecules in the blood (proteins), to form hyaline membranes. (These membranes are very prominent in premature infants who develop respiratory distress syndrome; it is often called hyaline membrane disease.) If ARDS is very severe or lasts a long time, the lungs do not heal, but rather become scarred, a process known as fibrosis. The lack of a normal amount of oxygen causes the blood vessels of the lung to become narrower, and in time they, too, may become scarred and filled with clotted blood. The lungs as a whole become very "stiff," and it becomes much harder for the patient to breathe.

Causes and symptoms

A very wide range of diseases or toxic substances, including some drugs, can cause ARDS. They include:

- Breathing in (aspiration) of the stomach contents when regurgitated, or salt water or fresh water from nearly drowning.
- Inhaling smoke, as in a fire; toxic materials in the air, such as ammonia or hydrocarbons; or too much oxygen, which itself can injure the lungs.
- Infection by a virus or bacterium, or **sepsis**, a widespread infection that gets into the blood.
- Massive trauma, with severe injury to any part of the body.
- Shock with persistently low blood pressure may not in itself cause ARDS, but it can be an important factor.
- A blood clotting disorder called disseminated intravascular coagulation, in which blood clots form in vessels throughout the body, including the lungs.
- A large amount of fat entering the circulation and traveling to the lungs, where it lodges in small blood vessels, injuring the cells lining the vessel walls.
- An overdose of a narcotic drug, a sedative, or, rarely, **aspirin**.

KEY TERMS

Alveoli—The tiny air sacs at the ends of the breathing tubes of the lung where oxygen normally is taken up by the capillaries to enter the circulation.

Aspiration—The process in which solid food, liquids, or secretions that normally are swallowed are, instead, breathed into the lungs.

Capillaries—The smallest arteries which, in the lung, are located next to the alveoli so that they can pick up oxygen from inhaled air.

Face mask—The simplest way of delivering a high level of oxygen to patients with ARDS or other low-oxygen conditions.

Steroids—A class of drugs resembling normal body substances that often help control inflammation in the body tissues.

Ventilator—A mechanical device that can take over the work of breathing for a patient whose lungs are injured or are starting to heal.

- Inflammation of the pancreas (**pancreatitis**), when blood proteins, called enzymes, pass to the lungs and injure lung cells.
- Severe burn injury.
- Injury of the brain, or bleeding into the brain, from any cause may be a factor in ARDS for reasons that are not clear. Convulsions also may cause some cases.

Usually ARDS develops within one to two days of the original illness or injury. The person begins to take rapid but shallow breaths. The doctor who listens to the patient's chest with a stethoscope may hear "crackling" or **wheezing** sounds. The low blood oxygen content may cause the skin to appear mottled or even blue. As fluid continues to fill the breathing sacs, the patient may have great trouble breathing, take very rapid breaths, and gasp for air.

Diagnosis

A simple test using a device applied to the ear will show whether the blood is carrying too little oxygen, and this can be confirmed by analyzing blood taken from an artery. The **chest x ray** may be normal in the early stages, but, in a short time, fluid will be seen where it does not belong. The two lungs are about equally affected. A heart of normal size indicates that the problem actually is ARDS and not heart failure. Another way a physician can distinguish between these two possibilities is to place a catheter

into a vein and advance it into the main artery of the lung. In this way, the pressure within the pulmonary capillaries can be measured. Pressure within the pulmonary capillaries is elevated in heart failure, but normal in ARDS.

Treatment

The three main goals in treating patients with ARDS are:

- To treat whatever injury or disease has caused ARDS. Examples are: to treat septic infection with the proper **antibiotics**, and to reduce the level of oxygen therapy if ARDS has resulted from a toxic level of oxygen.
- To control the process in the lungs that allows fluid to leak out of the blood vessels. At present there is no certain way to achieve this. Certain steroid hormones have been tried because they can combat inflammation, but the actual results have been disappointing.
- To make sure the patient gets enough oxygen until the lung injury has had time to heal. If oxygen delivered by a face mask is not enough, the patient is placed on a ventilator, which takes over breathing, and, through a tube placed in the nose or mouth (or an incision in the windpipe), forces oxygen into the lungs. This treatment must be closely supervised, and the pressure adjusted so that too much oxygen is not delivered.

Patients with ARDS should be cared for in an intensive care unit, where experienced staff and all needed equipment are available. Enough fluid must be provided, by vein if necessary, to prevent **dehydration**. Also, the patient's nutritional state must be maintained, again by vein, if oral intake is not sufficient.

