

Stroke Basics



What is a stroke?

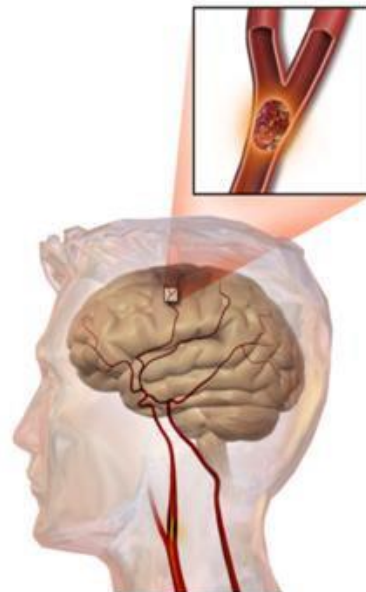
A **stroke** occurs when blood supply to the brain is suddenly reduced or a blood vessel bursts. A stroke prevents brain tissue from getting the oxygen and nutrients that the brain needs to survive. When a stroke occurs, brain cells begin to die within minutes.

There are two different types of stroke:

- **Ischemic** stroke (non-bleeding)
 - **Transient Ischemic Attack (TIA)**
- **Hemorrhagic** stroke (bleeding)

What is an Ischemic stroke and Transient Ischemic Attack (TIA)?

Ischemic stroke occurs when the arteries to your brain become narrowed or blocked. This causes reduced blood flow and oxygen to the brain tissue leading to permanent brain tissue injury. **Transient ischemic attack (TIA)** is caused by a temporary decrease in blood flow and oxygen to your brain. TIAs do not cause long-term neurological impairment



"Blausen 0836 Stroke" by Blausen Medical Communications, Inc. Licensed under CC BY 3.0 via Wikimedia Commons.

(neurological symptoms) or permanent brain tissue injury.

What causes ischemic stroke and TIA?

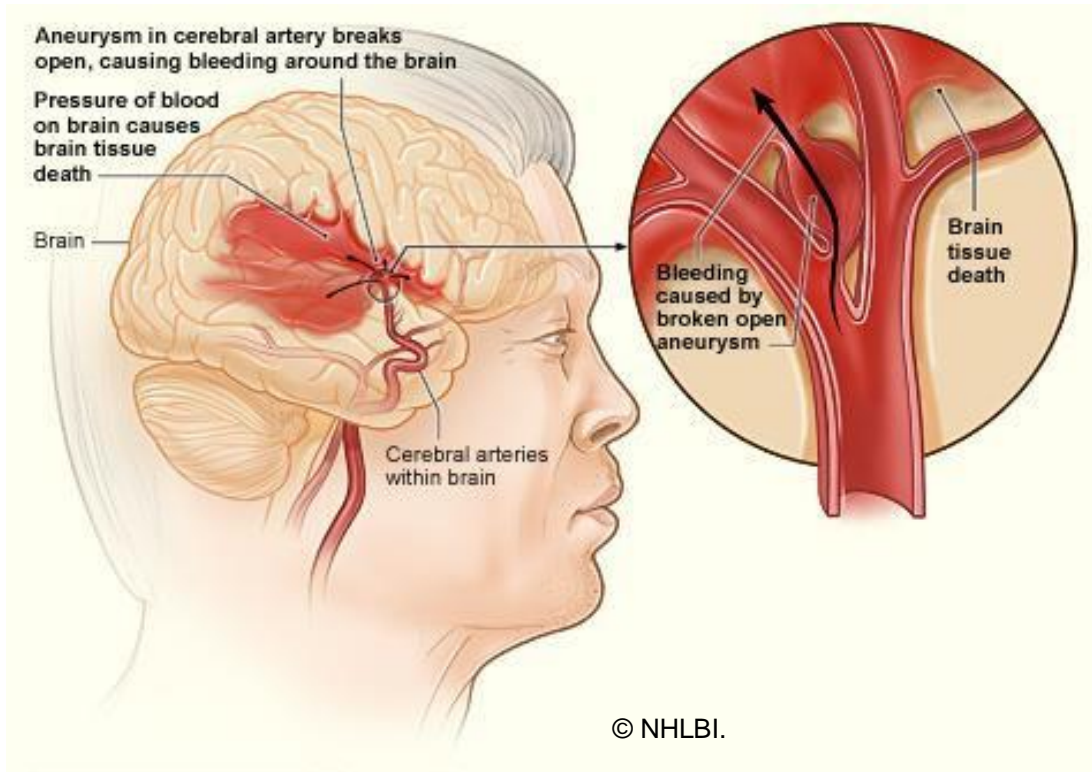
- Long-standing high blood pressure: This is called **small vessel (or lacunar) stroke**.
- Plaque or cholesterol buildup which can narrow or block arteries in the brain or neck: this is called **Atheroembolic or atherosclerotic stroke**.
- A blood clot travels from your heart to your brain, blocking blood flow: this is called a **cardioembolic stroke**. A common cause of cardioembolic stroke is atrial fibrillation.
- Unknown case: This is called an **idiopathic/cryptogenic stroke**, occurring in about 1 out of 3 of people who experience an ischemic stroke.
- Other (endocarditis, dissection, drugs of abuse)

What is a hemorrhagic stroke?

