

CANINE HERPES VIRUS

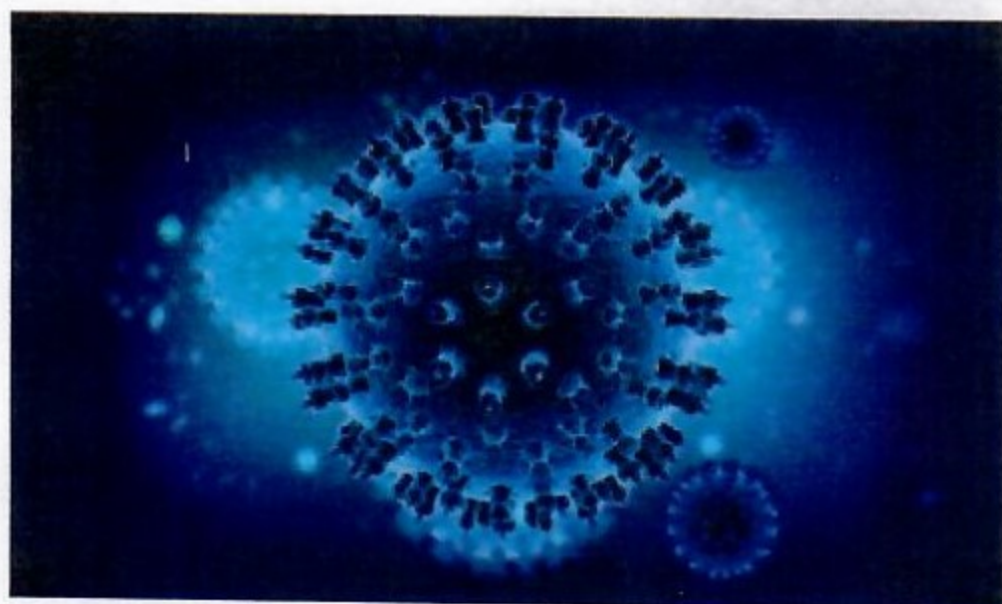
as a genital infection in the dog

Contrary to common belief among dog breeders, an increasing number of studies on reproductive problems and puppy deaths in dogs clearly indicate that comparatively few are, in fact, caused by genital infections. The most often implicated genital infectious agents in the dog are *Brucella canis*, Canine Herpesvirus, and the commensal bacteria beta-hemolytic streptococci, *Escherichia coli*, various *Pasteurella* species and staphylococci. The commensal bacteria are so called opportunistic pathogens, meaning that in healthy individuals, they constitute the normal microbiome, but they may cause disease in individuals, which for some reason have a compromised immune system or suffer from an unrelated disease. The circumstance that these opportunistic bacteria are found both in dogs with reproductive problems and in those with a normal reproduction means that both the decision on when it is really meaningful to take a bacterial sample from the genitalia, and how to interpret the result, is crucial. Much is to say about this, and especially the risks and complications involved in treating healthy dogs with antibiotics. In this text, however, I will focus on the Canine Herpes virus.

Canine Herpes virus (CHV1).

The Herpes viruses may cause disease in many species of animals, including humans. Characteristic for this group of viruses is that after an acute infection the virus will remain in the body in a resting state, and can be re-activated in connection with all kinds of stress. Well known in humans is the stress related flare up of lip ulcers caused by Herpes Simplex. The Canine Herpes Virus 1 (CHV1) is art specific, and only occurs in dogs. This virus is widespread in the dog population in many parts of the world, and between 40% and 88% of tested dogs have been found to have antibodies against CHV1, which shows that they at some time have been infected with this virus (Krogenaes et al., 2012; 2014).

Adult dogs that are infected with CHV1 only develop slight symptoms such as inflammation of the sclera of the eye, a cough, and an infection of the genital tract – sometimes with small blisters in the vaginal or preputial mucosa. Abortions have been seen in pregnant bitches after experimentally induced infection, but it is uncle-



Herpesvirus



Typical CH1 -necroses in kidneys

ar whether that occurs also in connection with spontaneous infections. CHV1 is also a part of the kennel cough complex. In contrast, to in adults, for young puppies up to 2-3 weeks of age CHV1 is an acute life threatening disease. The puppies can become infected already in the uterus during pregnancy, or in connection with parturition. It usually takes 6-10 days from when the puppies are infected until they begin to show symptoms. They then usually die within 1-3 days. A first sign that something is wrong with the litter is that the puppies are restlessly moving around and frequently vocalizing, and that they will not suckle. Usually all the puppies in the litter will become infected and the mortality rate is high. If some of the infected puppies survive, they may later develop locomotion problems, or become blind or deaf because of damages to the brain, or to have poor kidney or liver function.

CHV1 is most commonly spread via the upper airways, when dogs are sniffing on one another or coughing, or via saliva, urine or vaginal discharges, but it can also be spread when dogs are mating. It does not survive outside the body for more than about 24 hours, and it is sensitive for most disinfectants. The risk for that it is spread via clothes and shoes, therefore, is not big, although it is always a good idea to be careful.

