

## LIVER TUMORS - EPITHELIAL

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?***

Multiple tumors in the liver are not always cancers. The livers of older dogs become nodular although this does not have any clinical effects. Multiple nodules (regenerative nodules) with an accompanying increase in fibrous tissue may be the result of previous liver damage including inflammation of the liver (hepatitis). When the fibrosis affects the whole liver, it is called cirrhosis. At this stage, it is progressive and not curable.

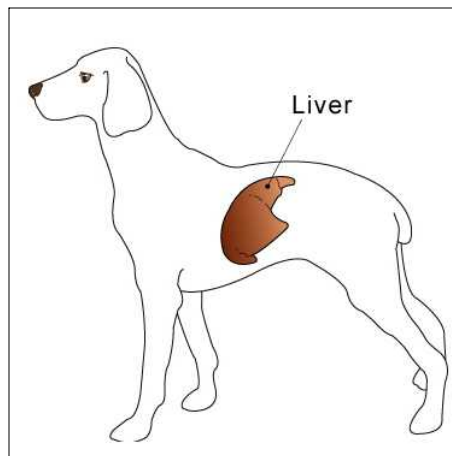
Cancers of the liver cells are called **hepatocellular adenomas** and **carcinomas**. The carcinomas are malignant and can spread (metastasize) to other parts of the body. Cancers also originate from the bile ducts both within and outside the liver but this type is only common in cats. Most are benign (**cholangiomas** or **biliary cystadenomas**). They are often without clinical effects. Malignant tumors (**cholangiocarcinomas**) may metastasize. Rarely, epithelial cancers called **carcinoids** originate from the hormone-producing neuroendocrine cells of the liver.

Malignant cancer cells of many tumor types spreading from other body locations may come to rest in the liver and grow as secondary cancers (metastases). The liver is one of the main sites in which metastases from tumors of other parts of the body grow.

### ***What do we know about the cause?***

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.

The cause of "old dog nodular hyperplasia" is unknown but it may be due to failure of growth factor regulation as the dog ages. It does not become cancerous.



Nodules with fibrous tissue usually follow previous inflammation (hepatitis) or destruction of the liver although the precise cause is rarely known. The primary illness may be due to infection or poisons produced naturally by plants and moulds or from man-made substances.

Chronic infections or ingestion of chemicals may play a role in the development of cancers but we do not know the specific causes in animals.

### ***Why has my pet developed this cancer?***

Some animals have a greater tendency (genetic susceptibility) to cancer. Some breeds have far more cancers than others, often of specific types. The more divisions a cell undergoes, the more probable is a mutation so cancer is more common in older animals.

### ***Are these common tumors?***

"Old dog nodular hyperplasia" is present in almost all dogs by the age of 14 years. Regenerative nodules are far less common.

Tumors of liver cells (hepatocellular tumors) are rare (less than 1% of all tumors). Dogs are usually 10 to 11 years of age or older, but these tumors are sometimes seen in dogs as young as 4 years of age. Cats with liver cell tumors vary in age from 2 to 18 years. There are no breed or sex predispositions. Cholangiomas and cholangiocarcinomas are rare in both dogs and cats but less rare in cats and most such cases occur in cats over ten years of age.

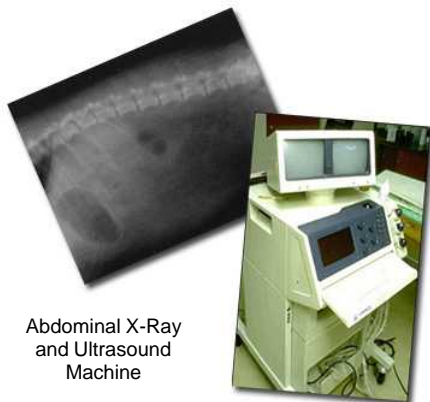
### ***How will these cancers affect my pet?***

Nodular hyperplasia and benign tumors usually have no clinical effects. Compression of adjacent structures could in theory cause signs but there are no reports of problems, probably because the liver has such significant functional reserves. This reserve capacity also means that fibrosis, cirrhosis and cancers are always advanced before there are any signs of illness. They may then cause loss of appetite, vomiting, lethargy, weakness and swelling of the abdomen with fluid. Less common signs are jaundice, diarrhea and weight loss. Many chemicals that are important in normal body functions (physiology) are made in the liver so there will be damage or dysfunction in many other body systems.

