

## **Vaccination – Pro’s and Con’s**

There has been a great deal of concern expressed about the risk to a dog’s health resulting from vaccination. Much of this has resulted from publicity from “Canine Health Concern” a pressure group founded by Catherine O’Driscoll. The motivation for the formation of this group was the death, of a number of much loved dogs attributed to adverse vaccine reactions.

The Canine Health Concern web site creates the impression that vaccination is a high-risk activity, almost certainly carried out too frequently in dogs. They express the view that the veterinary profession and vaccine manufacturers, at least tacitly, encourage this situation as it leads to greater revenue. Unfortunately I cannot find any clear expression of their opinion of the pro’s and con’s of vaccination if carried out at “appropriate intervals”. “Evidence” for their views is based on anecdotal stories and a flawed survey where participants are self selected such that their motivation to participate will be highly influence by negative personal experiences attributed, possibly incorrectly, to vaccination .

As views of this type have been sympathetically referred to both in the Rottweiler Club newsletter and in the Dog World breed notes I believe that it would be useful to put them into some sort of impartial scientific perspective. I feel that I am in a fairly unbiased position as I have owned and shown Rottweilers for 14 years and have a formal training in biochemistry. I work in a University, have never received financial support or sought support from Vaccine Companies and have no links with canine health care companies

### **Key facts.**

#### *1 Vaccination works*

The evidence is overwhelming. In humans small pox, diphtheria and polio have been virtually eradicated as a result of vaccination programs. In dogs common viral diseases such as distemper and more recently parvovirus have again been virtually eliminated.

#### *2 There is no such thing as a risk free treatment*

The use of any drug or chemically based therapeutic agent (such as a vaccine) carries some risk and sadly some patients will be damaged as a result of treatments they are receiving.

So when considering vaccination you have to balance the risks associated with the treatment with the risk of (a) catching the disease and (b) surviving the disease without damage.

## **How does vaccination work?**

When a foreign agent (molecule or particle such as a virus) gets into the body an “immune response” is mounted. In a gross simplification this occurs in three steps, firstly the agent is recognised as being alien, secondly specific cells are produced capable of producing “flags” (antibodies) that stick to the alien molecule and target it, finally it is destroyed. This immune response is mounted every time we are infected e.g. with a strain of the cold virus that we have not had before. The problem is that the three stages of the immune response take about 5 days. In the case of the cold a couple of days while the virus proliferates before we realise we are ill and two or three days of symptoms, before we start to improve. Having mounted a response to that virus the body will “remember” its properties for a time and will be able to mount an instant response if it encounters the virus again.

That’s fine for a cold but in the case of more severe infections we may become so ill in the 5-day lag time that the body is too weak to complete the immune response. Enter vaccination: here the idea is to expose the body to the foreign agent under controlled conditions such that an immune response is made but that any symptoms of disease are minimal or non-existent. Thereafter during the memory period for that response the body will be able to mount an immediate response to infection eliminating the lag period that could allow the disease to develop.

## **How is a vaccine produced that triggers an immune response but does not trigger illness?**

The earliest vaccine used a natural organism. Edward Jenner noticed that milkmaids who caught cow pox (a mild disease) became immune to the more virulent small pox. Later developments found that using viruses to infect a non-standard host (e.g. an animal that only shows mild symptoms to a human disease) could weaken them. After being passed from individual to individual several times in animals these viruses mutate such that when they are reintroduced to a person they generate an immune response but only mild symptoms. These are known as live vaccines and can be developed for animals as well as people. The risk of live vaccines is clear. If this weakening known as “attenuation” fails the patient could be injected with a virulent virus capable of causing disease.

More modern vaccines use dead viruses or virus fragments and the latest approaches use genetic engineering to synthesise small fragments of the virus that do not contain its infective genetic material but which can still trigger an immune response.

## **How long will the immunity caused by vaccination last**

This is difficult to predict and will depend on the animal type treated, individual variation, the type of vaccine used, and the characteristics of the disease organism. What is clear is that it is naïve to assume that you can expect a vaccination to last for the same period in a dog as in a human and that immunity periods will be the same for all diseases (We never need polio boosters but need periodic boosters for tetanus). While modern vaccines are safer than earlier live vaccines, the fact that they are often based on a small fraction of the infective agent means that the body will produce only a few different antibody types. If the whole virus is used many more antibody types

will be produced targeting different parts of the virus. In this case the level of protection will be higher and last longer. The best protection of all (assuming it does not prove fatal) is provided by catching the disease and making a natural recovery.

