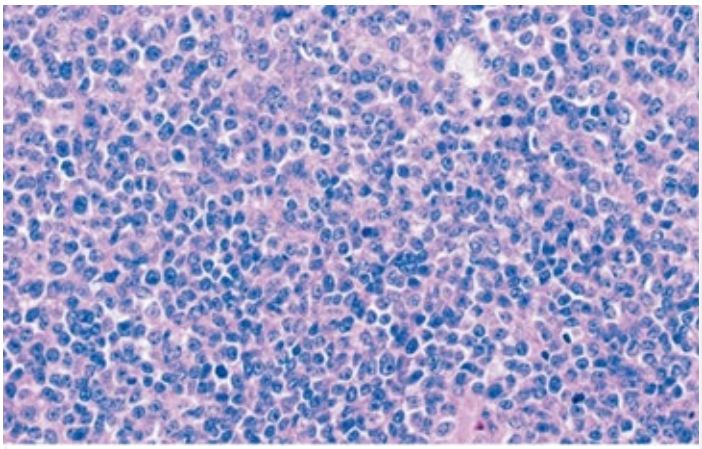
ASCP PATIENT CHAMPIONS

#TheLabSavedMyLife www.ascp.org/patients

LABORATORY TESTS RELATED TO SARCOMA

**Sarcomas can affect people of all genders. In this material, the terms "female" and "woman" are used to refer to people assigned female at birth. The terms "male" and "man" are used to refer to people assigned male at birth. Hormone therapy can affect some lab results, please consult your doctor about the correct reference ranges.*



UNDER THE MICROSCOPE

Ewing sarcoma is a type of cancer where the cells in the tumor grow together in a solid pattern. The cells look very similar to each other and have a large central part called the nucleus (which is blue in color) and a smaller surrounding part called the cytoplasm (which is pink in color). In Ewing sarcoma, the nucleus is much bigger compared to the cytoplasm, which indicates that the cancer cells are growing and dividing rapidly.

WHAT IS SARCOMA?

Sarcoma is a general term for a broad group of cancers that usually begins in the bones or soft tissues, which are also called connective tissues, and include muscle, fat, tendons, blood vessels, and nerves. There are over 70 types of sarcomas that generally fall into two categories, soft tissue sarcoma and bone sarcoma, depending on where they start.

COMMON BONE SARCOMAS

- Osteosarcoma – Develops in cells that form bones
- Chondrosarcoma – Develops in cartilage
- Ewing sarcoma – Develops in bone cells or immature soft tissue
- Fibrosarcoma – Develops in fibrous tissue, which supports, protects, and holds bones, muscles, and other tissues and organs in place

COMMON SOFT TISSUE SARCOMAS

- Angiosarcoma – Develops in the inner lining of the blood vessels
- Epithelioid sarcoma – Develops in the arms, hands, finger, legs, and feet
- Gastrointestinal stromal tumor (GIST) – Develops in the cells that line the gastrointestinal tract
- Kaposi's sarcoma – Develops in the cells that line lymph nodes or blood vessels
- Leiomyosarcoma – Develops in the muscles of organs in the pelvis and abdomen
- Liposarcoma – Develops in fatty tissue, often in the limbs or abdomen
- Rhabdomyosarcoma – Develops in cells that form skeletal muscles
- Synovial sarcoma – Usually develops in the cells near the tendons and joints

COMMON SIGNS AND SYMPTOMS OF SARCOMAS

Sarcoma symptoms vary depending on where the cancer develops. Some sarcomas will feel like small lumps under the skin, while others may cause internal pain when they grow large enough to press against organs.

OTHER SYMPTOMS MAY INCLUDE:

- Bone pain
- Pain in the hands, arms, feet, or legs
- Abdominal pain
- Weight loss
- Unexpected broken bones caused by a minor or no injury

DIAGNOSING SARCOMA

To diagnose sarcomas, a small piece of tissue needs to be taken out of the affected area in a procedure called a biopsy. This tissue sample is sent to a lab, where it is processed by laboratory professionals like pathologist assistants and histotechnologists and examined by a pathologist to determine the diagnosis. The pathologist may perform additional testing on the tissue to further identify the tumor.

