

Connective Tissue and Nerve Tumors – Visceral

These notes are provided to help you understand the diagnosis or possible diagnosis of cancer in your pet. For general information on cancer in pets ask for our handout “What is Cancer”. Your veterinarian may suggest certain tests to help confirm or eliminate diagnosis, and to help assess treatment options and likely outcomes. Because individual situations and responses vary, and because cancers often behave unpredictably, science can only give us a guide. However, information and understanding for tumors in animals is improving all the time.

We understand that this can be a very worrying time. We apologize for the need to use some technical language. If you have any questions please do not hesitate to ask us.

What are these tumors?

All tissues and organs of the body may develop cancer (an abnormal overgrowth of their constituent cells). Every organ (liver, lungs, spleen, kidneys and so on) contains a supporting framework of fibrous connective tissue as well as nerves to relay information to and from the brain. Most organs also contain muscle tissue and special cells (histiocytes or macrophages) whose function is to clear debris. Cancers of these tissues can therefore occur anywhere in the body.

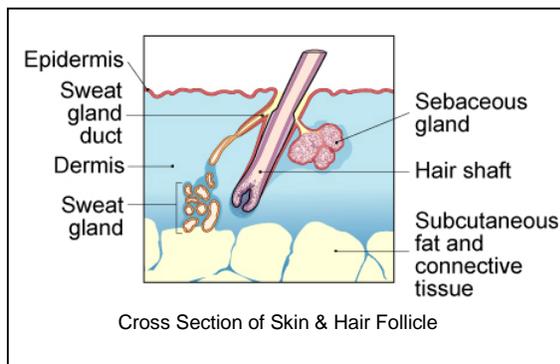
There are a multitude of names for these tumors including **Schwannoma**, **peripheral nerve sheath tumor** and **neurofibroma** for those of nerves and fibroma, fibrosarcoma and **spindle cell tumor** for fibrous tissue tumors. Muscle tumors are **rhabdomyomas**, **rhabdomyosarcomas**, **leiomyomas**, **leiomyosarcomas** and **granular cell tumors (myoblastomas)**. The tissue of origin is not always clear and granular cell tumors may be of nerve (Schwann cell) origin. **Fibrous histiocytoma** is a subtype of these cancers, possibly originating from a primitive cell, which can develop to either fibrous tissue or histiocytes.

What do we know about the causes?

Little is known about the cause of these tumors in dogs. Some fibrous tumors in young cats and multiple ones in older cats may be initiated by feline sarcoma retroviruses (recombinant forms of feline leukemia virus - FeLV). The virus disrupts the cell DNA genome and causes chromosomal changes. Most older cats have immunity to the virus so, in older cats, solitary tumors are not FeLV virus associated.

Are they common tumors?

The reason why a particular pet may develop this, or any cancer, is not straightforward. Cancer is often seemingly the culmination of



a series of circumstances that come together for the unfortunate individual.

All these are unusual tumors in internal organs although fibrous tumors are common in the skin and mouth.



Rhabdomyosarcoma may occur in the urinary bladder of young animals.

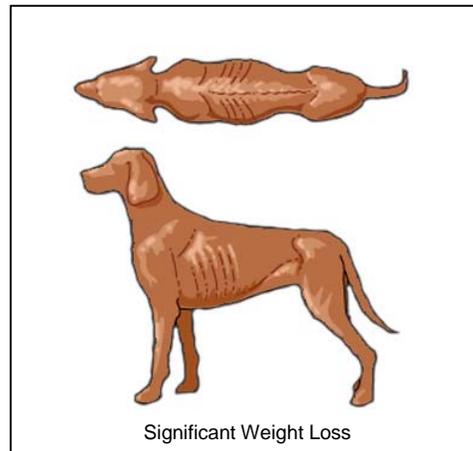
Granular cell tumors (myoblastomas) are most commonly found in the tongue of dogs. One has been recorded in the tonsil of a cat.

