

Biopsy

Biopsy is the removal and examination of a part or whole of the lesion.

The term biopsy most often indicates the removal of tissue from a living subject for histological evaluation and analysis. It is important for the clinician to obtain a proper specimen from the lesion for evaluation.

Overview

In some cases, a sample of tissue or cells is needed to help diagnose an illness or identify a cancer. The removal of tissue or cells for analysis is called a biopsy. While a biopsy may sound scary, it is important to remember that most are entirely pain-free and low-risk procedures. Depending on the situation, a piece of skin, tissue, organ, or suspected tumour will be surgically removed and sent to a lab for testing.

Why a biopsy is done

- A biopsy is the only sure way to diagnose most cancers.
- Imaging tests like CT scans and X-rays can help identify areas of concern, but they can't differentiate between cancerous and noncancerous cells.
- Biopsies are typically associated with cancer.
- Biopsy is also used to test whether abnormalities in the body are caused by cancer or by other conditions.

If a woman has a lump in her breast, an imaging test would confirm the lump, but a biopsy is the only way to determine whether it's breast cancer or another noncancerous condition, such as polycystic fibrosis.

Types of Biopsy

1. **Surgical biopsy**
 - a. **Excisional biopsy**
 - b. **Incisional biopsy**

2. Fine Needle Aspiration Cytology (FNAC)

3. Thick needle or Core biopsy

There are several different kinds of biopsies. Whatever the type, local anaesthesia is given to numb the area where the incision is made.

Bone marrow biopsy

A **bone marrow biopsy** is part of a **bone marrow** test that takes a sample of solid **bone** tissue. This test looks for abnormalities in blood cells and signs of any diseases. Patients can be given anaesthesia or a sedative before the **biopsy**, and manage any pain afterward with over-the-counter medications.

A bone marrow biopsy can take about 60 minutes. Bone stem cells that help produce:

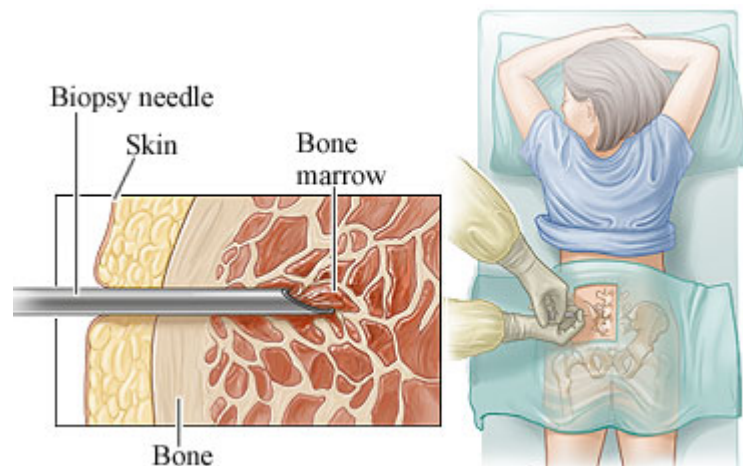
- Red and white blood cells
- Platelets
- Fat
- Cartilage
- Bone

Fig: Bone marrow sample collection

As age, more of the marrow becomes yellowish due to an increase in fat cells.

The red marrow is extracted, usually from the back of the hip bone. And the sample will be used to check for any blood cell abnormalities.

The pathology lab that receives your marrow will check to see if your bone marrow is making healthy blood cells. If not, the results will show the cause, which may be an infection, bone marrow disease, or cancer.



Cases

- Anaemia, or a low red blood cell count
- Bone marrow diseases, such as myelofibrosis or myelodysplastic syndrome
- Blood cell conditions, such as leukopenia, thrombocytopenia, or polycythemia
- Cancers of the bone marrow or blood, such as leukaemia or lymphomas
- Hemochromatosis, a genetic disorder in which iron builds up in the blood
- Infection or fever of unknown origin

Purpose: If it is suspected that there are problems with blood, it may undergo a bone marrow biopsy. This test can single out both cancerous and noncancerous conditions like leukaemia, anaemia, infection, or lymphoma. The test is also used to check if cancer cells from another part of the body have spread to bones.

Bone marrow is most easily accessed using a long needle inserted into hip bone. The insides of bones cannot be numbed, so patients may feel a dull pain during this procedure. Others, however, only feel an initial sharp pain as the local anaesthetic is injected.