TYPES OF BIOPSIES USED TO DIAGNOSE SARCOMA

FINE NEEDLE ASPIRATION: In a fine needle aspiration (also called fine needle biopsy), a doctor inserts a very thin, hollow needle into a tumor and collects a small amount of fluid and cells from the inside of the tumor. If the tumor is near the body's surface, the doctor can aim the needle by feeling the tumor with their hands. If the tumor is deeper in the body, they will use imaging like ultrasound or a CT scan to guide the needle. The advantage of this type of biopsy is that the skin doesn't have to be cut, and it can allow for faster diagnosis.

CORE NEEDLE BIOPSY: In a core needle biopsy, a doctor uses a needle to remove a small cylinder of tissue (about ½ inch long and 1/16 inch wide) from a tumor. Before they perform the procedure, they will use local anesthesia to numb the area. Similar to the fine needle aspiration procedure, if the tumor is near the body's surface, the doctor can aim the needle by feeling the tumor. If the tumor is deeper in the body, they will use imaging like ultrasound or a CT scan to guide the needle.

The cylinder of tissue from a core needle biopsy takes longer for the laboratory to process than the small amount of cells and fluid collected in a fine needle aspiration. This means results from core needle biopsies can take longer than results of fine needle aspirations, because there is more tissue to process.

EXCISIONAL OR INCISIONAL BIOPSY: In these biopsies, a doctor cuts through the skin to remove all or a part of a tumor. The procedure is called an excisional biopsy if they remove (or "excise") the entire tumor. If they only cut (or "incise") and remove a part of the tumor, the procedure is called an incisional biopsy. Doctors may choose to remove only part of the tumor if it is hard to reach or if the removal could cause complications.

Before the doctor performs either type of procedure, they will numb the area with local or regional anesthesia. If the tumor is inside the chest or abdomen, they will use general anesthesia to put the patient into a deep sleep so they are not awake for the procedure.

LAB TESTS RELATED TO DIAGNOSING SARCOMAS

The pieces of tissue removed during any biopsy are sent to the laboratory for a team of laboratory professionals and pathologists to analyze. Histotechnologists may perform a test called immunohistochemistry, where they stain the sample with special dyes to help identify the proteins associated with the tumor. Once they stain the slides, the pathologist can check to see if the tumor contains those proteins. This helps them to make a more specific diagnosis.

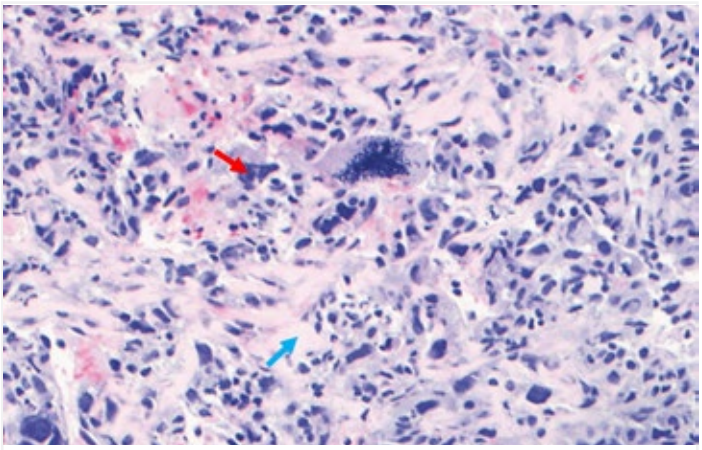
Sarcomas, like all cancers, are caused by changes in the genes that control the way cells grow and replicate. These changes are called genetic abnormalities and can be seen inside of tumor cells. Some genetic abnormalities are linked to specific types of sarcomas. Lab tests can identify these genetic abnormalities in tumors and help identify what type of sarcoma a person has. These tests include the following:

CYTOGENETICS: These tests examine the chromosomes inside cells. Chromosomes act as a library to store genetic information. Lab professionals can perform cytogenetic tests on tissue from a biopsy or tissue that has been processed and put on a glass slide. These tests can either identify all chromosomes in the cells or check for specific abnormalities related to a suspected diagnosis.

