



**Red, Cream and  
Tortoiseshell  
Cat Society**  
Founded in 1901

## **Feline Infectious Peritonitis (FIP)**

### **So what is FIP?**

Feline infectious peritonitis is caused by a mutation of the feline enteric corona virus and probably also requires immune susceptibility on the part of the affected cat. It can also cause transient diarrhea and an apparent infection in many cats. Some research indicates approximately 30% of "housecats" and approximately 80% of cats in catteries (from breeding establishments) are infected with feline corona virus. The great majority of these cats never develop FIP, so the susceptibility to this infection is low. For many years it was assumed that there were two distinct strains of FeCoV, the one that caused minor disease and the one that caused FIP. At the present time, the prevailing theory is that the FeCoV mutates in some cats, allowing it to live and even reproduce inside the white blood cells (in this case macrophages) of some cats. It can sometimes survive despite the immune system's efforts to get rid of it and it can be transported out of the intestinal tract and into the rest of the body by wandering white blood cells. This allows it to cause severe systemic disease which is almost always fatal. It seems that the presence of infection with FeCoV eventually leads to mutation of the virus in some cats, so they are not originally infected with a strain of virus that normally causes FIP, they just don't fight off the FeCoV virus fast enough to prevent a mutation from occurring that makes it become the FIP causing form of the virus. It is also apparent that the strains of FeCoV that can cause FIP can sometimes be spread from one cat to another, since severe outbreaks of FIP virus sometimes occur. How frequently the cause of an individual cat's FIP is a mutant from FeCoV the cat had or from FeCoV already mutated to an FIP producing form is hard to say. However, when there is a "pre-mutated" FeCoV virus infection, there are usually a number of cases in one household over the course of a couple of months, if there are more than four or five cats in the household.

### **What tests are available?**

The FIP test is an antibody test that detects antibody to feline corona virus. None of the current tests for FIP accurately differentiate the FIP mutant from the normal enteric corona virus. Therefore, these are tests for corona virus, not for FIP. Since it is known that very many cats have positive corona virus titres, this test has limited value as a diagnostic tool for FIP. There are two types of feline corona virus. One causes diarrhea and gastrointestinal signs in affected cats and may occur in cats without any signs of illness. It is estimated to affect up to 70 to 80% of cats in multiple cat households and about 25% of cats in single cat households. The second form of feline corona virus infection is FIP, which is thought to be fatal over 90% of the time when it infects cats. Obviously a much smaller number of cats are infected with this form of the virus since the cat population would be much smaller if that were the case. The test can not distinguish between the two types of corona virus exposure. Which is why FIP tests are hard to interpret. For the most part, testing a cat for FIP

that has no clinical signs of illness is not very useful. A positive titre indicates that antibodies are present to one of the two forms of corona virus but not much else.

### **So what is this "titre"?**

A titre is a method of determining how high the level of antibody in an animal's blood is. If a test can detect antibody in blood or serum that is diluted half and half with another liquid then the titre would be 1:2. If the test could detect the antibody when this new solution was diluted half and half again, the titre would be 1:4. This goes on and on. The higher the second number is, the higher the levels of antibody in the patient must be. While a 1:400 titre seems high, most reference books do not consider an FIP titre to be high until it is at least 1:1280 and some references use 1:3200.

### **Diagnosis**

FIP is very hard to diagnose. FIP probably causes clinical signs in most cats within 2 or 3 months of infection, or less, but there are reported cases in the literature with possible incubation periods of up to eleven months. FIP is nearly always fatal if it produces clinical signs, but it may take several months for death to occur, so the course of the disease doesn't help, yet, in determining if the disease is present in the two surviving cats. There are some reports of cats surviving infections that were presumed to be FIP but it is very unusual, if it occurs. Even though the FIP virus is more stable in the environment than many viruses are, it is still easy to kill. It is reported to be susceptible to virtually all of the common disinfectants and even just to plain detergent and water. Most cats that develop FIP are less than two years of age or over thirteen years of age. This is probably due to the fact that cats who live to be two years of age probably have immune systems that function well and are therefore able to control the mutant virus. The return of susceptibility after cats age is probably due to the development of immunosuppressive disorders, such as diabetes, kidney failure, liver disease and cancers as cats mature, which weakens immune systems that were formerly functioning well. Cats can be exposed to this virus and have sufficient immune competence to either eliminate it from their body or keep it suppressed to the point that they can live with it. Cats that merely suppress the FeCoV viruses may be long term carriers. It is known that cats can carry the virus for long periods, at least a year and probably longer.

### **How to deal with this problem?**

The corona virus itself is not especially hardy in the environment but it can survive for as long as seven weeks in some situations. It is usually passed by contact with the stools of infected cats. If there were not carriers of the virus, who keep it alive in their body and spread it for long periods of time, the home would be free after a couple of months. Since chronic carriers do exist, it can be very hard to eliminate this virus from a household once it has found its way in. It is suggested that approximately 25% of cats living in one or two cat households have FeCoV when studies were done looking for it. In catteries, the rate is closer to 75% and approaches 100% if there are more than 10 cats at one location.

### **Vaccination?**

Vaccination for FIP is still controversial among veterinarians. The vaccine caused some problems in clinical studies that do not seem to occur in the "real world" but are very worrisome. The most severe of these problems being sensitisation of the cat's immune system leading to a more severe

infestation with FIP in some cats in lab studies. This has made veterinarians wary of the vaccine. The effectiveness of vaccination is hard to measure in clinical situations, too, primarily due to the fact that it doesn't do much for cats that are already exposed to the FeCoV virus which we know to be the case in most group housing situations. However, there is some justification for vaccinating cats who have no titre to FeCoV when they are going to be placed into a home known to have had FeCoV exposure, since these cats have probably not been exposed and therefore may gain protection from the vaccine. They do have to be isolated until the vaccination series is complete, too. This is such a small group of cats who might actually benefit from vaccination that they are often overlooked.