Prognosis

If the patient's lung injury does not soon begin to heal, the lack of sufficient oxygen can injure other organs, such as the kidneys. There always is a risk that bacterial **pneumonia** will develop at some point. Without prompt treatment, as many as 90% of patients with ARDS can be expected to die. With modern treatment, however, about half of all patients will survive. Those who do live usually recover completely, with little or no long-term breathing difficulty. Lung scarring is a risk after a long period on a ventilator, but it may improve in the months after the patient is taken off ventilation. Whether a particular patient will recover depends to a great extent on whether the primary disease that caused ARDS to develop in the first place can be effectively treated.

Prevention

The only way to prevent ARDS is to avoid those diseases and harmful conditions that damage the lung. For

instance, the danger of aspirating stomach contents into the lungs can be avoided by making sure a patient does not eat shortly before receiving general anesthesia. If a patient needs oxygen therapy, as low a level as possible should be given. Any form of lung infection, or infection anywhere in the body that gets into the blood, must be treated promptly to avoid the lung injury that causes ARDS.

Resources

BOOKS

Smolley, Lawrence A., and Debra F. Bryse. *Breathe Right Now: A Comprehensive Guide to Understanding and Treating the Most Common Breathing Disorders*. New York: W. W. Norton & Co., 1998.

ORGANIZATIONS

National Heart, Lung and Blood Institute. P.O. Box 30105, Bethesda, MD 20824-0105. (301) 251-1222. <<http://www.nhlbi.nih.gov>>.

National Respiratory Distress Syndrome Foundation. P.O. Box 723, Montgomeryville, PA 18936.

OTHER

"Pulmonary Medicine." HealthWeb.com. 5 Jan. 1998. <<http://healthweb.org>>.

David A. Cramer, MD

AFP test see **Alpha-fetoprotein test**

African American health see **Minority health**

African sleeping sickness see **Sleeping sickness**

African trypanosomiasis see **Sleeping sickness**

Agammaglobulinemia see **Common variable immunodeficiency**

Aggression see **Conduct disorder**

Aging

Definition

Starting at what is commonly called middle age, operations of the human body begin to be more vulnerable to daily wear and tear; there is a general decline in physical, and possibly mental, functioning. In the Western countries, the length of life is often into the 70s. The upward limit of the life span, however, can be as high as 120 years. During

the latter half of life, an individual is more prone to have problems with the various functions of the body and to develop any number of chronic or fatal diseases. The cardiovascular, digestive, excretory, nervous, reproductive and urinary systems are particularly affected. The most common diseases of aging include Alzheimer's, arthritis, **cancer**, diabetes, depression, and heart disease.

Description

Human beings reach a peak of growth and development around the time of their mid 20s. Aging is the normal transition time after that flurry of activity. Although there are quite a few age-related changes that tax the body, disability is not necessarily a part of aging. Health and lifestyle factors together with the genetic makeup of the individual, and determines the response to these changes. Body functions that are most often affected by age include:

- Hearing, which declines especially in relation to the highest pitched tones.
- The proportion of fat to muscle, which may increase by as much as 30%. Typically, the total padding of body fat directly under the skin thins out and accumulates around the stomach. The ability to excrete fats is impaired, and therefore the storage of fats increases, including cholesterol and fat-soluble nutrients.
- The amount of water in the body decreases, which therefore decreases the absorption of water-soluble nutrients. Also, there is less saliva and other lubricating fluids.
- The liver and the kidneys cannot function as efficiently, thus affecting the elimination of wastes.
- A decrease in the ease of digestion, with a decrease in stomach acid production.
- A loss of muscle strength and coordination, with an accompanying loss of mobility, agility, and flexibility.
- A decline in sexual hormones and sexual functioning.
- A decrease in the sensations of taste and smell.
- Changes in the cardiovascular and respiratory systems, leading to decreased oxygen and nutrients throughout the body.
- Decreased functioning of the nervous system so that nerve impulses are not transmitted as efficiently, reflexes are not as sharp, and memory and learning are diminished.
- A decrease in bone strength and density.
- Hormone levels, which gradually decline. The thyroid and sexual hormones are particularly affected.
- Declining visual abilities. Age-related changes may lead to diseases such as **macular degeneration**.

- A compromised ability to produce vitamin D from sunlight.
- A reduction in protein formation leading to shrinkage in muscle mass and decreased bone formation, possibly leading to osteoporosis.

Causes and symptoms

There are several theories as to why the aging body loses functioning. It may be that several factors work together or that one particular factor is at work more than others in a given individual.

