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## Understanding Sarcoma

**Guest Expert:**

**Gary Friedlaender, MD**

*The Wayne Southwick Professor of  
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*Director, Yale Cancer Center Sarcoma  
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*Barber I am Bruce Barber and on this week's Yale Cancer Center Answers our hosts, Dr. Edward Chu and Dr. Ken Miller, will discuss sarcomas and explain about the various types and treatment options. Dr. Chu is the Deputy Director and Chief of Medical Oncology at the Yale Cancer Center and a leading expert in cancer drug development. Dr. Miller, a medical oncologist, is the Director of the Connecticut Challenge Survivorship Clinic at Yale Cancer Center and specializes in pain and palliative care. Yale Cancer Center Answers is our way of providing you with the most up to date cancer information every Sunday evening on WNPR. Dr. Chu and Dr. Miller welcome some of the nation's leading oncologists and cancer specialists who are in the forefront of the battle to fight cancer. They wish to provide you with help and hope from Yale Cancer Center. They will also answer any of your questions. If you would like to submit a question about cancer to the show, please email them to [canceranswers@yale.edu](mailto:canceranswers@yale.edu) or call 1-888-234-4YCC. If you are interested in listening to past editions of Yale Cancer Center Answers, or if you would like to learn more about a specific kind of cancer, all of the shows are posted in audio and written formats on the Yale Cancer Center website, [www.yalecancercenter.org](http://www.yalecancercenter.org). This evening, Dr. Chu and Dr. Miller will discuss sarcomas. Sarcoma is a cancer of the supportive tissues of the body including the bones, cartilage, fat, muscle, and blood vessels. The diagnosis and treatment of sarcoma is difficult because there are over 70 different types of sarcomas. Good evening doctors.*

Chu Hello Bruce, I am Dr. Chu.

Miller And I am Dr. Ken Miller.

Chu This evening Ken and I are joined by our close colleague Dr. Gary Friedlaender, the Wayne Southwick Professor of Orthopedics and Chairman of the Department of Orthopedics at the Yale School of Medicine. Dr. Friedlaender is the Director of the Sarcoma Program here at the Yale Cancer Center and is one of the leading experts in the treatment of osteogenic sarcoma. Gary, thank you so much for being with us this evening on Yale Cancer Center Answers.

Friedlaender Delighted Ed, and congratulations on your appointment as Deputy Director of Yale Cancer Center, and to both of you on the refunding of our cancer center. I have been around this institution for about 35 years, and as I recall Yale was among the first designated cancer centers. The continuous funding has been very exciting and encouraging, and reflects the hard work of people like both of you.

Chu Thank you Gary. We are certainly very excited about the designation and about moving forward with programs like yours to make this one of the preeminent cancer centers in the country.

Miller Gary, Ed mentioned that there are many types of sarcomas. Is there a simple and somewhat broad

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way to group sarcomas?

Friedlaender When I try to explain the different groups I like to use normal cells as an example. There are several groups of very important, specialized cells; some of them make bones, some of them make cartilage, tendon, or fat. Others make the surfaces of our skin, the lining of our GI tracts, the glands of our prostate, kidneys, and thyroids. Those cells all come with an instruction manual on how to do things normally. Occasionally, these cells lose their instructions and their ability to constrain themselves. They grow out of proportion and spread to other parts of the body, this is cancer. Those cells that are devoted to making bone, cartilage, fibrous tissue, tendon and structural supports are called sarcomas when they turn aggressive. Those that line the surfaces of cavities, like our skin, GI tract or glands, are carcinomas when they turn malignant. Together, these are cancers.

Chu What is the most common type of sarcoma that we see here in the United States?

Friedlaender Sarcomas are relatively uncommon, but people like myself and my colleague Dieter Lindskog, spend our entire professional life focusing on them. For example, there will be about 8,000 to 10,000 new sarcomas in the United States each year. The incidence of osteosarcoma, cancer that starts in bone, is roughly 1 out of 100,000; Connecticut will see about 30 a year. Each year, we will see more soft tissue sarcomas than bone and cartilage sarcomas.

Chu Does the type of sarcoma vary depending upon the age of the individual?

Friedlaender Absolutely. There are sarcomas that affect every age group. The specific kind of sarcoma that is most common in those under the age of 5, those in middle age, and those later in life are all different.

