

# **Diseases and Treatment**

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Medical care begins with assessing a disorder using information gathered from the patient and a variety of testing and examination methods. Based on these results, a course of treatment is recommended that may include drugs and surgery.

## **Types of Diseases**

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A disease is any disorder of normal body function. Diseases can be grouped into a number of different but often overlapping categories.

- **Infectious diseases** are caused by certain harmful micro-organisms and other parasites that live at the expense of another organism. Any disease-causing agent is described as a pathogen.

Infectious diseases are caused by viruses, bacteria, fungi (yeasts and molds), protozoa (single-celled animals), and worms (helminths). Infecting organisms can enter the body through several routes, or portals of entry, including damaged skin, respiratory tract, digestive system, and urinary and reproductive tracts.

An infected person's bodily discharges may contain organisms that spread infection through the air, food, water, or direct contact. Microorganisms often produce disease by means of the toxins (poisons) they release. The presence of harmful microorganisms or their toxins in the body is termed sepsis.

- **Degenerative diseases** result from wear and tear, aging, or trauma (injury) that can lead to a lesion (wound) and perhaps necrosis (death of

tissue). Common examples include arthritis, cardiovascular problems, and certain respiratory disorders such as emphysema.

- **Neoplasia** is the abnormal and uncontrolled growth of tissue.

A **benign** neoplasm does not spread, that is, undergo **metastasis** to other tissues, although it may cause damage at the site where it grows. An invasive neoplasm that can metastasize to other tissues is termed **malignant** and is commonly called cancer.

A malignant tumor that involves epithelial tissue is a carcinoma. If the tumor arises in glandular epithelium, it is an adenocarcinoma (the root aden/o means “gland”); a cancer of pigmented epithelial cells (melanocytes) is a melanoma. A neoplasm that involves connective tissue or muscle is a sarcoma. Cancers of the blood, lymphatic system, and nervous system are classified according to the cell types involved and other clinical features.

- **Immune disorders** include failures of the immune system, allergies, and autoimmune diseases, in which the body makes antibodies to its own tissues.
- **Metabolic disorders** result from lack of enzymes or other factors needed for cellular functions. Many hereditary disorders fall into this category. Malnutrition caused by inadequate intake of nutrients or inability of the body to absorb and use nutrients also upsets metabolism.
- **Hormonal disorders** are caused by underproduction or overproduction of hormones or by an inability of the hormones to function properly. One common example is diabetes mellitus.
- **Mental and emotional disorders** affect the mind and adaptation of an individual to his or her environment.

## Responses to Disease

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### **Inflammation**

A common response to infection and to other forms of disease is inflammation. When cells are injured, they release chemicals that allow blood cells and fluids to move into the tissues. This inflow of blood results in the four signs of inflammation:

- Heat
- Pain
- Redness
- Swelling

The suffix -itis indicates inflammation, as in appendicitis (inflammation of the appendix) and tonsillitis (inflammation of the tonsils). Inflammation is one possible cause of edema, a swelling or accumulation of fluid in the tissues. Other causes of edema include fluid blockage, heart failure, and imbalance in body fluid composition.

### **Phagocytosis**

The body uses phagocytosis to get rid of invading microorganisms, damaged cells, and other types of harmful debris. Certain white blood cells are capable of engulfing these materials and destroying them internally. Phagocytic cells are found circulating in the blood, in the tissues, and in the lymphatic system. The remains of phagocytosis consist of fluid and white blood cells, a mixture called pus.

### **Immunity**

Immunity refers to all our defenses against infectious disease. Inflammation and phagocytosis are examples of **inborn** or **innate** protective mechanisms, which are based on a person's genetic makeup and do not require any previous exposure to a disease organism. Other defenses that fall into this category are mechanical barriers, such as intact skin and mucous membranes, as well as body secretions, such as stomach acid and enzymes in saliva and tears.

Immunity that we develop during life from exposure to disease organisms is termed **adaptive** immunity, or **acquired** immunity. This type of immunity is specific for particular diseases encountered by natural exposure or by the administration of vaccines. The system responsible for adaptive immunity consists of cells in the blood, lymphatic system, and other tissues. These cells recognize different foreign invaders and get rid of them by direct attack and by producing circulating antibodies that immobilize and help destroy them. The immune system also monitors the body continuously for abnormal and malfunctioning cells, such as cancer cells. The immune system may overreact to produce allergies and may react to one's own tissues to cause autoimmune diseases.

## Treatment

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If diagnosis so indicates, treatment, also termed therapy, is begun. This may consist of counseling, drugs, surgery, radiation, physical therapy, occupational therapy, psychiatric treatment, or some combination of these.

**Palliative therapy** is treatment that provides relief but is not intended as a cure. Terminally ill patients, for example, may receive treatment that eases pain and provides comfort but is not expected to change the outcome of the disease.

During diagnosis and throughout the course of treatment, a patient is evaluated to establish a prognosis—that is, a prediction of the disease’s outcome.

## **Drugs**

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A drug is a substance that alters body function. Traditionally, drugs have been derived from natural plant, animal, and mineral sources. Today, most are manufactured synthetically by pharmaceutical companies. A few, such as certain hormones and enzymes, have been produced by genetic engineering. Many drugs, described as over-the-counter (OTC) drugs, are available without a prescription (Rx). Others require a healthcare provider’s prescription for use.

## **Adverse Drug Effects**

An unintended or off-target effect of a drug or any other form of treatment is a **side effect**. Most drugs have potential adverse side effects that must be evaluated before they are prescribed. In addition, there may be **contraindications**, or reasons not to use a particular drug for a specific individual based on the person’s medical conditions, current medications, sensitivity, or family history.

While a patient is under treatment, it is important to be alert for signs of adverse effects such as digestive upset, changes in the blood, or signs of allergy, such as hives or skin rashes. **Anaphylaxis** is an immediate and severe allergic reaction that may be caused by a drug. It can lead to life-threatening respiratory distress and circulatory collapse.

## **Drug Names**

Drugs may be cited by either their **generic** or **brand** names. The generic name is usually a simple version of the chemical name for the drug and is not capitalized. The brand name (trade name, proprietary name) is a registered trademark of

the manufacturer and is written with an initial capital letter. For example, Panadol is the brand name for the analgesic compound acetaminophen; the antidepressant Prozac is fluoxetine.

## **Surgery**

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Surgery is a method for treating disease or injury by manual operations. Surgery may be done through an existing body opening, but usually it involves cutting or puncturing tissue with a sharp instrument in the process of incision. Surgery usually requires some form of anesthesia to dull or eliminate pain. After surgery, incisions must be closed for proper healing. Traditionally, surgeons have used stitches or sutures to close wounds, but today they also use adhesive strips, staples, and skin glue.

## **Radiation Therapy (Radiotherapy)**

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X-rays and radioactive materials are helpful in diagnosing disease and are also used in radiotherapy, the treatment of tumors using radiation to destroy cancer cells. The radiation may be applied by directing a beam of radiation toward the tumor with a machine that delivers radiation doses many times higher in intensity than those used for diagnosis. Alternately, the radiation may be introduced through the bloodstream or may be surgically implanted. Radiation therapy is also called radiation oncology. Radiotherapy can produce undesirable side effects because of incidental destruction of normal body tissues. Most of the side effects disappear with time and include nausea and vomiting, hair loss, ulceration or dryness of mucous membranes, and suppression of bone marrow activity.