MOLECULAR GENETIC TESTS: These tests look at the DNA and RNA inside tumor cells. DNA is like a blueprint that tells your body how to grow and work properly. RNA acts as a messenger from DNA to the rest of the cells. During molecular genetic testing, DNA and RNA are removed from the cells or tissue obtained in a biopsy procedure. The DNA and RNA are then tested with special equipment to identify the specific genetic abnormality that is causing sarcoma.

ASK YOUR DOCTOR

- What type of sarcoma do I have?
- How does the type affect my treatment options?
- What are my treatment options?
- Why do you recommend this particular treatment option?
- What are the follow-up tests and what are we looking for?
- Are there any additional tests that would help better understand my disease prognosis?
- What screening tests do you recommend?
- Should I make any dietary or lifestyle changes?



UNDER THE MICROSCOPE

Osteosarcoma is a type of bone cancer. In this image, the cancer cells have dark blue centers (nuclei) that vary in shape and size, which is not normal. The cancer cells also produce a substance called "osteoid," which is a pink material that is deposited between the cells. This is what makes the tumor look pink. The blue arrow points to the osteoid, and the red arrow points to the abnormal nuclei.

STAGES OF SARCOMA

Staging is a way to describe where the cancer is located, how far it has spread, and what parts of the body it has spread to. The complete staging system is quite complex and includes the size, location, and grade of the tumor.

The grade of the tumor describes how closely it resembles healthy tissue.

Low grade (also called well-differentiated): The tumor closely resembles healthy tissue.

High grade (also called poorly differentiated): The tumor does not resemble healthy tissue.

STAGES OF SARCOMA	
STAGE IA	The tumor is 5 cm or less across and low grade. It has not spread to the lymph nodes or other parts of the body.
STAGE IB	The tumor is more than 5 cm across and low grade. It has not spread to the lymph nodes or other parts of the body.
STAGE IIA	The tumor is more than 5 cm across and higher grade. It has not spread to the lymph nodes or other parts of the body
STAGE IIB	The tumor is more than 5 cm across and higher grade. It has not spread to the lymph nodes or other parts of the body
STAGE III	The cancer is more than 5 cm and higher grade OR it has spread to the lymph nodes.
STAGE IV	The cancer has spread to other parts of the body.

MEET JAMES

"The laboratory team really helps you understand what you are going through, and they have a big part in saving your life."

When he was 13 years old, James, a piano prodigy who performed at Carnegie Hall for the first time at 11 years old, began experiencing extreme abdominal pain. His doctors identified a tumor outside his bladder, and biopsies were taken. He was diagnosed with Ewing Sarcoma.

During treatment, James lost the feeling in his fingers, and with it, his ability to play piano. After nearly three months of chemotherapy, he was declared cancer-free and the feeling in his fingers returned. He has since gone on to complete high school and continues to play the piano.

"We are not alone," said his mother Noriko, "there are so many people working behind the scenes to help us out."

MEET JOHN

"Believe in your ability to get well and ask questions about your lab tests to your healthcare providers. Be well-informed to make the best decision for yourself."

John was living a typical life of a 16-year-old teenager in sunny Boca Raton, Florida, when he began feeling a growing discomfort behind his knee. John assumed the pain was related to a recent football game, but as the pain got worse, John and his parents decided to have it checked. John's parents sought out a bone specialist, who saw a tumor. John underwent a biopsy, and after the results came in, John's parents were told he had osteosarcoma, a cancerous tumor in his left femur.

Throughout his chemotherapy treatment, John dealt with his symptoms as best he could and did not let his leg problems get him down too much. Aside from the occasional weakness, John was able to continue being a happy-go-lucky kid enjoying sports and socializing with his classmates. John's treatment was successful, and he continues to live cancer-free in Boca Raton.

ADDITIONAL RESOURCES

Scan the QR code to view and download our educational resources.

Scan the QR code to hear directly from our Champions.

@ASCPPatientChampions

@ASCPPatientChampions

/ASCPPatientChampions

@ASCPChampions

ASCPPatientChampions

Champions@ascp.org

For more information and to get involved:
www.ascp.org/patients