- Programmed senescence, or aging clock, theory. The aging of the cells of each individual is programmed into the genes, and there is a preset number of possible rejuvenations in the life of a given cell. When cells die at a rate faster than they are replaced, organs do not function properly, and they are soon unable to maintain the functions necessary for life.
- Genetic theory. Human cells maintain their own seed of destruction at the level of the chromosomes.
- Connective tissue, or cross-linking theory. Changes in the make-up of the connective tissue alter the stability of body structures, causing a loss of elasticity and functioning, and leading to symptoms of aging.
- Free-radical theory. The most commonly held theory of aging, it is based on the fact that ongoing chemical reactions of the cells produce free radicals. In the presence of oxygen, these free radicals cause the cells of the body to break down. As time goes on, more cells die or lose the ability to function, and the body soon ceases to function as a whole.
- Immunological theory. There are changes in the immune system as it begins to wear out, and the body is more prone to infections and tissue damage, which may finally cause **death**. Also, as the system breaks down, the body is more apt to have autoimmune reactions, in which the body's own cells are mistaken for foreign material and are destroyed or damaged by the immune system.

Diagnosis

Many problems can arise due to age-related changes in the body. Although there is no one test to be given, a thorough physical exam and a basic blood screening and blood chemistry panel can point to areas in need of further attention. When older people become ill, the first signs of disease are often nonspecific. Further exams should be conducted if any of the following occur:

- diminished or lack of desire for food
- increasing confusion

- failure to thrive
- urinary incontinence
- dizziness
- weight loss
- falling

Treatment

For the most part, doctors prescribe medications to control the symptoms and diseases of aging. In the United States, about two-thirds of people 65 and over take medications for various complaints. More women than men use these medications. The most common drugs used by the elderly are painkillers, **diuretics** or water pills, sedatives, cardiac drugs, **antibiotics**, and mental health drugs.

Estrogen replacement therapy (ERT) is commonly prescribed to postmenopausal women for symptoms of aging. It is often used in conjunction with progesterone. ERT functions to help keep bones strong, reduce risk of heart disease, restore vaginal lubrication, and to improve skin elasticity. Evidence suggests that it may also help maintain mental functions.

Expected results

Aging is unavoidable, but major physical impairment is not. People can lead a healthy, disability-free life well through their later years. A well established support system of family, friends, and health care providers, together with focus on good **nutrition** and lifestyle habits and good **stress** management, can prevent disease and lessen the impact of chronic conditions.

Alternative treatment

Nutritional supplements

Consumption of a high-quality multivitamin is recommended. Common nutritional deficiencies connected with aging include B **vitamins**, vitamins A and C, **folic acid**, calcium, magnesium, zinc, iron, chromium, and trace **minerals**. Since stomach acids may be decreased, it is suggested that the use of a powdered multivitamin formula in gelatin capsules be used, as this form is the easiest to digest. Such formulas may also contain enzymes for further help with digestion.

Antioxidants can help to neutralize damage by the free radical actions thought to contribute to problems of aging. They are also helpful in preventing and treating cancer and in treating **cataracts** and **glaucoma**. Supplements that serve as antioxidants include:

- Vitamin E, 400–1,000 IUs daily. Protects cell membranes against damage. It shows promise in prevention against heart disease, and Alzheimer's and Parkinson's diseases.
- Selenium, 50 mg taken twice daily. Research suggests that selenium may play a role in reducing the risk of cancer.
- Beta-carotene, 25,000–40,000 IUs daily. May help in treating cancer, colds and flu, arthritis, and immune support.
- Vitamin C, 1,000–2,000 mg per day. It may cause **diarrhea** in large doses. If this occurs, however, all that is needed is a decrease in the dosage.

Other supplements that are helpful in treating age-related problems including:

- B₁₂/B-complex vitamins, studies show that B₁₂ may help reduce mental symptoms, such as confusion, memory loss, and depression.
- Coenzyme Q10 may be helpful in treating heart disease, as up to three-quarters cardiac patients have been found to be lacking in this heart enzyme.

Hormones

The following hormone supplements may be taken to prevent or to treat various age-related problems. However, caution should be taken before beginning treatment, and the patient should consult his or her health care professional.

DHEA improves brain functioning and serves as a building block for many other important hormones in the body. It may be helpful in restoring declining hormone levels and in building up muscle mass, strengthening the bones, and maintaining a healthy heart.

Melatonin may be helpful for **insomnia**. It has also been used to help fight viruses and bacterial infections, reduce the risk of heart disease, improve sexual functioning, and to protect against cancer.

Human growth hormone (hGH) has been shown to regulate blood sugar levels and to stimulate bone, cartilage, and muscle growth while reducing fat.

Herbs

Garlic (*Allium sativa*) is helpful in preventing heart disease, as well as improving the tone and texture of skin. Garlic stimulates liver and digestive system functions, and also helps in dealing with heart disease and high blood pressure.