A good example of this is Kennel cough. We anticipate our puppies catching kennel cough around 9-10 months as we regularly take them to training classes and shows, we do not actively avoid it and we do not now vaccinate against it (obviously we quarantine them when they have it). Our experience has been that after a bout of kennel cough at this age they will probably suffer a second milder dose 12-18 months later and then never suffer again (this includes a ten year old bitch suffering from terminal cancer who did not catch kennel cough from 2 infected puppies despite the impracticalities of totally separating them). Interestingly the only dog we have had who had a life-threatening attack of kennel cough was one we took back from a pet home that became infected for the first time at 16 months.

### **The conspiracy theory**

The CHC imply that vets and Vaccine companies advocate unnecessarily short vaccination intervals to increase revenues – does this make sense? The vaccine companies can easily adjust dose price to compensate for dosing interval and so there is little commercial value in alienating your client base by advocating a regime known to cause health problems. There are two far more compelling reasons to promote the use of intervals that err on the side of caution (i) The reputation of the vaccine will be damaged if the interval is too long and some vaccinated animals succumb to the disease (ii) when an animal vaccinated in accordance with manufacture's instructions subsequently develops the disease the manufacturer risks being sued. Vets advising longer vaccination intervals than recommended by the manufacturer might also find themselves in a difficult situation if a client's dog subsequently contracted the disease.

### **Nature of risk**

So apart from the general risks of any are there specific risks associated with vaccinating too frequently? The suggestion often made is that frequent vaccination can cause autoimmune diseases. Now we can get dragged into an exchange of contradictory references to scientific reports (please note that I have yet to see any reference made in an article by Catherine O'Driscoll that contains sufficient information for me as an experienced researcher to be able to trace the article cited) or more productively we can consider the result of the evolutionary pressures that have lead to the development of an effective immune system.

Lets say that 6 months ago I caught a specific strain of the common cold. As a result of fighting off the cold I will have a period of immunity to that specific strain. Six months later I inhale the same cold virus from a colleague at work. There are now two possible outcomes: 1 my immunity has lapsed and I catch the cold again, 2 I am still immune and I am protected.

Case 2 is essentially the same as being vaccinated before immunity is lost i.e. more frequently than necessary. As this will happen naturally with very high frequency it should be obvious that if there is a risk of autoimmune disease it is likely to be very small or a very high percentage of the population would be suffering from these

diseases. Similar arguments would apply to any consequence of too frequent vaccination.

There is a problem with too frequent vaccination and it results from the same effect that limits the minimum age we can vaccinate puppies. If a vaccine is given while there is still a high level of antibodies to the vaccine antigen. The remaining antibodies lead to the destruction of the vaccine antigen before it re-triggers the immune response. In puppies this problem is more severe because the blood antibodies have come from the mother and not from an earlier immune response in the puppy.

### **Homeopathic nosodes**

The conventional scientific wisdom is that homeopathic medicines cannot work (e.g. a recent Horizon documentary). The problem is that standard scientific assessments are not good at evaluating multi-component effects. Usually a standard medicine will have a known mode of action and a quantifiable relationship between dose and effect. In comparison homeopathy would be expected to have a holistic effect and show an inverse dose response relationship i.e. the lower the concentration the more pronounced the effect. The design of an appropriate scientific test to eliminate the possibility of a homeopathic effect is fraught with difficulty. The purely laboratory based studies can be criticised for being “artificial” while whole animal studies cannot be sufficiently controlled to eliminate the possibility of observed effects resulting from some uncharacterised background change. So at present we can say that there is no robust scientific evidence to support homeopathy, however a fundamental truth of mainstream science is that “absence of evidence does not provide evidence of absence” i.e. the jury’s still out.

In the context of vaccination it does not seem unreasonable to believe that the effect we are looking for is so specific, i.e. protection from a single disease, that were homeopathic vaccination to be highly effective it would be apparent in standard scientific studies. The fact that it is not suggests that homeopathic vaccination is a risky approach and any “success” reported is more likely to result from a low risk of exposure that results from the widespread use of conventional vaccines limiting disease spread.

### **How often should you vaccinate**

Our personal decision, which aims to maximise benefit while minimising risk, is as follows:

We vaccinate puppies in accordance with manufacturers instructions against the main “killer diseases”

We boost after 12 months and then every 18 months until 8 years

We do not vaccinate dogs over 8.

In reaching this decision after consultation with our vet, we have assumed that:

- 1 Re-vaccination is likely to lead to progressively longer period of immunity

- 2 Recommended vaccination protocols err too strongly on the side of caution for the legal reasons outlined above.
- 3 We live in a rural area with relatively low exposure risks
- 4 In the case of dogs over 8 their risk of exposure will be further reduced by their decreased need for exercise.

Your decision must be based on your own assessment of the risk. Sadly there will be no foolproof strategy and you should be sceptical of those who suggest there is.

John Hubble 2003