Miller When someone is diagnosed with any type of cancer one of the questions they always ask is "Why?" Along those lines, what causes sarcoma and what are some of the risk factors?

Friedlaender Well, we have some outstanding colleagues who are working on more complete answers. But there certainly are two generalities. One is that some people are predisposed genetically to have cancer. There are also things in the environment that we eat or are exposed to that seem to bring out this increased incidence of cancer in some people. The "double-hit phenomena" is being susceptible and then meeting up with an environmental factor.

Miller At this point is there anything that someone can do to decrease their risk, or do we not have that level of understanding yet?

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Friedlaender That is a very important question. I can think of things one should avoid in order to reduce their risk; radiation therapy for example. We know that cancer is often controlled well by radiation therapy, but we also know that a small percentage of people who are treated in that manner will develop cancers later. However, from my point of view, I would rather get rid of my first cancer and than be concerned about the risk of the second one.

Chu Is there anything that you would suggest for those individuals in terms of more frequent follow-ups or diagnostic tests that could be helpful?

Friedlaender Absolutely. Surveillance, whether it is the initial surveillance that we do everyday as our own advocates looking for lumps and bumps, or it is the surveillance that we get involved with after we have a diagnosis of cancer; both are extremely important and very viable.

Miller When you see patients with sarcoma, what are the symptoms that brought them to their doctor and then eventually to you?

Friedlaender This usually happens in two general manners. One is that the patient is aware that something is wrong either because of a lump, mass or pain that cannot otherwise be explained. The second way is just the absolute coincidence of being cared for well and encountering the cancer in the process of normal screening. I get my prostate-specific antigen checked every year. My wife gets her mammogram every year. There are things we can do to put ourselves under surveillance.

Miller Most lumps and bumps that people have, are they sarcomas? If someone has a fatty tumor underneath the skin, what happens in that case?

Friedlaender I often lapse into using the term tumor. Many people think that a tumor is automatically bad. I use the term to reflect any lump. There are benign lumps and malignant lumps. We see far more benign lumps than malignant lumps. Making the distinction between the two is obviously important.

Chu When should someone seek further medical attention?

Friedlaender I think that if you have an unexplained bump, especially a bump that doesn't appear on the other side of your body in the same place and is growing or painful, your healthcare provider must help you make a decision about it. I would much rather explain to someone why they have nothing to worry about then have them wait and worry. Anxieties, as well as the practicalities, need to be addressed.

Chu How often do you biopsy lumps on the body?

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Friedlaender Part of this is an art and part of this is science. People with lumps and bumps deserve the careful attention of our profession. It involves talking with them and examining them. Sometimes it involves laboratory tests, and if necessary getting specialized imaging studies and ultimately a biopsy. As you continue down that path, the number of people who need those services gets less and less. Very often I can tell somebody that something is harmless just by talking to them and examining them. When I am unsure or they are anxious, I go to the next step; imaging studies and then the occasional biopsy.

Miller After a biopsy is performed, who examines it? Can you tell us about the group approach when someone has been diagnosed?

Friedlaender Taking care of people, especially in oncology, is a team approach. That team includes people like myself who are surgically oriented, and people like you and Ed who are oriented in medical oncology and radiation oncology. These are the more recognized members of our team. Others that we sometimes don't hear about as frequently are radiology and pathology colleagues and that wonderful support system of services that are necessary for the comprehensive care of patients; not to mention the wonderful scientists.

Chu This type of multidisciplinary care is best provided at our Comprehensive Cancer Center.

Friedlaender There is no question about it. Both the scope of expertise and the timeliness of applying the expertise and resources happen in a very special way at places that have made a commitment to be a comprehensive cancer center like Yale.

Miller We are going to take a break for a medical minute. If you have questions about sarcomas, or for Dr. Friedlaender, Dr. Ed Chu or myself, you can visit [www.yalecancercenter.org](http://www.yalecancercenter.org). We will be back with Dr. Gary Friedlaender.