Siberian ginseng (*Eleutherococcus senticosus*) supports the adrenal glands and immune functions. It is

KEY TERMS

Antioxidants—Substances that reduce the damage of the highly reactive free radicals that are the byproducts of the cells.

Alzheimer's disease—A condition causing a decline in brain function that interferes with the ability to reason and to perform daily activities.

Senescence—Aging.

Vata—One of the three main constitutional types found under Ayurvedic principles. Keeping one's particular constitution in balance is considered important in maintaining health.

believed to be helpful in treating problems related to stress. Siberian ginseng also increases mental and physical performance, and may be useful in treating memory loss, chronic **fatigue**, and immune dysfunction.

Ginkgo biloba works particularly well on the brain and nervous system. It is effective in reducing the symptoms of conditions, such as Alzheimer's, depression, visual problems, and problems of blood circulation. It may also help treat heart disease, strokes, **dementia**, **Raynaud's disease**, head injuries, leg cramps, macular degeneration, **tinnitus**, **impotence** due to poor blood flow, and diabetes-related nerve damage.

Proanthocyanidins, or PCO, are Pycnogenol, derived from grape seeds and skin, and from pine tree bark, and may help in the prevention of cancer and poor vision.

In **Ayurvedic medicine**, aging is described as a process of increased vata, in which there is a tendency to become thinner, drier, more nervous, more restless, and more fearful, while having a loss of appetite as well as sleep. Bananas, almonds, avocados, and coconuts are some of the foods used in correcting such conditions. One of the main herbs used for such conditions is gotu kola (*Centella asiatica*), which is used to revitalize the nervous system and brain cells and to fortify the immune system. Gotu kola is also used to treat memory loss, **anxiety**, and insomnia.

In Chinese medicine, most symptoms of aging are regarded as symptoms of a yin deficiency. Moistening foods such as millet, barley soup, tofu, mung beans, wheat germ, spirulina, potatoes, black sesame seeds, walnuts, and flax seeds are recommended. Jing tonics may also be used. These include deer antler, dodder seeds, processed rehmannia, longevity soup, mussels, and chicken.

Prevention

Preventive health practices such as healthy diet, daily **exercise**, stress management, and control of lifestyle habits such as **smoking** and drinking, can lengthen the life span and improve the quality of life as people age. Exercise can improve the appetite, the health of the bones, the emotional and mental outlook, and the digestion and circulation.

Drinking plenty of fluids aids in maintaining healthy skin, good digestion, and proper elimination of wastes. Up to eight glasses of water should be consumed daily, along with plenty of herbal teas, diluted fruit and vegetable juices, and fresh fruits and vegetables with high water content.

Because of a decrease in the sense of taste, older people often increase their intake of salt, which can contribute to high blood pressure and nutrient loss. Use of sugar is also increased. Seaweeds and small amounts of honey can be used as replacements.

Alcohol, nicotine, and **caffeine** all have potential damaging effects, and should be limited or completely eliminated from consumption.

A diet high in fiber and low in fat is recommended. Processed foods should be replaced by complex carbohydrates, such as whole grains. If chewing becomes a problem, there should be an increased intake of protein drinks, freshly juiced fruits and vegetables, and creamed cereals.

Resources

BOOKS

- Darden Ph.D., Ellington. *Living Longer Stronger*. New York: A Perigee Book, The Berkeley Publishing Group, 1995.
- Pitchford, Paul. *Healing with Whole Foods*. Berkeley, CA: North Atlantic Books, 1993.

OTHER

- "Anti-Aging-Nutritional Program." <<http://www.healthy.net/hwlibrarybooks/haas/perform/antiagin.htm>> (December 28, 2000).
- "Effects of Hormone in the Body." <http://www.anti-aging.org/Effects_hGH.html> (December 28, 2000).
- "The Elderly-Nutritional Programs." <<http://www.healthy.net/hwlibrarybooks/haas/lifestage/elderly.htm>> (December 28, 2000).
- "Evaluating the Elderly Patient: the Case for Assessment Technology." <<http://text.nlm.nih.gov/nih/ta/www/01.html>> (December 28, 2000).
- "Herbal Phytotherapy and the Elderly." <<http://www.healthy.net/hwlibrarybooks/hoffman/elders/elders.htm>> (December 28, 2000).
- "Pharmacokinetics." Merck & Co., Inc. (1995-2000). <<http://www.merck.com/pubs/mmanual/section22/chapter304/304a.htm>> (December 28, 2000).

"To a Long and Healthy Life." <<http://www.healthy.net/hwlibraryarticles/aesoph/longandhealthy.htm>> (December 28, 2000).

Patience Paradox

Agoraphobia

Definition

The word agoraphobia is derived from Greek words literally meaning "fear of the marketplace." The term is used to describe an irrational and often disabling fear of being out in public.

