

# THE ALZHEIMER'S PROJECT

## GLOSSARY

**Alzheimer's disease (AD)**—a progressive degenerative disease of the brain that causes impairment of memory and other cognitive abilities.

**Amyloid precursor protein (APP)**—the larger protein from which beta-amyloid is formed.

**ApoE gene**—a gene that codes for a protein that carries cholesterol to and within cells; different forms of the ApoE gene are associated with differing risks for late-onset Alzheimer's disease. This gene may be referred to as a risk factor gene or a "susceptibility gene" because one form of the gene, called ApoE4, is associated with the risk of developing late-onset AD.

**Aricept® (Donepezil)**—one of a group of drugs called cholinesterase inhibitors approved by the U.S. Food and Drug Administration to treat the symptoms of Alzheimer's disease. Other approved drugs of the type commonly being prescribed are Razadyne® (galantamine) and Exelon® (rivastigmine). Another medication called Namenda® (memantine) is a different type of drug, an N-methyl D-aspartate (NMDA) antagonist, and is prescribed to delay some of the symptoms of moderate to severe Alzheimer's disease.

**Assisted Living**—facilities for adults who need help with everyday tasks such as dressing, eating, bathing, or using the bathroom, but who don't require full-time nursing care. Some facilities have special units for memory-impaired residents. Health insurance often does not cover these types of facilities, but long-term care insurance may.

**Axon**—the extension from a neuron that transmits outgoing signals to other neurons.

**Beta-amyloid**—derived from the amyloid precursor protein and found in plaques, the insoluble deposits outside neurons. May also be called A-beta.

**Beta-amyloid plaque**—a largely insoluble deposit found in the space between nerve cells in the brain. The plaques in Alzheimer's disease are made of beta-amyloid and other molecules, surrounded by non-nerve cells (glia) and damaged axons and dendrites from nearby neurons.

**Capillaries**—billions of tiny blood vessels in the brain that carry oxygen, glucose (the brain's principal source of energy), nutrients, and hormones like insulin to brain cells so they can do their work, and remove carbon dioxide and cell waste products.

**Brain-derived neurotrophic factor (BDNF)**—a growth factor that stimulates survival, growth, and adaptability of some neurons. Increased levels in some brain regions are related to physical exercise, in animal experiments.

**Cerebral cortex**—the outermost layer of the cerebral hemispheres sometimes referred to as the gray matter. It is composed of neurons and nerve fibers and associated support cells called glia.

**Cerebrospinal fluid (CSF)**—the fluid found in and around the brain and spinal cord. Its function is to transport substances to and away from the brain itself and to cushion the brain hydraulically. Measuring cerebrospinal fluid and its contents helps scientists understand chemistry of the brain. CSF is collected by a procedure called lumbar puncture.

**Chromosomes**—thread-like structures in the nucleus of a cell that contain the DNA. Sequences of DNA make up genes. Most human cells have twenty-three pairs of chromosomes containing a total of approximately thirty thousand genes.

**Clinical trial**—a research study involving humans; these studies rigorously test the safety, side effects, and the effectiveness of a medication or behavioral treatment.

**Cognition**—conscious thought and mental activity, including learning, perceiving, making decisions, and remembering.

**Cognitive reserve**—the brain's ability to operate effectively even when some damage to cells or brain cell communications has occurred.

**Computed tomography (CT) scan**—a diagnostic procedure that uses special X-ray equipment and computers to create cross-sectional pictures of the body.

**Delusion**—an abnormal mental state characterized by false belief that persists despite the facts. People with Alzheimer's may experience delusions that cause them to feel suspicious or paranoid.

**Dementia**—a broad term referring to a decline in cognitive function that interferes with daily life and activities. Alzheimer's disease is one form of dementia.

**Dendrite**—a branch-like extension of a neuron that receives messages from other neurons.

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**Diabetes**—a chronic metabolic disorder in which the body doesn't produce or properly use insulin, a hormone that is made in the pancreas and is essential for the healthy functioning of all cells in the body.

**Early-onset Alzheimer's disease**—a rare form of AD that usually affects people between ages thirty and sixty. It is called familial AD (FAD) if it runs in the family.

**Entorhinal cortex**—an area within the brain where damage from AD often begins.

**Epidemiological study**—a study of the causes, distribution, and control of disease in populations, with emphasis on investigating relationships between personal characteristics (demographic, socioeconomic, lifestyle, biological, and genetic) and occurrence of disease.