Hemorrhagic strokes occur when a blood vessel bursts causing bleeding inside of the brain.

There are two types of hemorrhagic stroke:

1. **Intraparenchymal** (in·tra·pa·ren·chy·mal) **hemorrhage** occurs when a blood vessel in the brain bursts. Intraparenchymal hemorrhages are often related to high blood pressure or trauma to the head.
2. **Subarachnoid** (sub·arach·noid) **hemorrhage** occurs when a blood vessel bursts within the **subarachnoid space**, which is the area between your brain and the tissues that cover it. Subarachnoid hemorrhages are often related to aneurysms (bulging due to weak blood vessel) or trauma to the head.



What are the effects of stroke?

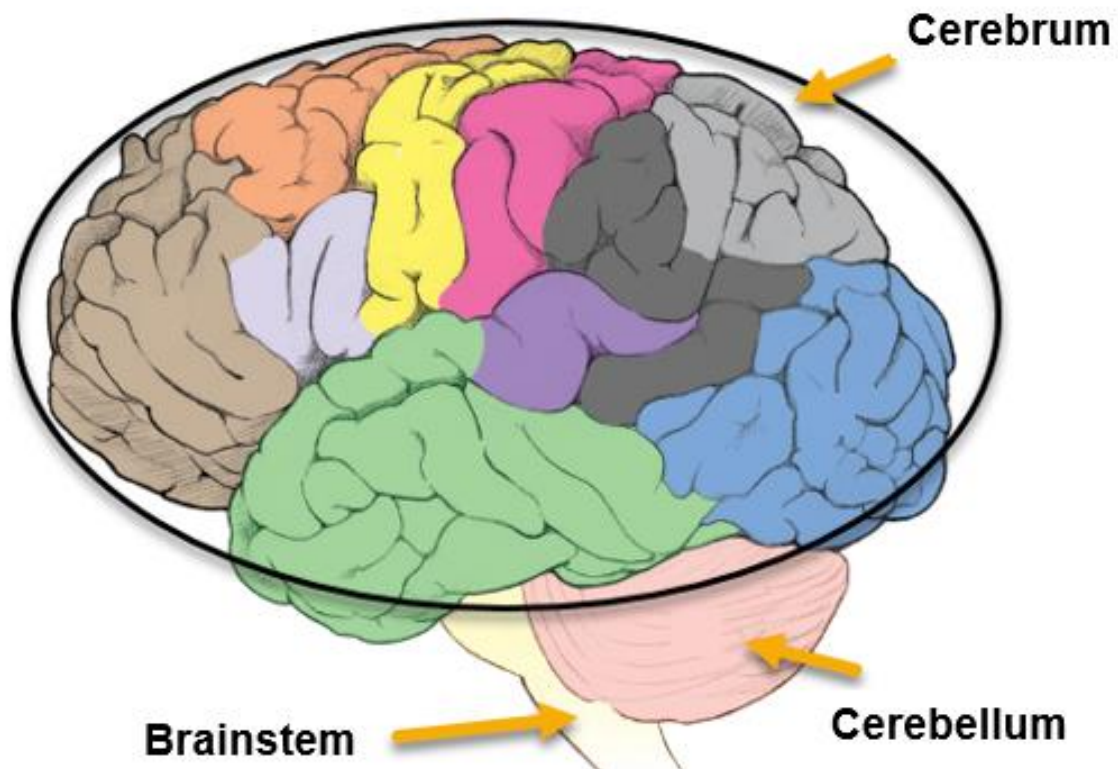
The effects of stroke vary from person to person and are based on the location and size of the stroke, as well as the person's baseline level of function. Each part of the brain is responsible for a specific function. When a specific area of the brain is damaged, the normal function of that area may become impaired.

Main Parts of the Brain and their Function

The brain is divided into three different sections:

- Cerebrum (right and left side)
- Cerebellum
- Brainstem

Three Main Functional Areas of the Brain



The Cerebrum

The language function (or ability to understand language or communicate) is located in your left hemisphere. Memory changes can occur from damage to either side of the cerebrum.

- Effects of a **right hemispheric stroke** can include sudden:
 - Left-sided weakness or paralysis and sensory changes
 - Gaze preference to the right
 - Left-sided neglect or lack of awareness of the left side of the person's space or body
 - Difficulty with directions or depth perception
 - Loss of the left visual field in both eyes

- Difficulty with speech (how words sound)
- Effects of a **left hemispheric stroke** can include sudden:
 - Right-sided weakness or paralysis and sensory changes
 - Gaze preference to the left
 - Problems understanding verbal and written language
 - Loss of the right visual field in both eyes
 - Difficulty with speech (how words sound)

- Please see the image at the end of this chapter for an illustration of the functional areas of the cerebral cortex. This image can help you understand what functions the different parts of the brain control.