Complications:

- Haemorrhage, or excessive bleeding
- Allergic reaction to anaesthesia
- Infection
- Persistent pain where the biopsy was done

Patient should be asked, if-

- Any medications or supplements she/he is taking
- Medical history, especially if patient has a history of bleeding disorders
- Any allergies or sensitivities to tape, anaesthesia, or other substances
- Patient is pregnant or think she might be
- If she/he has extra anxiety about having the procedure and need medication to help her/him relax

Sample Collection: steps

- Before the biopsy, patient will change into hospital gown
- Patient will have a heart rate and blood pressure checked.
- Patients will be asked to sit on their side or lie on their stomach.
- A local anaesthetic is applied to the skin and to the bone to numb the area where the biopsy will be taken.
- A bone marrow biopsy is most commonly taken from the ridge of the rear hip bone or from the chest bone.
- A needle is pushed through the skin into bone to collect red marrow.
- The needle goes into the bone and collects red marrow

Endoscopic biopsy

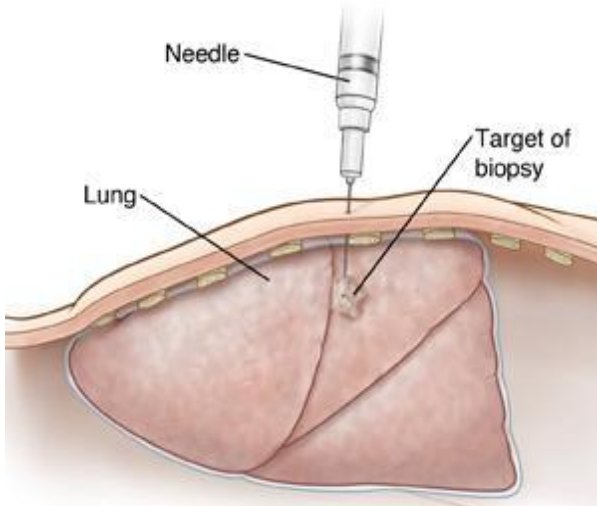
Where: Endoscopic biopsies are used to reach tissue inside the body in order to gather samples from places like the bladder, colon, or lung.

Procedure: During this procedure, a flexible thin tube called an endoscope. The endoscope has a tiny camera and a light at the end. A video monitor allows viewing the images. Small surgical tools are also inserted into the endoscope. Using the video, these are guided to

collect a sample. The endoscope can be inserted through a small incision in the body, or through any opening in the body, including the mouth, nose, rectum, or urethra.

Time: Endoscopies normally take anywhere from 5 to 20 minutes.

Afterward, the patient might feel mildly uncomfortable, or have bloating, gas, or a sore throat. These will all pass in time.



Needle biopsies

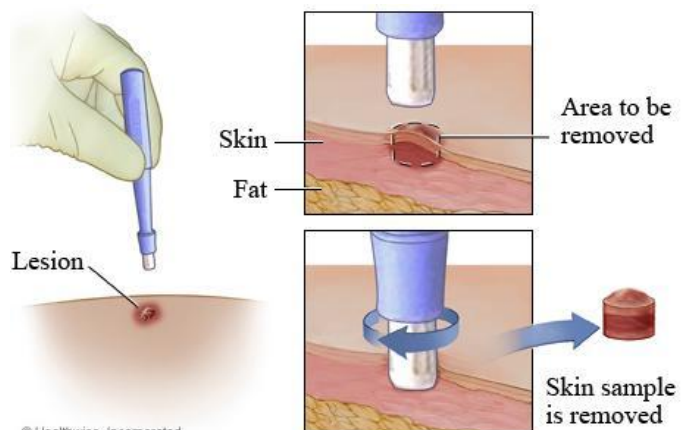
Use: Needle biopsies are used to collect skin samples, or for any tissue that is easily accessible under the skin. The different types of needle biopsies include the following:

- Core needle biopsies use medium-sized needles to extract a column of tissue, in the same way that core samples are taken from the earth.
- Fine needle biopsies use a thin needle that is attached to a syringe, allowing fluids and cells to be drawn out.
- Image-guided biopsies are guided with imaging procedures — such as X-ray or CT scans — so it is easy to access specific areas, such as the lung, liver, or other organs.
- Vacuum-assisted biopsies use suction from a vacuum to collect cells.

Skin biopsy

A skin biopsy is a procedure in which a sample of skin tissue is removed, processed, and examined under a microscope.

Methods: Several different methods may be used to obtain a skin sample, depending on the size and location of the abnormal area of skin, called a skin lesion. The skin sample is placed in a solution, such as formaldehyde, or in a sterile container if infection is suspected. In each of these procedures, the tissue is processed and then examined under a microscope.