Description

Agoraphobia is just one type of phobia, or irrational fear. People with **phobias** feel dread or panic when they face certain objects, situations, or activities. People with agoraphobia frequently also experience panic attacks, but panic attacks, or **panic disorder**, are not a requirement for a diagnosis of agoraphobia. The defining feature of agoraphobia is **anxiety** about being in places from which escape might be embarrassing or difficult, or in which help might be unavailable. The person suffering from agoraphobia usually avoids the anxiety-provoking situation and may become totally housebound.

Causes and symptoms

Agoraphobia is the most common type of phobia, and it is estimated to affect between 5-12% of Americans within their lifetime. Agoraphobia is twice as common in women as in men and usually strikes between the ages of 15-35.

The symptoms of the panic attacks which may accompany agoraphobia vary from person to person, and may include trembling, sweating, heart **palpitations** (a feeling of the heart pounding against the chest), jitters, **fatigue**, tingling in the hands and feet, nausea, a rapid pulse or breathing rate, and a sense of impending doom.

Agoraphobia and other phobias are thought to be the result of a number of physical and environmental factors. For instance, they have been associated with biochemical imbalances, especially related to certain neurotransmitters (chemical nerve messengers) in the brain. People who have a panic attack in a given situation (e.g., a shopping mall) may begin to associate the panic with that situation and learn to avoid it. According to some theories, irrational anxiety results from unresolved emotional conflicts. All of these factors may play a role to varying extents in different cases of agoraphobia.

Diagnosis

People who suffer from panic attacks should discuss the problem with a physician. The doctor can diagnose the underlying panic or anxiety disorder and make sure the symptoms aren't related to some other underlying medical condition.

The doctor makes the diagnosis of agoraphobia based primarily on the patient's description of his or her symptoms. The person with agoraphobia experiences anxiety in situations where escape is difficult or help is unavailable—or in certain situations, such as being alone. While many people are somewhat apprehensive in these situations, the hallmark of agoraphobia is that a person's active avoidance of the feared situation impairs his or her ability to work, socialize, or otherwise function.

Treatment

Treatment for agoraphobia usually consists of both medication and psychotherapy. Usually, patients can benefit from certain antidepressants, such as amitriptyline (Elavil), or **selective serotonin reuptake inhibitors**, such as paroxetine (Paxil), fluoxetine (Prozac), or sertraline (Zoloft). In addition, patients may manage panic attacks in progress with certain tranquilizers called **benzodiazepines**, such as alprazolam (Xanax) or clonazepam (Klonopin).

The mainstay of treatment for agoraphobia and other phobias is cognitive behavioral therapy. A specific technique that is often employed is called desensitization. The patient is gradually exposed to the situation that usually triggers fear and avoidance, and, with the help of breathing or relaxation techniques, learns to cope with the situation. This helps break the mental connection between the situation and the fear, anxiety, or panic. Patients may also benefit from psychodynamically oriented psychotherapy, discussing underlying emotional conflicts with a therapist or support group.

Prognosis

With proper medication and psychotherapy, 90% of patients will find significant improvement in their symptoms.

Resources

BOOKS

Hallowell, Edward M. *Worry: Controlling It and Using It Wisely*. New York: Pantheon Books, 1997.

PERIODICALS

Forsyth, Sondra. "I Panic When I'm Alone." *Mademoiselle*, Apr. 1998, 119-24.

Hale, Anthony S. "ABC of Mental Health: Anxiety." *British Medical Journal* 314 (28 June 1997): 1886-9.

KEY TERMS

Benzodiazepines—A group of tranquilizers often used to treat anxiety.

Desensitization—A treatment for phobias which involves exposing the phobic person to the feared situation. It is often used in conjunction with relaxation techniques.

Phobia—An intense and irrational fear of a specific object, activity, or situation.

"Panic Disorder—Panic Attacks and Agoraphobia." *American Family Physician* 52, no. 7 (15 Nov. 1995): 2067-8.

ORGANIZATIONS

American Psychiatric Association. 1400 K Street NW, Washington DC 20005. (888) 357-7924. <<http://www.psych.org>>.

Anxiety Disorders Association of America. 11900 Park Lawn Drive, Ste. 100, Rockville, MD 20852. (800) 545-7367. <<http://www.adaa.org>>.

National Institute of Mental Health. Mental Health Public Inquiries, 5600 Fishers Lane, Room 15C-05, Rockville, MD 20857. (888) 826-9438. <<http://www.nimh.nih.gov>>.

