Malignant melanoma in dogs - therapeutic melanoma vaccine
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What is malignant melanoma?

Melanoma is a relatively common tumour in dogs that develops from pigment-producing cells (melanocytes). It is the pigment in these cells that gives the skin its colouration and hence these tumours are often darkly coloured. This tumour usually develops in the mouth (especially on the gums, lips and palate), on the foot (especially the junction of the toe and nail and the pad), on haired skin anywhere on the body and occasionally within the eye.

This tumour is generally malignant, in that it will grow to invade surrounding tissue, and, more importantly, may spread elsewhere within the body, particularly to the nearby lymph glands (lymph nodes) and the lungs. Most tumours in the mouth and many tumours of the nail bed are malignant, whereas many tumours arising from haired skin and within the eye are benign.

A diagnosis of melanoma is made by a pathologist examining a piece of tissue under the microscope. This examination will show whether the tumour is a melanoma or not and, in combination with its site of origin, whether it is likely to have a malignant pattern of behaviour or not.
**What treatments area viable for malignant melanoma?**

Surgical removal of the tumour is the best therapy for this type of cancer. However, as the tumour has the potential to spread elsewhere in the body, additional therapy is needed to reduce the likelihood of this spread and delay the speed at which it develops. Malignant melanoma is not very responsive to traditional anti-cancer (chemotherapy) drugs and these are not commonly used. Recently, a new therapy has become available for dogs with malignant melanoma. This treatment is aimed at harnessing the immune response and encouraging white blood cells (the cells that fight off infections) to recognise and kill the tumour cells. Many types of tumour have developed mechanisms to evade or suppress the immune response and avoid being killed, but this novel therapy tips the balance back in favour of the immune response.

One of the problems with cancer therapy is that the tumour cells are related to and develop from normal cells of the patient. Hence, it is difficult to find a therapy that will selectively kill the tumour cells but not the body's normal cells. Malignant melanoma is a good target for this kind of therapy as melanoma cells are different from most other cells in the body, in that they produce pigment.

**How does the therapeutic melanoma vaccine work?**

The melanoma vaccine works by stimulating an immune response to vital components of the pigment-producing system inside melanoma cells. Genetic material (DNA) which is responsible for the manufacture of a protein involved in pigment production (tyrosinase) is injected into the muscle of the patient with melanoma. This protein in the vaccine is recognised by the body as being 'foreign' and in the wrong location, and as a result, an immune response is made. This immune response will also attack the melanoma tumour cells which contain the same tyrosinase protein. Although termed a 'vaccine', because it stimulates an immune response, the melanoma vaccine differs from the normal annual vaccinations (which are designed to prevent disease) in that it is designed to treat disease that is already present.

**When can the therapeutic melanoma vaccine be used?**

In order to determine whether this treatment would be a good choice for any particular patient, a number of tests need to be performed. Laboratory analysis of the tumour by a pathologist is needed to confirm that the tumour is a melanoma and to assess how rapidly the mass is growing. X-rays or a CT scan are used to look for the presence of tumour spread elsewhere within the body, particularly the lymph glands (lymph nodes) and lungs. Biopsy samples of the lymph nodes may also be taken. It is important that the main (primary) tumour and any enlarged lymph nodes are removed first if at all possible to improve the efficiency of vaccine therapy.

**What does the treatment involve?**

The treatment comprises an injection every 2 weeks for 4 doses, followed by a booster injection every 6 months. The injection is delivered with a special device that uses compressed air, rather than a needle, to inject the vaccine. The treatment is very well tolerated and side-effects are very uncommon. If they do occur, side-effects are mild, which is a similar situation to the routine annual vaccines that dogs receive.

The therapeutic melanoma vaccine is licensed for the treatment of melanoma arising from the mouth, but there is evidence that the vaccine is also effective in treating melanoma arising from the nail bed and the skin. The use of therapeutic vaccine will significantly increase the life expectancy of dogs with malignant melanoma compared to what it would have been without the vaccine.

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