Skin biopsies most often are done to diagnose skin cancer, which may be suspected when an abnormal area of skin has changed colour, shape, size, or appearance or has not healed after an injury. Skin cancers are the most common type of cancers.

Early diagnosis of a suspicious skin lesion and skin biopsy can help identify skin cancers and lead to early treatment

A rash or lesion on skin which is suspicious for a certain condition, does not respond to therapy prescribed by your doctor, or the cause of which is unknown, your doctor may perform or order a biopsy of the involved area of skin. This can be done by using local

anaesthesia and removing a small piece of the area with a razor blade, a scalpel, or a small, circular blade called a “punch.” The specimen will be sent to the lab to look for evidence of conditions such as infection, cancer, and inflammation of the skin structures or blood vessels.

Process of Biopsy:

1. Choose the most suspicious area. e.g. Red area when pre malignancy is suspected
2. Avoid ulcers slough and necrotic tissue
3. Give regional or local anaesthesia into the lesion including normal tissue margin.
4. Specimens are collected.
5. Specimens should be preferable at least 1 cm long and 0.6cm wide by 2mm deep.
6. Specimen edge should be vertical not developed.
7. For large lesions several areas may need to be sampled.
8. Label the specimen bottle with the patient's name and clinical details.
9. Suture and control any bleeding
10. Give analgesics.

How to Prepare

Before a skin biopsy, patient should be asked if s/he:

- Is taking any medicines, particularly anti-inflammatory medicines such as prednisone. Anti-inflammatory medicines may change the way biopsy looks under the microscope.
- Is allergic to any medicines.
- Has had any bleeding problems or is taking blood-thinning medicines, such as aspirin or warfarin (Coumadin).
- Is or might be pregnant.

No special preparation is needed before having this test.

Patient is asked to sign a consent form that says she/he understands the risks of the test and agrees to have it done.

How It Is Done

- Usually the place where the biopsy will be taken is cleaned with an alcohol wipe.
- A marker may be used to outline the edges of the skin sample.
- For some biopsies, a surgical drape is used to cover the area around the biopsy and the doctor will wear a mask, gown, and gloves.

- Several different methods may be used to obtain a skin sample, depending on the size and location of the skin lesion.
- The skin sample is placed in a solution, such as formaldehyde, or in a sterile container if infection is suspected.
- In each of these procedures, the tissue is then examined under a microscope.

Excision

After a local anaesthetic is injected, the entire lesion is removed with a scalpel. Stitches are used to close the wound. Pressure is applied to the site until the bleeding stops. The wound is then covered with a bandage or sterile dressing. If the excision is large, a skin graft may be needed.

Risks

Although unlikely, there is a slight risk of infection and a slight risk of persistent bleeding. If you usually form scars after skin injuries or surgery, you could develop a scar at the biopsy site.

After the procedure

Patients should be instructed on how to care for biopsy sites. Keep the biopsy site clean and dry until it heals completely.

Stitches will be taken out 3 to 14 days after the biopsy, depending on the biopsy site. Adhesive bandages should remain in place until they fall off. This usually takes from 7 to 14 days.

The biopsy site may be sore or bleed slightly for several days. Ask your doctor how much bleeding or other drainage is expected. Call your doctor immediately if you have:

- Excessive bleeding or drainage through the bandage. If excessive bleeding occurs, apply pressure to the biopsy site and contact your doctor.
- Increased tenderness, pain, redness, or swelling at the biopsy site.
- A fever.

Results

A skin biopsy is a procedure in which a sample of skin tissue is removed, processed, and examined under a microscope

Results from a skin biopsy usually are available in 3 to 10 days.

Skin biopsy	
Result	Found
Normal:	The skin sample consists of normal skin tissue.
Abnormal:	Noncancerous (benign) growths are seen. Benign growths do not contain <u>cancer</u> cells. Benign skin changes include moles, <u>skin tags</u> , <u>warts</u> , <u>seborrheic keratoses</u> ,

keloids, cherry angiomas, and benign skin tumours, such as neurofibromas or dermatofibromas.

Cancer cells such as basal cell cancer, squamous cell cancer, or melanoma are present.

Other diseases such as lupus, psoriasis, or vasculitis are present.

A bacterial or fungal infection is present.

