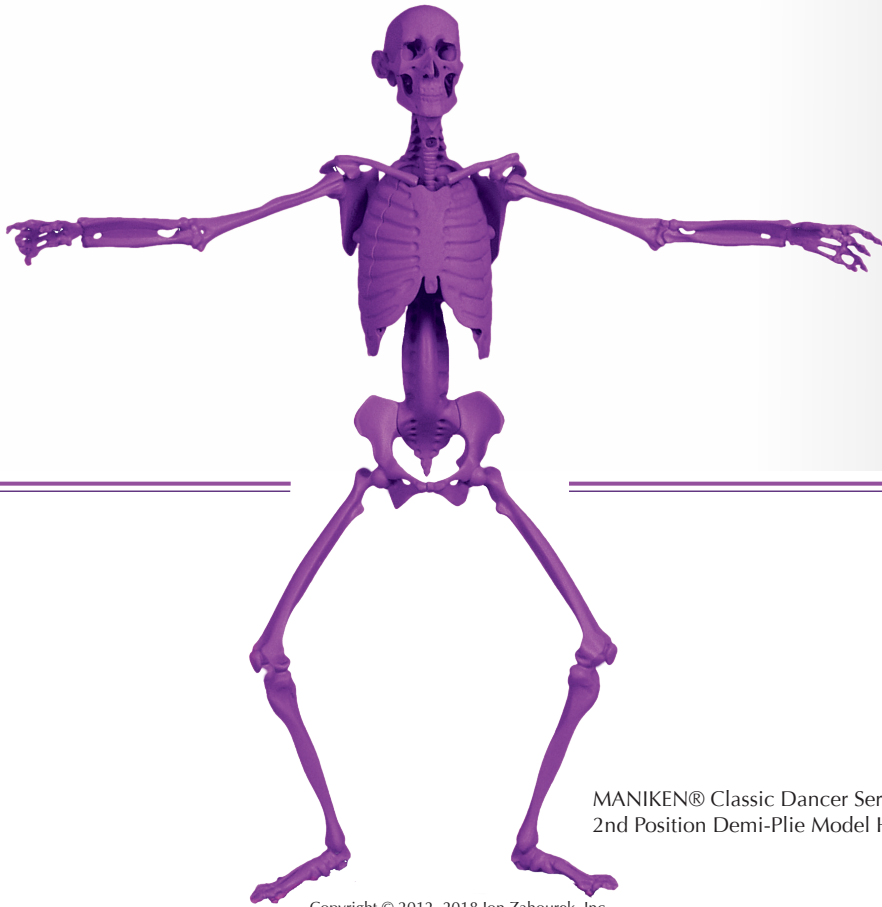




ANATOMY IN CLAY® LEARNING SYSTEM

The Mind Cannot Forget What The Hands Have Learned.™



November: Alzheimer's Disease Awareness Month

One in eight older Americans has
Alzheimer's Disease.

MANIKEN® Classic Dancer Series:
2nd Position Demi-Plie Model Human Skeletal Model

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In support of America's **Alzheimer's Disease Awareness** Month in November, Chuck Roney, one of our lead educator advocates and the **FEATURED EDUCATOR** in our Fall Newsletter, has written an activity using the ANATOMY IN CLAY® Learning System.

Objectives

- Review Alzheimer's Disease statistics,
- Define Alzheimer's Disease and recognize the warning signs and symptoms,
- Identify the lobes and different regions of the brain, including and the location of the limbic system specifically the hippocampus and its role in short term memory, and
- Build the nervous system and define the disease structures that seem to be identified with the progression of Alzheimer's disease such as: amyloid plaques and neurofibrillary fibers.

Alzheimer's Disease Statistics

- 5.4 million Americans are living with Alzheimer's disease.
- One in eight older Americans has Alzheimer's disease.
- Alzheimer's disease is the sixth-leading cause of death in the United States and the only cause of death among the top 10 in the United States that cannot be prevented, cured or even slowed.
- The disease was named for Dr. Alois Alzheimer, a German doctor who in 1906 found abnormal clumps of tangled fibrous bundles in the brain of a woman who had died of an unusual mental illness.

What is Alzheimer's Disease?

- Alzheimer's is a type of dementia (dementia is a loss of brain function) that causes problems with memory, thinking and behavior.
- Alzheimer's is the most common form of dementia. Alzheimer's accounts for 50 to 80 percent of dementia cases.
- Alzheimer's is not a normal part of aging although the majority of people are 65 and older.
- Alzheimer's is a progressive disease that worsens over time.
- There are numerous stages that a person goes through during the course of this disease. These stages can be summed up as follows: Normal, to forgetting words or objects, to confusion, to not being able to care for themselves, and finally not being able to respond to their environment.

Hippocampus and Alzheimer's

- The hippocampus is the part of the brain that is involved in memory forming, organizing, and storing. It is part of the limbic system, appears to be primarily responsible for our emotional life, and has a lot to do with the formation of memories.
- It is a frequent observation that without a fully functional hippocampus, humans may not remember where they have been and how to get where they are going.
- In Alzheimer's disease the hippocampus is one of the first regions of the brain to suffer damage causing memory problems and disorientation appear among the first symptoms.

What are the warning signs?