Spread (metastasis) from malignant tumors is usually late in the course of the disease so it is the original tumor within the liver that causes the clinical effects rather than the small tumors (metastases) in other organs. Cancer, and a wide variety of types of liver damage, can induce an inflammatory and degenerative condition of the skin known as 'metabolic epidermal necrolysis', or 'hepatocutaneous syndrome'.

### ***How are these cancers diagnosed?***

A lump may sometimes be palpable through the abdominal wall. X-rays and ultrasonography can indicate changes in the liver and show lumps. Fibrous tissue can occasionally be seen suggesting the nodules are regenerative but otherwise the techniques are incapable of distinguishing nodular hyperplasia and true cancers. Fluid can sometimes be seen in the cysts of cholangiomas.



Abdominal X-Ray  
and Ultrasound  
Machine

No blood test is specific for these cancers. Low blood protein (albumen) is the most common blood finding in cirrhosis. Other blood changes suggest liver disease but are not specific for the type.

To distinguish tumor type, surgical invasion will be needed.

Cytology, the microscopic examination of cell samples, is not diagnostic for these tumors. Needle core biopsies taken through the skin are rarely diagnostic. Accurate diagnosis and prediction of behavior (prognosis) depends on microscopic examination of larger samples of tissue by histopathology. This is done at a specialized laboratory by a veterinary pathologist. The piece of tissue has to include the edge of a lump. Only



examination of the whole lump will indicate whether the cancer has been fully removed.

### ***What types of treatment are available?***

Surgical removal of localized tumors is often successful. Medical treatment of inflammation with antibiotics and anti-inflammatory drugs may be needed. Sometimes, drugs are used to stop the fibrosis from progressing.

One of the main ways of managing liver diseases is with diet. The liver makes water soluble Vitamins B, C and K, proteins and other foods for the rest of the body. Compensation for poor function is vital. The diet needs to have high quality protein, low fat and be rich in minerals and vitamins. Several commercially prepared diets are available. They often improve the clinical condition of animals with liver disease more than any other treatment.

### ***Can these cancers 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.

### ***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 it. Any loss of sutures or significant swelling or bleeding should be reported to your veterinarian. You may be asked to check that your pet can pass urine and feces or to give treatment to aid this. Your pet will usually require a special diet.

If you require additional advice on post-surgical care, please ask.

### ***How will I know how the cancer will behave?***

Histopathology will give you 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).



### ***When will I know if the cancer is permanently cured?***

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

"Old dog nodular hyperplasia" is not curable but there are no clinical signs or adverse clinical effects on liver function. It is usually an incidental finding.

Regenerative nodules remain undetected until late in the disease when they are usually not curable and the course of the disease is short, sometimes only weeks. Routine blood biochemical tests do not indicate whether fibrosis is likely to progress rapidly. However, there are special substances in the blood (acute phase proteins) that, in some types, can indicate whether a dog is more likely to survive for longer. Even so, survival is unlikely to be more than a year.

Localized cancers of liver cells and bile ducts in dogs and cats have been removed surgically and good quality life is possible for several months up to three years. Recurrence is not common. Malignant tumors spread late in the course of the disease when the primary is large. Clinical effects are therefore due to the primary tumor, not metastases. Some are too large and extensive to remove surgically.

***Are there any risks to my family or other pets?***

No, these are not infectious tumors and are not transmitted from pet to pet or from pets to people.

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*This client information sheet is based on material written by Joan Rest, BVSc, PhD, MRCPATH, MRCVS.  
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