### *Medical Minute*

*This is a medical minute, brought to you as a public service by Yale Cancer Center. There are over 10 million cancer survivors in the US and the numbers keep growing. Completing treatment for cancer is a very exciting milestone, but cancer and its treatment can be a life changing experience. Following treatment, the return to normal activities and relationships may be difficult, and cancer survivors may face other long-term side-effects of cancer including heart problems, osteoporosis, fertility issues, and an increased risk of second cancers. Resources for cancer survivors are available at federally designated comprehensive centers such as Yale Cancer Center to keep cancer survivors well and focussed on healthy living. More information is available at [yalecancercenter.org](http://yalecancercenter.org).*

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- Miller Welcome back. We would like to remind you if you have questions for Dr. Gary Friedlaender about sarcomas you can e-mail us at [canceranswers@yale.edu](mailto:canceranswers@yale.edu). Gary, let us focus on osteosarcoma which you talked about as being a cancer of the bone. If an adult is diagnosed with it, what happens in terms of treatment?
- Friedlaender First of all, it is most common in young adults; from about 10 to 25. The most important thing is to make the right diagnosis. Matching the right treatment to the right diagnosis is of primary importance as well. Once the diagnosis of osteosarcoma is made, treatment will include a combination of medicine or chemotherapy and surgery. We know from clinical trials how to fine tune the order in which we do those and the manner in which we accomplish them.
- Miller A lot of us remember years ago when one of the Kennedy's lost their leg from sarcoma. Most of us have some memory of that happening quite a bit. Is amputation still very common or have things changed?
- Friedlaender Things have changed dramatically in a number of ways. They have changed in that when I trained 35 to 40 years ago, the survival rate for two years with osteosarcoma was about 5% to 10%. Today about 80% to 90% of people with osteosarcoma are cured; not just for two years or five years, but cured. This is because of the multi-drug chemotherapy that goes along with this. From a surgical point of view, the options are either amputation or some form of what we call limb-sparing approach. Some people still need to have an amputation and do wonderfully afterwards.
- Chu Is it possible that perhaps we are catching them in an earlier stage and that allows the chemotherapy and radiation to work a little bit better?
- Friedlaender I would like to think so, but rule #1 is don't trust your cancer. You guys are really important.
- Miller It is an interesting evolution. Many years ago, and this would apply to other cancers as well, surgery was really the primary form of treatment and it wasn't as multimodality.
- Friedlaender Let me give you a brief anecdote. We used to argue in surgically treating a tumor around the knee, how high up the leg to amputate to increase survival. It wasn't until we combined removal of the primary tumor where it begins with effective multidrug chemotherapy that survival turned around completely.
- Miller Let me ask you about prosthesis, in particular about endoprosthesis. What are some of the things you can do now when reconstructing a leg or a joint?
- Friedlaender There are a lot of opportunities and I try to tailor these to the individual's needs. Now we can

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remove the tumor where it exists in the leg or the arm, just the bone that is involved plus an envelope of normal tissue, and then reconstruct that defect. For example, when taking out the bottom half of the thigh bone, I can replace that and return people to good function in one of two ways. I can put in a bone that has been donated by a generous individual. We are all familiar with donating a heart, lungs or liver, some generous people also donate bone. The other alternatives are metals and plastics. Many people are aware of the exciting opportunity to replace hips, knees and other joints because of arthritis, from that technology we created metal and plastic replacement parts for virtually all of the long bones in the arms and legs.

Chu Obviously this requires a great deal of research; bone research and biomedical engineering research. What type of research is ongoing here at Yale to help support the great clinical work that you and your group are doing?

Friedlaender In our department it falls into two broad areas; one is biology. Understanding how cells work, understanding what happens when they are not working correctly and how we might tease them back to better function or eliminate them. It is not just orthopedics, but a very-very strong group of scientists also studying bone at the molecular and cellular levels. We have got an outstanding group of scientists throughout the medical center that are looking at biologic solutions to cells that don't work correctly. Secondly, we have an outstanding unit focused on biomechanics and working with our bioengineering school here. We are learning the things that are important to function from a mechanical point of view, so we can design better replacements.

Miller In your practice are other types of sarcomas, such as soft tissue sarcomas, more common than tumors of the bone?

Friedlaender Soft tissues sarcomas are more common. The most common is a fibrous sarcoma, or some variant of a fibrous sarcoma. These are often embedded in the muscles, around the neurovascular structures, nerves and the blood vessels. Liposarcoma is another relatively common soft tissue sarcoma. Many of these are treated surgically in a similar manner, but we still like to know exactly what it is so that when other members of our team, like you and our radiation colleagues, provide care you can tailor to the specific tumor. The idea is to take the tumor out with an envelope of normal tissue. Our imaging techniques made that much more feasible and successful.