The Cerebellum

- Effects of a **cerebellar stroke** can include sudden:
 - Dizziness
 - Imbalance and problems with coordination
 - Difficulty with speech (how words sound)
 - Nausea, vomiting

The Brainstem

The brainstem is the body's vital support and controls functions such as blood pressure, breathing, and heartbeat. The brainstem also controls eye movement, speech, and swallowing. As with cerebral strokes, brainstem strokes can cause left- or right-sided weakness or numbness.

- Effects of a **brainstem stroke** can include sudden:
 - Impaired swallowing
 - Difficulty with speech (how words sound)
 - Double vision
 - Imbalance and problems with coordination
 - Trouble walking

- Weakness or paralysis, usually on one side of the body
- Numbness, usually on one side of the body

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FUNCTIONAL AREAS OF THE CEREBRAL CORTEX

1 Higher Mental Functions
Concentration
Planning
Judgment
Emotional expression
Creativity
Inhibition - Ability to control self

2 Motor Function Area
Eye movement and placement of eyes

3 Broca's Area
Ability to talk
Ability to write

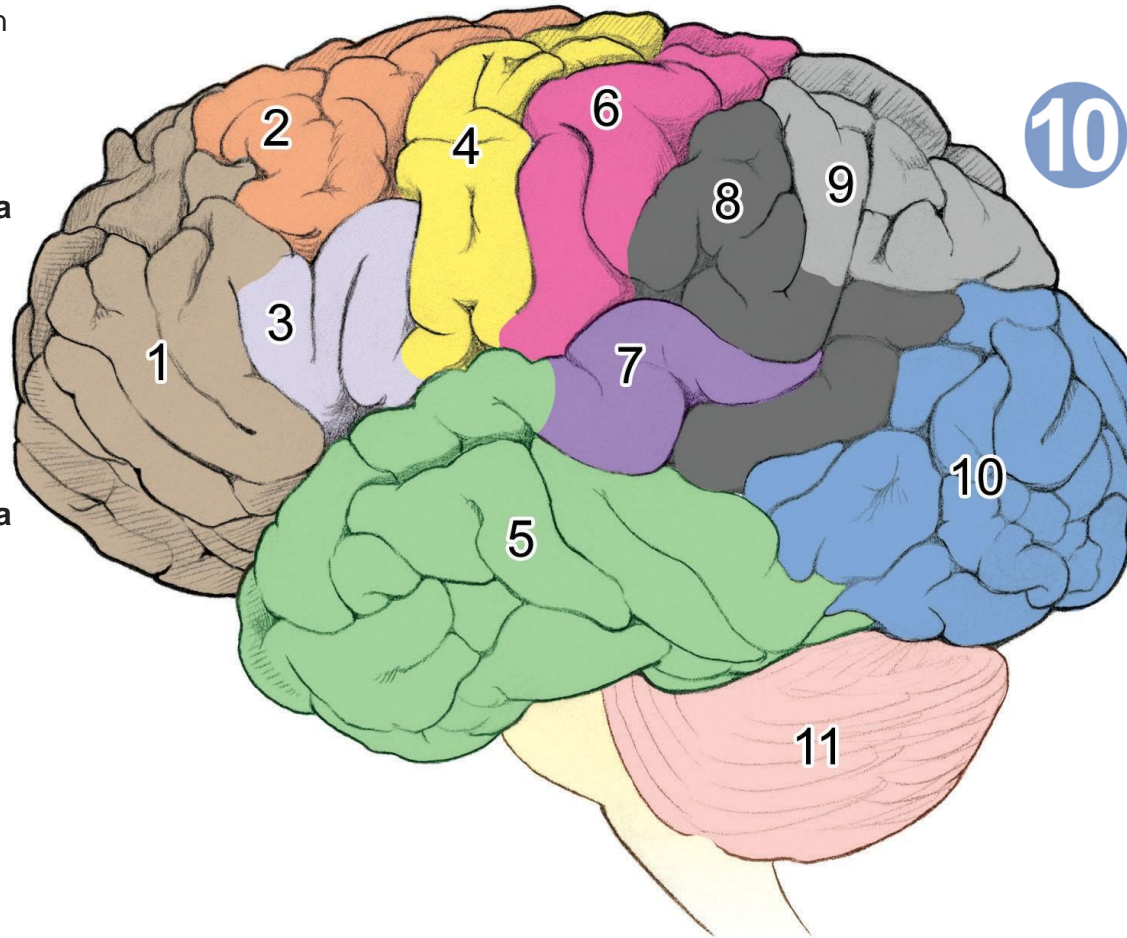
4 Motor Function Area
Ability to move muscles

5 Association Area
Short-term memory
Emotion

6 Sensory Area
Touching and feeling

7 Auditory Area
Hearing

8 Wernicke's Area
Written and spoken language understanding



9 Somatosensory Association Area
Understanding of weight, texture, temperature, etc. for recognizing and comprehending an object

10 Visual Areas
Sight
Ability to recognize pictures
Awareness of size and shape

FUNCTIONAL AREAS OF THE CEREBELLUM

11 Motor Functions
Coordination of movement
Balance
Posture