Grace Animal Hospital and Pet Lodge
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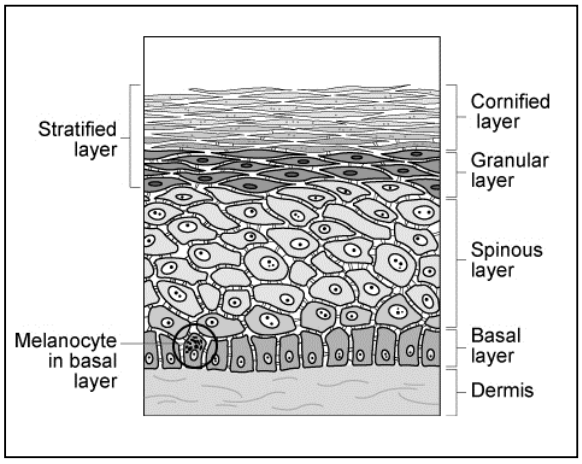
Melanocytic Tumors

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.

Melanocyte Biology

Melanocytes are cells that produce a pigment called melanin. They are found in many parts of the body where there is pigment, particularly skin, hair and eyes.



Melanogenesis (formation of melanin by melanocytes) is a complex process controlled by genetic, hormonal and ultraviolet (UV) light. A sun tan is the result sunlight (UVA and UVB) stimulating our melanocytes. The immediate response to sunlight is not protective. It redistributes melanin and fades in minutes to days. The delayed response is protective but takes 3-4 days. Melanocytes also have functions in thermal insulation and salt balance to protect animals from sunstroke.

Melanocytes are very sensitive to many types of damage and “wear out” so they lose their ability to reproduce themselves. In humans, after ten hair scalp growth cycles melanocytes fail to respond to signals to move into new hairs so by 50 years of age, 50% of the population are 50% ‘grey’-haired.

What is a ‘melanoma’?

This is a tumor of pigment producing melanocytic cells. In humans the classification of melanocytic tumors is very complex. The names are confusing and used in different ways by human and veterinary pathologists. **Melanocytoma** (dermal melanoma, benign melanoma) is a benign tumor.

It may be described as compound or simple meaning with or without tumor melanocytes in the overlying epidermis (see diagram above) and with other subclassifications indicating its microscopic appearance.

The malignant tumor may also be called melanoma but can also be more clearly identified by the terms **malignant melanoma** or **melanosarcoma**. Melanocytic hyperplasias (non-cancerous cell overgrowths) are benign and may be called '**lentigo'** or '**lentigo simplex'**.

Image courtesy of Jan Hall, BVM&S, MS, MRCVS, DipACVD, Clinical Dermatology, Ontario Veterinary College

On the hairy parts of the skin of dogs and cats, most tumors are benign but those on mucocutaneous junctions (such as nail beds and lips) are often malignant. The exception to this rule is eyelid melanocytic tumors, which are usually benign.

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.

In humans, environmental and host (individual person) factors are important in development of melanoma. UV irradiation is the most important environmental factor. UVB causes direct damage to molecules (pyrimidine dimers) in the genetic blueprint (DNA) of cells and UVA causes oxidative damage to cell chemical reactions. This damage leads to poor cell repair and sometimes cancerous changes (carcinogenesis). In dogs and cats, some melanocytic tumors develop in the areas of skin most exposed to sunlight but overall these tumors are most frequent in more heavily pigmented animals.

Why has my pet developed this cancer?

Although some of these tumors develop in the areas of skin most exposed to sunlight, the genetic make up of your dog or cat or heavy natural pigmentation is most likely to be the main predisposing factor.

Is this a common tumor?

Melanomas are common in dogs. One common site is the nail bed. The peak incidence for benign tumors is between five and eleven years of age and for malignant cancers, nine and thirteen years. Melanocytic tumors are uncommon in cats. When they occur in cats between the ages of four and thirteen they are usually benign; in elderly cats they may be malignant (invasive and spreading).

How will this cancer affect my pet?

Tumors of the haired skin are usually noted as local areas of increased pigmentation although not all have this pigment. Most are an obvious lump that may ulcerate, bleed or have physical effects on the surrounding structures. Some tumors have smaller satellite tumors around them, particularly in cats. The tumors may not be so obvious in a site such as the nailbed where the cancer grows inwards. Pain may be the most obvious sign at such a site. Malignant tumors may spread through the body and the clinical effects caused will depend on the tissues and organs where the tumor cells seed new tumors.

How is this cancer diagnosed?

Clinically, this pigmented tumor can be suspected from appearance but some are not pigmented. Also some other types of tumors may also be pigmented or look dark. Other types of tumors commonly occur in predilection sites for melanocytic tumors such as the nail bed.

Accurate diagnosis therefore relies upon microscopic examination of suspect tissue (histopathology). This is done at a specialized laboratory by a veterinary pathologist. For grading the severity and outlook for the tumor's likely progress, the whole lump is usually needed by the pathologist. Pigmented lesions are diagnosable by cytology (the microscopic examination of cell samples) or a needle biopsy from the lump), but without grading and staging by histopathology, cytology is inadequate for prognosis (prediction of future behavior).

Histopathology reports typically indicate the type of tumor and mitotic rate (an estimate of rate of division of the tumor cells, (which is an important predictor of outcome) and whether the tumor has been completely removed. These findings help forecast how the cancer is likely to behave but occasionally melanocytic tumors that appear benign on histopathological appearance turn out to be malignant. This occurs in some 10% of "benign" melanomas - so there needs to be a mildly guarded prognosis on all of them. The pathologist may need to remove (bleach) the pigment to check malignancy with greater certainty.

There are various research techniques used to indicate prognosis more accurately such as the Ki-67 proliferative index. However, the predictive value is often little different (Ki-67 97% predictive compared with 91% for histopathology) so these techniques are not used routinely.

What types of treatment are available?

The most common treatment for a melanocytic tumor is surgical removal of the lump. As in humans, there has been little progress with other treatments. Responses to chemotherapy and radiation therapy are poor. Immunotherapy with interferons has not improved survival in humans. Current research is focussed on combining immunotherapy (cytokine and gene therapy) with other standardized treatment. Vaccines are in clinical trials in humans.

Can this cancer disappear without treatment?

This cancer very rarely disappears without treatment. Very occasionally, spontaneous loss of blood supply to the cancer can make it die but the dead tissue will still 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?

Preventing your pet from rubbing, scratching, licking or biting the tumor will reduce itching, inflammation, ulceration, infection and bleeding. Any ulcerated area needs to be kept clean.

After surgery, the operation site similarly 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 if the cancer is cured?

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

Histopathology will provide the diagnosis, which helps to indicate how it is likely to behave. The veterinary pathologist usually adds a prognosis that describes the probability of local recurrence at the same or close site (if the tumor is removed), or metastasis (distant spread).

In many cases, the diagnosis and prognosis indicate there can be a complete cure. Sadly, there are some cases where the diagnosis and prognosis indicate that surgical removal will only give remission and the cancer will recur or spread. There are a few tumors that are difficult to predict behaviorally.

Dogs with skin tumors that have a low rate of cell division, have a 90% chance of surviving more than 2 years after diagnosis; but this reduces to 25% if the rate of cell division (mitotic index) is high. Only 10% of the first group have a tumor related death; but 45% of dogs in the second group will die from tumor related causes. More nailbase melanocytic tumors have an unfavorable outcome than tumors occurring at other sites.

We have less information about recurrence of tumors and survival times in cats.

Are there any risks to my family or other pets?

No, this is not an infectious tumor and it is not transmitted from pet to pet or from pet to people.

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