Miller How do you decide which patients need radiation therapy after you remove a soft tissue sarcoma?

Friedlaender For me, it is relatively easy. I call up my friendly radiation oncologist and I respect his opinion. But the more direct answer to your question is that we know that some cell types respond better, meaning they are injured more successfully by radiation than others. Cartilage, for example, doesn't seem to be bothered as much by radiation as fatty tumors are. These distinctions become

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important as we put together as a team a consensus approach on how best to care.

Chu Gary, is there any role for chemotherapy once the soft tissue sarcoma has been surgically removed by you and your team?

Friedlaender Absolutely, it is a one-two punch. Tumors have two parts; where they begin and the rest of the body. The rest of the body is ultimately the most important to the care and that is where a systemic treatment like chemotherapy is crucial. Surgery and radiation therapy focus on the primary site. Chemotherapy is important. It also has a lot to do with timing. Do you give the chemotherapy first or do the surgery first? Many people, myself included initially, had the feeling that if there is a malignant lump, it has to go first with surgery. But in fact, protecting them systemically is more important. During wonderful clinical research trials, patients appropriately volunteered to test one method versus another. We have found it is actually better to start with chemotherapy in the treatment of osteosarcoma; the survival rate is a little bit higher. That is the recommended way of taking care of people; chemotherapy and radiation, some chemotherapy at the beginning, surgery, and then more chemotherapy.

Chu This really highlights the importance of a tightly integrated coordinated approach between each of the key disciplines in dealing with patients with sarcoma.

Friedlaender Absolutely. I know your cellphone numbers, we meet regularly and we couldn't do this in isolation of each other.

Miller Gary, what is on the cutting edge in terms of the advances in surgery, but also more generally for patients with sarcoma?

Friedlaender We are very-very hopeful that we are going to learn more about the biology of these tumors. We know that there are genes and gene defects that are particularly associated with certain tumors. We are not clear on whether these cause the tumors or are a reflection of having the tumor, but we are finding out more about that. We know that genes help us under the microscope to identify different kinds of tumors. We have a strong suspicion that altering genes, either genes that are wrong or genes that help us deliver toxic or effective treatment to cells might be helpful. We are learning more about better surgical techniques and how to completely remove tumors without affecting normal structures in the vicinity.

We are also learning how to improve the longevity of replacement parts. Normally, these metals and plastics are cemented in place. They work wonderfully in that the important rehabilitation is jump started quickly but eventually the cement wears out. We are thinking in terms of 20 years, then we have to replace these parts, which we can do, but we would like to make

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these last for a lifetime. Bone replacements, bone grafts or donated tissues take longer to rehab and heal, but in the end are replaced by their own tissues. I put in someone else's bone and over time it becomes your bone. It becomes a genuine GM part and comes with a lifetime warranty, but that process takes longer.

Miller In the last few years what we call targeted therapy has become more common. Medicines, just like you are talking about that turn a gene on or off are used in a certain type of sarcoma of the stomach called the gastrointestinal stromal tumor. Do you think those targeted therapies will have a role in the treatment of other sarcomas?

Friedlaender In my judgment, absolutely, but we are not going to know until we do the clinical trials and compare what we know is good with what we think is better.

Chu That would also underscore the importance of molecular profiling each of the different sarcomas to try to identify the key pathways involved in one tumor versus another.

Friedlaender There are two good reasons to delve more deeply. One is to understand cells and what goes wrong and how we can fix them. The other is to determine that even though certain cells may look the same on the surface, inside they are different and respond better to different treatments.

Miller We would like to thank you Gary. This has been a fascinating discussion about sarcomas and about cancer in general.

Chu Gary, thank you so much, we look forward to having you on a future show. Until next week, this is Dr. Ed Chu and Dr. Ken Miller from the Yale Cancer Center wishing you a safe and healthy week.

Barber *Thank you Dr. Chu and Dr. Miller. If you have any questions for Dr. Friedlaender, I encourage you to go to [www.yalecancercenter.org](http://www.yalecancercenter.org) for more information about cancer and the resources available to you. You can also listen to past editions of Yale Cancer Center Answers in audio and written formats on the Yale Cancer Center website at [www.yalecancercenter.org](http://www.yalecancercenter.org). Remember to tune in to WNPR every Sunday evening at 6:00 for Yale Cancer Center Answers to receive the latest information in cancer care and treatment.*