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Agranulocytosis see **Neutropenia**

AIDS

Definition

Acquired immune deficiency syndrome (AIDS) is an infectious disease caused by the human **immunodeficiency virus** (HIV). It was first recognized in the United States in 1981. AIDS is the advanced form of infection with the HIV virus, which may not cause recognizable disease for a long period after the initial exposure (latency). No vaccine is currently available to prevent HIV infection. At present, all forms of AIDS therapy are focused on improving the quality and length of life for AIDS patients by slowing or halting the replication of the virus and treating or preventing infections and cancers that take advantage of a person's weakened immune system.

Description

AIDS is considered one of the most devastating public health problems in recent history. In June 2000, the Centers

Risk of acquiring HIV infection by entry site

Entry site	Risk virus reaches entry site	Risk virus enters	Risk inoculated
Conjunctiva	Moderate	Moderate	Very low
Oral mucosa	Moderate	Moderate	Low
Nasal mucosa	Low	Low	Very low
Lower respiratory	Very low	Very low	Very low
Anus	Very high	Very high	Very high
Skin, intact	Very low	Very low	Very low
Skin, broken	Low	High	High
Sexual:			
Vagina	Low	High	High
Penis	Low	Low	High
Ulcers (STD)	Medium	Low	Very high
Blood:			
Products	High	High	Low
Shared needles	High	High	High
Accidental needle	High	Very High	Low
Traumatic wound	Modest	High	High
Perinatal	High	High	High

for Disease Control and Prevention (CDC) reported that 120,223 (includes only those cases in areas that have confidential HIV reporting) in the United States are HIV-positive, and 311,701 are living with AIDS (includes only those cases where vital status is known). Of these patients, 44% are gay or bisexual men, 20% are heterosexual intravenous drug users, and 17% are women. In addition, approximately 1,000-2,000 children are born each year with HIV infection. The World Health Organization (WHO) estimates that 33 million adults and 1.3 million children worldwide were living with HIV/AIDS as of 1999 with 5.4 million being newly infected that year. Most of these cases are in the developing countries of Asia and Africa.

Risk factors

AIDS can be transmitted in several ways. The risk factors for HIV transmission vary according to category:

- **Sexual contact.** Persons at greatest risk are those who do not practice safe sex, those who are not monogamous, those who participate in anal intercourse, and those who have sex with a partner with symptoms of advanced HIV infection and/or other **sexually transmitted diseases** (STDs). In the United States and Europe, most cases of sexually transmitted HIV infection have resulted from homosexual contact, whereas in Africa, the disease is spread primarily through sexual intercourse among heterosexuals.
- **Transmission in pregnancy.** High-risk mothers include women married to bisexual men or men who have an abnormal blood condition called **hemophilia** and require blood transfusions, intravenous drug users, and women living in neighborhoods with a high rate of HIV

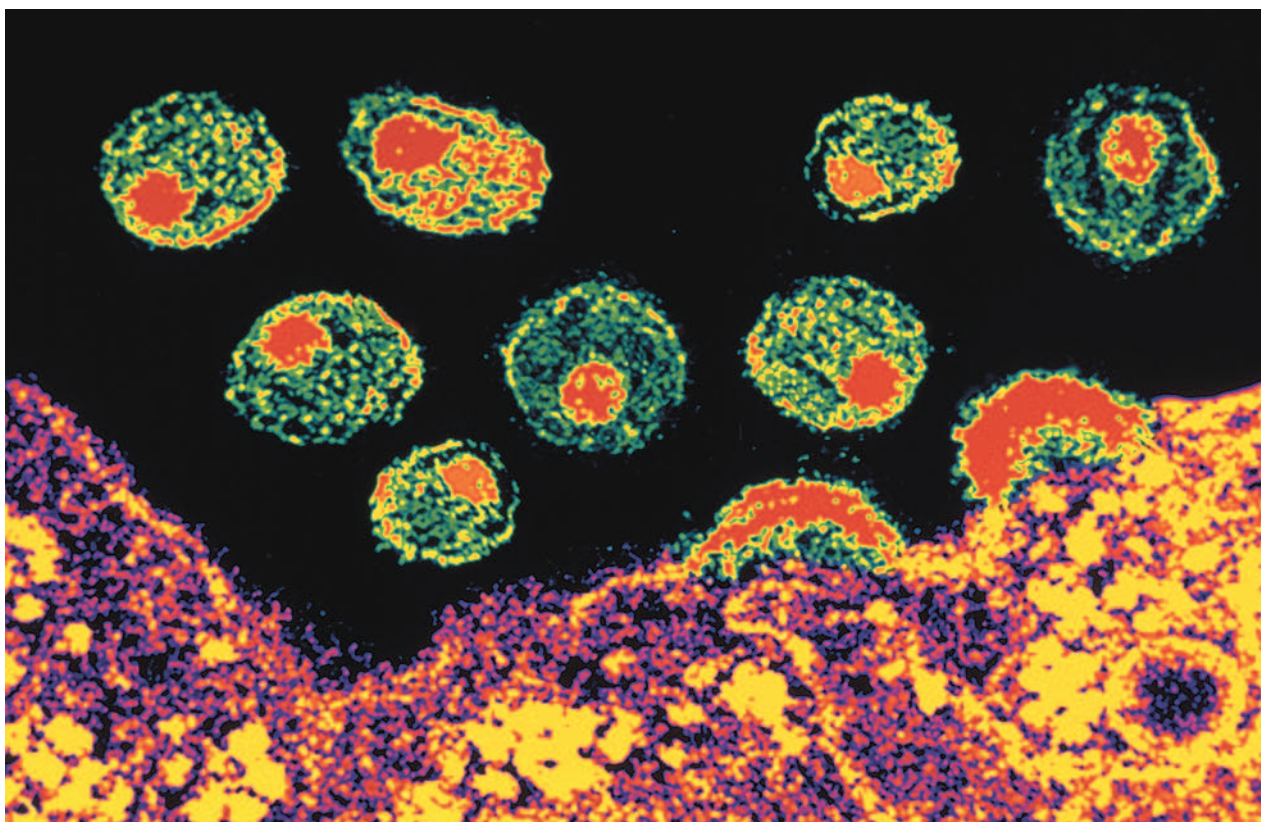
infection among heterosexuals. The chances of transmitting the disease to the child are higher in women in advanced stages of the disease. Breast feeding increases the risk of transmission by 10-20%. The use of zidovudine (AZT) during pregnancy, however, can decrease the risk of transmission to the baby.