- Memory loss that disrupts early life.
- Challenges in planning and solving problems.
- Difficulty in completing normal tasks at home.
- Confusion with time and place.
- Trouble understanding visual images and spatial relationships.
- New problems with words in speaking and writing.
- Misplacing things and trouble retracing steps.
- Decreased or poor judgment.
- Withdrawal from work or social activities.
- Changes in mood and personality

Building the Brain

In this activity students will review the major lobes of the brain and the location of the limbic system. Special emphasis will be placed on the location and function of the hippocampus as it relates to Alzheimer's disease.

1. Using your ANATOMY IN CLAY® MANIKEN® model, start building the lobes of the brain. Begin with the Frontal lobe by taking a string of terra cotta clay about 10" inches long (the string should look like a piece of spaghetti). Allow the string to fall into the palm of your hand and then make it into a ball. Place this into the front portion of the skull in the MANIKEN® model. Do not let the clay go below the eye and not more than 1/3 back to the rear of the skull. The ridges or bumps are the gyri and the shallow grooves are the sulci.

2. Take a small piece of clay and form a horseshoe placing it up against the back of the Frontal lobe and this represents the pre-central gyrus. Repeat this procedure with another piece of clay, this time using blue clay, and place it against the pre-central gyrus. This represents the post-central gyrus.

3. Using the same method that was done to create the Frontal lobe you will now make the Parietal lobe. This will be placed against the post-central gyrus and fill the back portion of the brain.

4. Using the same method as before, create the Occipital lobe by taking a string of yellow clay, forming it into a ball and place it into the posterior cranial fossa below the Parietal lobe.

5. Create the Temporal lobe by taking green clay, about the size of a peanut M&M, take the string of clay and fold it into an oblong structure and place it in front of the Occipital lobe but do not go past 1/2 way across the brain.

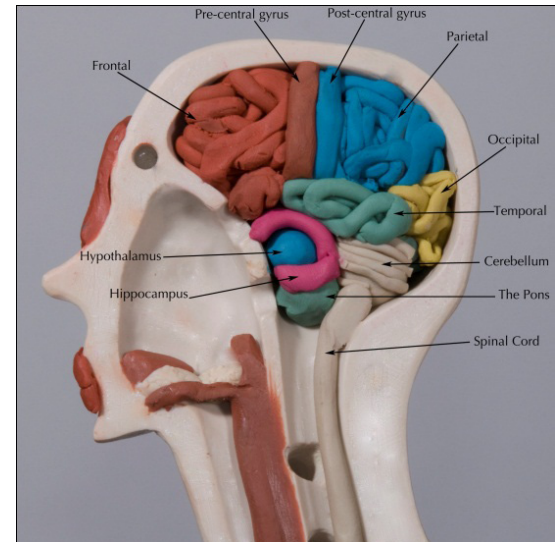
6. To make the Cerebellum, take beige or buff color clay to represent those myelinated portions of the nervous system that appear white. Take the ball of clay and extend it anteriorly to about 1/4 of the Temporal lobe. Make very thin angel hair spaghetti pieces, which will represent the gyri, and place them parallel to one another on the cerebellum next to each other in a horizontal alignment. The area between the gyri is the sulci.

7. Take another piece of beige clay and make it into a tube about 3" inches long, attaching it to the Cerebellum and running it down the depression on the model. This piece will represent the Spinal Cord.

8. Take a green piece of clay make it into a ball about the size of an M&M and place it anteriorly to the beginning of the spinal cord. This will represent the Pons.

9. Take a piece of blue clay smaller than an M&M and place it anteriorly to the Cerebellum, just below the Temporal lobe and just above the Pons. This will represent the Hypothalamus.

10. Now that you have created the lobes of the brain, add the structure that is relevant to the discussion of Alzheimer's disease – the Hippocampus, which as described earlier, plays a major role in short-term memory and degenerates with this disease. Take a piece of red clay, make a thin tube about 2" inches long and wrap it around the Hypothalamus just above the Pons.



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Additional Physiology Information

Amyloid Plaques, Neurofibrillary Tangles, and Brain Shrinkage

- Amyloid is a general term that is used for protein fragments that the body normally produces. Beta amyloid is a protein fragment snipped from an amyloid precursor protein. In a healthy brain, these protein fragments are broken down and eliminated. In an Alzheimer's brain, the fragments accumulate to form hard, insoluble plaques.
- Neurofibrillary tangles are insoluble twisted fibers found inside the brain's cells. These tangles consist of a protein called tau, which forms part of a structure called a microtubule. The microtubule helps transport nutrients and other important substances from one part of the nerve cell to another. In Alzheimer's disease, however, the tau protein is abnormal and the microtubule structures collapse.
- In Alzheimer's disease, there is an overall shrinkage of brain tissue. The grooves in the brain called sulci are noticeably widened and there is shrinkage of the gyri, the well-developed folds of the brain's outer layer. The ventricles (chambers) within the brain that contain cerebrospinal fluid are noticeably enlarged.

Further Facts, Images and Resources

<http://rienstraclinic.com/newsletter/2006/November/>
<http://www.ahaf.org/alzheimers/about/understanding/>
<http://www.seniorhomes.com/p/alzheimers-care-costs/>
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