**Enzyme**—a protein that causes or speeds up a biochemical reaction.

**Functional MRI (fMRI)**—an adaptation of an MRI (see magnetic resonance imaging) technique that measures brain activity during a mental task, such as one involving memory, language, or attention.

**Gene**—the biologic unit of heredity passed from parent to child. Genes are segments of DNA and contain instructions that tell a cell how to make specific proteins.

**Genetic risk factor**—a variant in a cell's DNA that does not cause a disease by itself but may increase the chance that a person will develop a disease.

**Glial cell**—a type of brain cell that supports, protects, or nourishes neurons. One form of glia are called microglia and they appear to be part of an inflammatory response that helps the brain clear accumulating beta amyloid.

**Hallucination**—a false perception experienced by some people with Alzheimer's, in which they see, hear, smell, taste, and/or feel something that isn't there.

**Hippocampal formation**—a structure in the brain that plays a major role in learning and memory and is involved in converting short-term memory to long-term memory. Also called the hippocampus.

**Inflammation**—the process by which the body responds to cellular injury by attempting to eliminate foreign matter and damaged tissue.

**Insulin resistance**—a condition in which the pancreas makes enough insulin, but the cells do not respond properly to it; characterizes and precedes type 2 diabetes.

**Hospice Care**—end-of-life care focused on providing comfort and support rather than curing disease, and which is provided by health professionals and volunteers. Hospice care can take place at home, at a hospice center, in a hospital or in a skilled nursing facility. Medicare provides a hospice benefit.

**Late-onset Alzheimer's disease**—the most common form of AD. It occurs in people aged sixty and older.

**Magnetic resonance imaging (MRI)**—a diagnostic and research technique that uses magnetic fields to generate a computer image of internal structures in the body.

**Microtubule**—an internal support structure for cells including neurons that guide organelles and molecules from the body of the cell to the end of the axon.

**Mild cognitive impairment (MCI)**—a condition in which a person has cognitive problems greater than those expected for his or her age. Amnesic MCI includes memory problems, but not the personality or other cognitive problems that characterize AD.

**Mutation**—a permanent change in the DNA of a cell that can affect the structure of a protein to such an extent that it causes a disease.

**Neurodegenerative disease**—a disease characterized by a progressive decline in the structure and function of brain tissue. These diseases include AD, Parkinson's disease, frontotemporal lobar degeneration, and dementia with Lewy bodies. They are usually more common in older people.

**Neurofibrillary tangle**—a collection of twisted and hyperphosphorylated tau found in the cell body, axons, and dendrites of a neuron in AD.

**Neurologist**—a physician trained in diagnosing and treating diseases of the nervous system, including diseases of the brain, spinal cord, nerves, and muscles.

**Neuron**—a nerve cell.

**Neurotransmitter**—a chemical messenger between neurons. These substances are released by the axon of one neuron and excite or inhibit activity in a neighboring neuron.

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**Nucleus**—the structure within a cell that contains the chromosomes and controls many of the cell's activities.

**Pathology**—structural and functional changes to cells and tissues of the body that result from a disease process.

**Pittsburgh Compound B (PiB)**—the radioactive tracer compound used during a PET (see Positron emission tomography) scan of the brain to show beta-amyloid deposits.

**Positron emission tomography (PET)**—an imaging technique using radioisotopes that allows researchers to observe and measure activity in different parts of the brain by monitoring blood flow and concentrations of substances such as oxygen and glucose, as well as other specific constituents of brain tissues.

**Sundowning**—behavioral problems such as restlessness, agitation, and irritability that occur in people with dementia typically at the end of the day and sometimes into the night. Doctors are not certain what causes sundowning, but it can be troubling for caregivers.

**Support Group**—a group that provides members with information and assistance by sharing experiences, concerns, and factual information. Some are moderated by health professionals, while others have peer leaders. Caregivers often find support groups helpful, and they may meet in person or sometimes online. There are now groups to address the special issues of people who are diagnosed at the earliest stages of Alzheimer's disease.

**Susceptibility gene**—see genetic risk factor.

**Synapse**—the tiny gap between nerve cells across which neurotransmitters and nerve signals pass.

**Tau**—a protein that helps to maintain the structure of microtubules in normal nerve cells. Abnormal tau is a principal component of the paired helical filaments in neurofibrillary tangles.

**Transgenic**—an animal that has had a gene (such as the human APP gene) inserted into its chromosomes for the purpose of research. Mice carrying a mutated human APP gene often develop plaques in their brains as they age.