# Stereotactic Brain Biopsy

## What is a brain biopsy?

A brain biopsy is a procedure performed by a neurosurgeon to remove a sample of abnormal brain tissue for examination under a microscope. The purpose of this procedure is to determine the existence or cause of disease.

## What is a stereotactic brain biopsy?

A stereotactic brain biopsy is a minimally invasive procedure that allows a neurosurgeon to use pictures of a patient's brain (from an MRI or CT scan) like a road map to remove a piece of abnormal tissue, which is also called a lesion.

3D computer models based on MRI or CT scans locate a lesion before surgery and show its exact position. During the procedure, infrared cameras can match the "real patient" to the 3D computer model, which functions like the global positioning system (GPS) in a car, to help map the procedure and locate the abnormal tissue. Instruments used in the procedure are also detected by the cameras and are displayed on the computer model in real-time.

## Why is a stereotactic brain biopsy performed?

A stereotactic biopsy is performed to remove tissue samples to determine the existence or cause of disease. This information is then used to select the appropriate treatment for the patient.

## Who examines the brain tissue?

A physician who specializes in examining brain tissue cells, called a neuropathologist, receives the sample and performs a variety of tests to make a diagnosis. This process takes 5-7 days before final results are known.

## Overview of the procedure

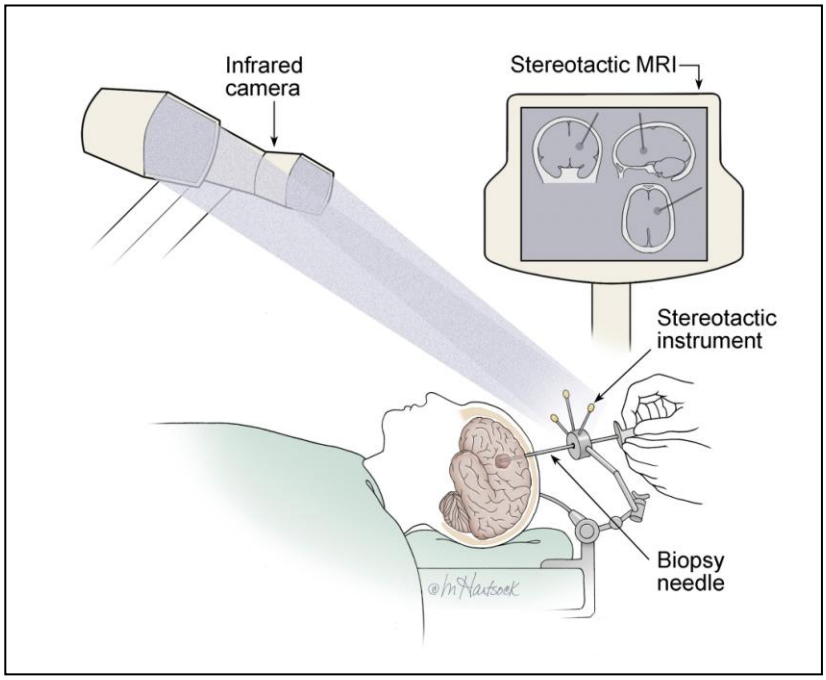
### What happens before the biopsy?

- In the doctor's office, you will sign consent forms and complete paperwork to inform the surgeon about your medical history (i.e. allergies, medications, anesthesia reactions, previous treatment).
- Several days before surgery, you will need preoperative testing that may include an electrocardiogram (EKG), chest X-ray and blood work.
- A special MRI, used specifically for stereotactic procedures, will be obtained prior to surgery. Small adhesive markers will be applied to your scalp and remain in place until surgery is completed.

**Preparing for the biopsy:**

- One week prior to surgery, discontinue all non-steroidal anti-inflammatory medicines (e.g. Naproxen, Advil, etc.) and blood thinners (e.g. Coumadin, heparin, aspirin, Plavix, etc.). Additionally, stop smoking, chewing tobacco and drinking alcohol because these activities can cause bleeding problems.
- Do not eat or drink anything past midnight the night before surgery. On the morning of your biopsy, you may take certain medications as instructed by your doctor with a small sip of water.