Surgical biopsy

Sometimes a patient may have an area of concern that cannot be safely or effectively reached using the methods described above or the results of other biopsy specimens have been negative. An example would be a tumour in the abdomen near the aorta. In this case, a surgeon may need to get a specimen using a laparoscope or by making a traditional incision

Types according to the techniques of Biopsies:

Shave biopsy

- After a local anaesthetic is injected, a surgical knife (scalpel) is used to shave off the growths. Stitches are not needed.
- Any bleeding can usually be controlled with a chemical that stops bleeding and by applying pressure.
- The biopsy site is then covered with a bandage or sterile dressing.

Punch Biopsy

Punch biopsy is considered the primary technique to obtain diagnostic, full-thickness skin specimens. It is performed using a circular blade or trephine attached to a pencil-like handle. The instrument is rotated down through the epidermis and dermis, and into the subcutaneous fat.

A small part of the lesion is obtained as a specimen using a punch. This technique is of particular use in mucosal lesions from inaccessible regions that cannot be reached by conventional methods. The technique produces some amount of crushing or distortion of the tissues.

Punch biopsy is considered the primary technique for obtaining diagnostic full-thickness skin specimens. It requires basic general surgical and suture-tying skills and is easy to learn.

The technique involves the use of a circular blade that is rotated down through the epidermis and dermis, and into the subcutaneous fat, yielding a 3- to 4-mm cylindrical core of tissue sample.

Stretching the skin perpendicular to the lines of least skin tension before incision results in an elliptical-shaped wound, allowing for easier closure by a single suture.

Once the specimen is obtained, caution must be used in handling it to avoid crush artefacts.

Uses: Punch biopsies are useful in the work-up of cutaneous neoplasms, pigmented lesions, inflammatory lesions and chronic skin disorders. Properly administered local anaesthesia usually makes this a painless procedure.

Procedure:

- After a local anaesthetic is injected, a small, sharp tool that looks like a cookie cutter (punch) is placed over the lesion, pushed down, and slowly rotated to remove a circular piece of skin.
- The skin sample is lifted up with forceps or a needle and is cut from the tissue below.
- Stitches may not be needed for a small skin sample.
- If a large skin sample is taken, one or two stitches may be needed. Pressure is applied to the site until the bleeding stops.
- The wound is then covered with a bandage or sterile dressing.

Incisional Biopsy

*An **incisional biopsy** is a procedure in which a small area of tissue is taken to identify the composition (or make-up) of a lesion or abnormality.*

When there is a large diffuse lesion, a “representative” section of the lesion is incised with the help of a scalpel along with the normal tissue and sent for histopathological evaluation. The depth of the biopsy should be enough to obtain a representative area of the lesion. Usually an elliptical, wedge-shaped tissue is obtained with the “V” of the wedge converging into the deeper tissues.

Excisional Biopsy

An excisional biopsy is a more involved procedure where the entire abnormality or area of interest is removed.

Excisional biopsy is taken if the lesion is extremely small in size. In these cases, the entire lesion is excised into the same sitting and sent for histopathological examination. It is a combination of diagnostic and ablative procedure and is suitable for lesions <1 cm.

With all the investigations in hand, the clinician has a clear picture of the type, the location, extent and behaviour of the lesion. A final diagnosis is then obtained and a suitable medical or surgical line of treatment is decided upon.

How are the incisional and excisional tests performed?

- Incisional or excisional biopsies are generally done to follow up on an abnormality detected on a scan or physical exam. These are typically performed as an outpatient procedure, using local anaesthesia (a numbing medicine). Occasionally, depending on the location of the biopsy, a medicine may also be given to help you relax.
- A small cut in the skin will be made to access the area. If the area cannot be felt, X-ray or ultrasound can be used to locate the area.
- The procedure typically takes about an hour. If a sedating medicine is given, an hour or two is needed to recover.
- The sample is then sent for review to the pathologist, a doctor who specialises in looking at tissues under the microscope.
- Similar to any biopsy, the most common risk associated with the procedure is bleeding. A hematoma, or a pocket of blood, can form and collect at the site of the biopsy. This can be uncomfortable but should resolve over the following week.

How to prepare a patient for an incisional or excisional biopsy?

- If sedation is going to be given, it is needed to fast for 6-8 hours prior to the procedure. If only local anaesthesia is used, there is no fasting needed.
- If the patient is on blood thinners, it should be stopped several days in advance. This should be discussed when the biopsy is scheduled.

Results of a pathology report

- Following the biopsy, the tissue sample is processed by a pathologist. A preliminary report is given; however, the final report generally takes several days.
 - The report generally states the patient's name, date of birth, site of biopsy, and indication (reason for the test) at the top of the report. Pathology reports follow a standard outline, regardless where they are obtained. The findings are discussed in a very systematic approach.