Fibrous histiocytoma and malignant fibrous histiocytoma (giant cell tumor of soft tissue) are uncommon in dogs and rare in cats. It is doubtful whether any are truly benign. They usually occur in older animals but a malignant one has been recorded in a 4-month-old dog. Multiple nodular lesions have also been described in young dogs.

How will the cancer affect my pet?

The most obvious effect of most cancers is a lump. Depending on its site, this may cause abdominal swelling and be palpable or have physical effects on the surrounding structures, blocking the intestine or preventing urination for example. Others may cause other clinical signs such as difficulty in breathing if they are in the chest. Malignant cancers may spread through the body by seeding in body cavities and invading the blood, lymph and nerve transport systems.

Weight loss due to loss of body fat and muscle is common in malignant cancer. The immune system is often damaged which allows cancers to develop and infections to persist. A few tumors induce signs that are not readily explained by local or distal spread of the tumors. These are known as paraneoplastic syndromes. Some are due to abnormal hormone production by the cancer. Examples include low blood sugar, which can be associated with some muscle tumors.



How is this cancer diagnosed?

Clinically, cancer may be suspected. X-rays and ultrasonography can indicate lumps but the techniques are incapable of distinguishing non-cancerous nodules and true cancers.



X-ray and Ultrasound machines

In order to identify the tumor type, it is necessary to obtain a sample of the tumor itself. Needle biopsies through the skin are rarely diagnostic even when guided by ultrasound and exploratory surgery is required. The tissue samples are submitted for microscopic examination by histopathology, the microscopic examination of specially prepared and stained tissue sections. This is done at a specialized laboratory where the slides are examined by a veterinary pathologist.

The histopathology report typically includes the name of the tumor and a prognosis (what will probably happen) that includes an indication of the probability of local recurrence.

What treatment is available?

The treatment for all these tumors is surgical removal, usually of the lump but occasionally more radical such as removal of a whole kidney or liver lobe.

These tumors do not respond to chemotherapy. The tumors are sensitive to radiotherapy but this is unsuitable for tumors in internal sites.

Can this cancer disappear without treatment?

Cancer rarely disappears without treatment but as development is a multi-step process, it may stop at some stages. The body's own immune system can kill cancer cells but it is rarely 100% effective. Rarely, loss of blood supply to a cancer will make it die but the dead tissue will probably need surgical removal. The body's immune system is not effective in causing this type of tumor to regress.

How can I nurse my pet?

After surgery, the operation site needs to be kept clean and your pet should not be allowed to interfere with the site. Any loss of sutures or significant swelling or bleeding should be reported to your veterinarian. If you require additional advice on post-surgical care, please ask.



How will I know how this cancer will behave?

Histopathology will give your veterinarian the diagnosis that helps to indicate how it is likely to behave. The veterinary pathologist usually adds a prognosis that describes the probability of local recurrence or metastasis (distant spread).

How and when will I know if the cancer is permanently cured?

'Cured' has to be a guarded term in dealing with any cancer.

The prognosis of fibrosarcomas depends on the location for ease and margin of excision and grade as determined by cell divisions (mitotic index). Although it is unusual for these cancers to spread to distant parts of the body (metastasize), many are locally invasive.

Rhabdomyosarcoma is a highly malignant tumor capable of widespread metastasis. Granular cell tumors (myoblastoma) do not recur after full surgical removal nor do they metastasize. Leiomyomas and leiomyosarcoma are a continuum from benign to malignant so prediction of behavior is not always easy. However, although they may spread (metastasize), this is late in the disease and often only to the local lymph nodes (glands). The outlook is usually good following surgery.

Fibrous histiocytoma and malignant fibrous histiocytoma (giant cell tumor of soft tissue) exhibit a broad range of morphology and behavior. Most recur and a few metastasize. They are usually locally invasive so difficult to remove. It has been suggested that the histiocytic ones are more malignant than fibrocytic.

Are there any risks to my family or other pets?

No, these tumors are not transmissible from pet to pet or to people by contact or through body fluids.