**What happens during the biopsy?**




There are **five** main steps during a stereotactic biopsy:

1. Positioning and registration
2. Making a skin incision and creating an opening in the skull
3. Inserting the needle and obtaining a tissue sample
4. Examination of tissue sample by the neuropathologist
5. Closure

**Step 1: Positioning and registration**

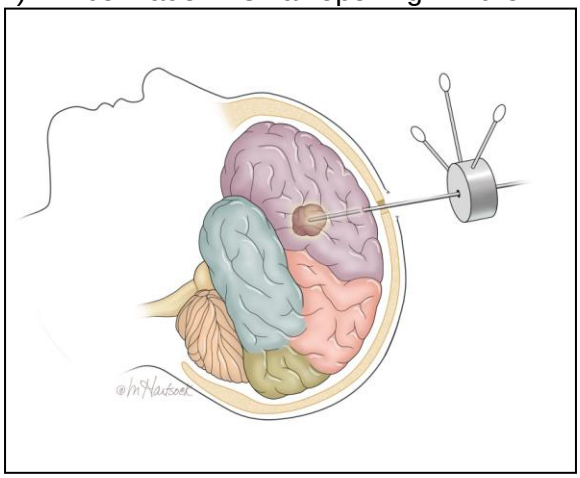
With an intravenous (IV) line placed in your arm, general anesthesia will be administered while you lie on the operating table. Once asleep, your head will be placed in a 3-pin skull fixation device that attaches to the table and holds your head in position during the procedure.

Your head will be aligned with the images from your stereotactic MRI to form a 3D model on a computer screen in a process called registration. This process will enable your neurosurgeon to monitor the biopsy on a screen, in real-time, as it is being performed.

**Step 2: Making a skin incision and creating an opening in the skull**

A small strip of hair around the incision will be shaved. After the scalp is thoroughly cleaned, a small incision will be made in a location that provides the best path to the targeted abnormal tissue.

After the incision, a burr hole (a nickel-sized hole in the skull) will be made. A small opening will then be made in the protective covering of the brain to expose and access the brain tissue located underneath.



**Step 3: Inserting the needle and obtaining a tissue sample**

Using the 3D model created by the MRI and CT scans, a biopsy needle will be inserted through the burr hole to the exact location of the lesion to remove a tissue sample (Figure 1). The neurosurgeon will watch the needle in real-time on the screen during insertion. Approximately 4 small samples will be removed for testing.

**Step 4: Examination of tissue sample by the neuropathologist**

The tissue samples will be immediately taken to a neuropathologist for a preliminary reading to make sure the sample is usable. Once confirmed, the neurosurgeon will usually obtain additional samples for testing. Final pathology results take 5-7 days and will be discussed at your follow-up appointment.

Figure 1

**Step 5: Closure**

After a tissue sample is removed, a small titanium plate will be attached to the skull with screws to cover the opening made from the burr hole. The plate and screws will permanently support the area, and can sometimes be felt under your skin. The skin incision will be closed with staples, stiches or topical adhesive. A soft bandage is placed over the incision, and will be removed the next day.

## What happens after the biopsy?

After the biopsy, vital signs will be monitored closely as you awake from anesthesia. Once awake, you will be transferred to the Neuroscience Care Unit on the fourth floor of the hospital for close observation and monitoring.

While recovering, a nurse will check your pupils with a flashlight and ask questions, such as "what is your name?" You will be frequently asked to move arms, fingers, legs and toes. Nausea and headache after surgery may occur and medications will be given to control these symptoms. After surgery, steroid medication (to control brain swelling) and anticonvulsant medication (to prevent seizures) will be given and gradually stopped as directed by your doctor. In most cases, you will remain in the hospital overnight and will be discharged the next day.

## Discharge Instructions

When released from the hospital discharge instructions will be provided regarding activity level, wound care, medications and follow-up appointments. At your postoperative visit, final pathology results and treatment options will be discussed with your neurosurgeon. Any stitches or staples from the procedure will be removed 10-14 days after surgery in a physician's office. If a topical adhesive was used to close the incision, it will dissolve over 2-4 weeks with the incision care outlined in the discharge instructions.

## What are the risks?

Possible risks associated with a stereotactic biopsy procedure include, but are not limited to: hemorrhage (bleeding in the brain), brain swelling, seizures, infection or stroke. Rarely, the biopsy samples will not provide a definitive diagnosis and additional testing may be required.

---

**Updated:** 10.2013
**Reviewed by:** Morgan Laubach, CNP; Ronald E. Warnick, MD