- **Exposure to contaminated blood or blood products.** With the introduction of blood product screening in the mid-1980s, the incidence of HIV transmission in blood transfusions has dropped to one in every 100,000 transfused. With respect to HIV transmission among drug abusers, risk increases with the duration of using injections, the frequency of needle sharing, the number of persons who share a needle, and the number of AIDS cases in the local population.
- **Needle sticks among health care professionals.** Present studies indicate that the risk of HIV transmission by a needle stick is about one in 250. This rate can be decreased if the injured worker is given AZT, an anti-retroviral medication, in combination with other medication.

HIV is not transmitted by handshakes or other casual non-sexual contact, coughing or sneezing, or by blood-sucking insects such as mosquitoes.

AIDS in women

AIDS in women is a serious public health concern. Women exposed to HIV infection through heterosexual contact are the most rapidly growing risk group in the United States population. The percentage of AIDS cases diagnosed in women has risen from 7% in 1985 to 23% in 1999. Women diagnosed with AIDS may not live as long as men, although the reasons for this finding are unclear.



Mature HIV-1 viruses (above) and the lymphocyte from which they emerged (below). Two immature viruses can be seen budding on the surface of the lymphocyte (right of center). (Photograph by Scott Camazir, Photo Researchers, Inc. Reproduced by permission.)

AIDS in children

Since AIDS can be transmitted from an infected mother to the child during pregnancy, during the birth process, or through breast milk, all infants born to HIV-positive mothers are a high-risk group. As of 2000, it was estimated that 87% of HIV-positive women are of childbearing age; 41% of them are drug abusers. Between 15-30% of children born to HIV-positive women will be infected with the virus.

AIDS is one of the 10 leading causes of **death** in children between one and four years of age. The interval between exposure to HIV and the development of AIDS is shorter in children than in adults. Infants infected with HIV have a 20-30% chance of developing AIDS within a year and dying before age three. In the remainder, AIDS progresses more slowly; the average child patient survives to seven years of age. Some survive into early adolescence.

Causes and symptoms

Because HIV destroys immune system cells, AIDS is a disease that can affect any of the body's major organ systems. HIV attacks the body through three disease

processes: immunodeficiency, autoimmunity, and nervous system dysfunction.

Immunodeficiency describes the condition in which the body's immune response is damaged, weakened, or is not functioning properly. In AIDS, immunodeficiency results from the way that the virus binds to a protein called CD4, which is primarily found on the surface of certain subtypes of white blood cells called helper T cells or CD4 cells. After the virus has attached to the CD4 receptor, the virus-CD4 complex refolds to uncover another receptor called a chemokine receptor that helps to mediate entry of the virus into the cell. One chemokine receptor in particular, CCR5, has gotten recent attention after studies showed that defects in its structure (caused by genetic mutations) cause the progression of AIDS to be prevented or slowed. Scientists hope that this discovery will lead to the development of drugs that trigger an artificial mutation of the CCR5 gene or target the CCR5 receptor.