The canine herpes virus grows very slowly, multiplying only once per 24 hours and is therefore not very infectious. The kennel that becomes infected with CHV1, however, can be hit quite hard over a period of time, until most of the dogs have become infected and have developed antibodies against CHV1. This may take 6 months or more, depending on the circumstances.

When a dog or bitch is infected by CHV1 for the first time, it will take 2-3 weeks before the in-

crease in antibodies has reached a level that is high enough for the virus to stop multiplying, and eventually transform into its latent form. The CHV1 can only infect other dogs during its actively multiplying phase. Consequently, after 2-3 weeks the individuals that have been infected by CHV1 for the first time will no longer spread the disease to other dogs. The antibody level will then slowly diminish over time, sometimes over several years. If the same dog is infected by CHV1 again this will induce a booster effect, and this time it will take just 2-3 days for the antibody response to reach the level when the virus is inactivated and stops multiplying, and the dog no longer is shedding the virus and thus will not spread the infection to other dogs.

Consequently, only newly infected dogs will be spreading the CHV1 to other dogs, and only during the phase when the virus is actively multiplying. That is for 2-3 weeks if it is the first infection and for 2-3 days in a dog that has been infected before. Thus, if a male dog that has never developed antibodies to CHV1 mates a bitch which is in the active stage of virus multiplication, this male, in case he becomes infected (which is not always the case), can pass the virus on during the next 2-3 weeks. If a male dog which has previously been infected by CHV1 mates a bitch which is in the active stage of virus multiplication he can spread the virus on only during the next 2-3 days.

If a bitch which has never developed antibodies to CHV1 is mated to a male which is in the active stage of a CHV1-infection, and thus might spread the virus, this bitch, if infected, will develop a high level of antibodies within 2-3 weeks, i.e. in good time before the whelping. The puppies will, therefore, be protected from being infected with CHV1 as the bitch by that time have produced enough antibodies in the milk.

Problems mainly may occur when a pregnant bitch that does not have antibodies to CHV1 is infected during the last 3 weeks of pregnancy, because the level of antibody in the colostrum may not have risen enough to protect the puppies from infection. Similarly, CHV1 may cause fatal disease in puppies, which have not received enough antibodies in the colostrum and are infected during the first 3 weeks after birth. These two periods of increased risk for disease from the CHV1 are commonly called 'The 6 critical weeks'.

A bitch which has had a litter of puppies dying from CHV1 will usually have unaffected litters in the future.

In cases of puppy deaths from CHV1 the diagnosis can be made by performing a simple autopsy, just looking at the internal organs of the puppy. These usually have a for CHV1-infections typical, speckled, appearance with small red-grey areas of hemorrhage and dead tissue (necrosis). Diagnosing CHV1 in adult dogs is done by analysing the level of antibodies in a blood sample.

CHV1 is a virus and treating the infected puppies with antibiotics is therefore not an option. Some attempts have been made to use antiviral medications (for humans), but with no well documented effects. CHV1-infected puppies usually succumb within 2-3 days after showing the first symptoms.

As there is no medical cure for CHV1 the best way to protect, the kennel is to be pro-active, preventing the introduction of the virus. Kennel hygiene is imperative. Pregnant bitches and bitches nursing a litter of puppies should be separated

from other dogs. Especially from those who are actively traveling to shows, courses or trials etc with many participating dogs. Avoid submitting the dogs to all kinds of stress as much as possible, as this is a seriously contributing factor when a latent CHV1 infection is activated. Bitches that are out on breeding terms should be brought to the kennel in good time, at least 2-3 weeks before whelping, so that they can adapt to the environment and to allow their immune system to do its job in the new surroundings.

To avoid problems from CHV1 one strategy is to test all the dogs and bitches in the kennel for antibodies to CHV1, to identify those that have a titer, and especially those, which have not already encountered the virus and thus are vulnerable to infection and at risk for puppy deaths. Should the test show that all the dogs already have developed antibodies to the virus no other action is necessary. If, in contrast, none of the dogs should have an antibody titer (which would be a rare situation) one strategy might be to try to continue to keep the kennel CVH1-free (which would be a challenge), or to vaccinate all the dogs against the virus. In the majority of kennels, however, the tests show that there are both dogs which have a titer and some, especially younger dogs, that have not. In those situations, the unprotected dogs should be vaccinated against CHV1 at the time of breeding and again two weeks before whelping. All new introductions should be kept isolated from the other dogs and tested before they are allowed into the kennel.

In a kennel with acute problems from CHV1 a veterinarian might be able to provide so called hyper-immune serum. That is serum collected from a dog with a high antibody titer against CHV1. Such serum can be stored in a freezer, to be used in newborn puppies if the bitch does not have enough antibodies.

A vaccine against CHV1 is available, and breeders who want to do all they can in order to avoid puppy deaths might chose to use this also when they do not really have any reason to expect problems. It should be given in connection with mating or early in pregnancy and again as a booster 2 weeks before expected whelping. The effect is short, and the vaccinations should therefore be repeated when the bitch is mated again. Studies of the protective effects of this vaccine published so far are not entirely clear.

**” This virus is
widespread in the
dog population in
many parts of the
world “**