Once HIV has entered the cell, it can replicate intracellularly and kill the cell in ways that are still not completely understood. In addition to killing some lymphocytes directly, the AIDS virus disrupts the functioning of

the remaining CD4 cells. Because the immune system cells are destroyed, many different types of infections and cancers that take advantage of a person's weakened immune system (opportunistic) can develop.

Autoimmunity is a condition in which the body's immune system produces antibodies that work against its own cells. Antibodies are specific proteins produced in response to exposure to a specific, usually foreign, protein or particle called an antigen. In this case, the body produces antibodies that bind to blood platelets that are necessary for proper blood clotting and tissue repair. Once bound, the antibodies mark the platelets for removal from the body, and they are filtered out by the spleen. Some AIDS patients develop a disorder, called immune-related **thrombocytopenia** purpura (ITP), in which the number of blood platelets drops to abnormally low levels.

As of 2000, researchers do not know precisely how HIV attacks the nervous system since the virus can cause damage without infecting nerve cells directly. One theory is that, once infected with HIV, one type of immune system cell, called a macrophage, begins to release a toxin that harms the nervous system.

The course of AIDS generally progresses through three stages, although not all patients will follow this progression precisely:

Acute retroviral syndrome

Acute retroviral syndrome is a term used to describe a group of symptoms that can resemble mononucleosis and that may be the first sign of HIV infection in 50-70% of all patients and 45-90% of women. Most patients are not recognized as infected during this phase and may not seek medical attention. The symptoms may include **fever**, **fatigue**, muscle aches, loss of appetite, digestive disturbances, weight loss, skin **rashes**, **headache**, and chronically swollen lymph nodes (lymphadenopathy). Approximately 25-33% of patients will experience a form of **meningitis** during this phase in which the membranes that cover the brain and spinal cord become inflamed. Acute retroviral syndrome develops between one and six weeks after infection and lasts for two to three weeks. Blood tests during this period will indicate the presence of virus (viremia) and the appearance of the viral p24 antigen in the blood.

Latency period

After the HIV virus enters a patient's lymph nodes during the acute retroviral syndrome stage, the disease becomes latent for as many as 10 years or more before symptoms of advanced disease develop. During latency, the virus continues to replicate in the lymph nodes, where it may cause one or more of the following conditions:

PERSISTENT GENERALIZED LYMPHADENOPATHY (PGL).

Persistent generalized lymphadenopathy, or PGL, is a condition in which HIV continues to produce chronic painless swellings in the lymph nodes during the latency period. The lymph nodes that are most frequently affected by PGL are those in the areas of the neck, jaw, groin, and armpits. PGL affects between 50-70% of patients during latency.

CONSTITUTIONAL SYMPTOMS. Many patients will develop low-grade fevers, chronic fatigue, and general weakness. HIV may also cause a combination of food malabsorption, loss of appetite, and increased metabolism that contribute to the so-called AIDS wasting or wasting syndrome.

OTHER ORGAN SYSTEMS. At any time during the course of HIV infection, patients may suffer from a yeast infection in the mouth called thrush, open sores or ulcers, or other infections of the mouth; **diarrhea** and other gastrointestinal symptoms that cause **malnutrition** and weight loss; diseases of the lungs and kidneys; and degeneration of the nerve fibers in the arms and legs. HIV infection of the nervous system leads to general loss of strength, loss of reflexes, and feelings of numbness or burning sensations in the feet or lower legs.

Late-stage disease (AIDS)

AIDS is usually marked by a very low number of CD4+ lymphocytes, followed by a rise in the frequency of opportunistic infections and cancers. Doctors monitor the number and proportion of CD4+ lymphocytes in the patient's blood in order to assess the progression of the disease and the effectiveness of different medications. About 10% of infected individuals never progress to this overt stage of the disease and are referred to as nonprogressors.

OPPORTUNISTIC INFECTIONS. Once the patient's CD4+ lymphocyte count falls below 200 cells/mm³, he or she is at risk for a variety of opportunistic infections. The infectious organisms may include the following:

- **Fungi.** The most common fungal disease associated with AIDS is *Pneumocystis carinii* **pneumonia** (PCP). PCP is the immediate cause of death in 15-20% of AIDS patients. It is an important measure of a patient's prognosis. Other fungal infections include a yeast infection of the mouth (**candidiasis** or thrush) and cryptococcal meningitis.
- **Protozoa.** **Toxoplasmosis** is a common opportunistic infection in AIDS patients that is caused by a protozoan. Other diseases in this category include isoporiasis and cryptosporidiosis.
- **Mycobacteria.** AIDS patients may develop **tuberculosis** or MAC infections. MAC infections are caused by