

DISEASE INFORMATION FACT SHEET

Feline infectious peritonitis



This Disease Information Fact Sheet accompanies the 2013 AAFP Feline Vaccination Advisory Panel Report published in the *Journal of Feline Medicine and Surgery* (2013), Volume 15, pp 785–808.

Disease facts

Feline infectious peritonitis (FIP) is an immune-mediated disease triggered by infection with a feline coronavirus (FCoV). FCoV is found very commonly in cats; it is transmitted via the oral–fecal route between felids, but is not infectious to other species (including humans). Coronavirus-specific antibodies are present in up to 90% of cats in catteries and in up to 50% of cats in single-cat households, yet only about 5% of FCoV-infected cats will develop FIP in multiple-cat households.¹

Initially it was hypothesized that FCoV strains causing FIP were different from avirulent enteric FCoV strains. FCoV strains were subdivided into two distinct ‘biotypes’, feline enteric coronavirus (FECV) and feline infectious peritonitis virus (FIPV). However, it is now accepted that all FCoV types may induce systemic infection and that those ‘biotypes’ are not two different virus species, but rather represent virulence variants of the same virus.² The precise process by which FIP develops is unclear, but there are two main hypotheses.³ The most widely accepted hypothesis, the internal mutation theory, assumes that a mutation is necessary to enable the virus to replicate in macrophages.^{4–6} Cats are initially infected with the primarily avirulent FCoV, which replicates in enterocytes. In some instances a mutation occurs in the FCoV genome, resulting in a new phenotype with the ability to replicate within macrophages. No consistent mutation has been identified.

The second hypothesis is that any FCoV can cause FIP but that viral load and the individ-

The 2013 Report of the Feline Vaccination Advisory Panel of the American Association of Feline Practitioners (AAFP) provides practical recommendations to help clinicians select appropriate vaccination schedules for their feline patients based on risk assessment. The recommendations rely on published data as much as possible, as well as consensus of a multidisciplinary panel of experts in immunology, infectious disease, internal medicine and clinical practice. The Report is endorsed by the International Society of Feline Medicine (ISFM).

ual’s immune response determine whether FIP will develop.^{7–9} Taking viral genetics and host immunity into account, it is likely that both theories play a role.³ In both hypotheses, the key pathogenic event in the development of FIP is replication of FCoV in macrophages.

Affected cats develop a spectrum of clinical signs caused by 1) granulomatous lesions in target organs, including central nervous system, eyes and parenchymatous organs or 2) vasculitis leading to fluid redistribution into second spaces, accumulating in body cavities causing effusions (eg, abdominal [ascites], thoracic, pericardial, scrotal).^{3,10} In addition to these well known clinical presentations, some unusual pictures have been described, including the development of a focal granulomatous mass causing intestinal obstruction,¹¹ priapism,¹² skin fragility,¹³ and other skin lesions (eg, nodular or papular lesions, pododermatitis).^{14,15}



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Vaccine types

A vaccine for FIP is commercially available in the USA, Canada and Europe, and contains a temperature-sensitive modified-live mutant strain of coronavirus for intranasal administration. The vaccine is not licensed for kittens younger than 16 weeks of age because protection from disease has not been demonstrated in these young animals. This vaccine was developed specifically to avoid induction of high serum antibody levels as these may promote antibody-dependent enhancement (ADE) of infectivity (see vaccine safety).

Onset and duration of immunity

Controversy exists concerning the ability of this vaccine to protect from FCoV infection or to prevent development of disease; little is known about onset and duration of immunity. The vaccine is licensed for annual revaccination but the maximum duration of immunity has not been determined.

Some studies demonstrate protection from disease,^{16,17} while others show little or no benefit from vaccination.^{18,19} Discrepancies between study results are likely attributable to differences in the experimental setting of the challenge trials (eg, strain and dose of challenge virus, genetic predisposition of test animals). In a field study of 138 cats belonging to 15 cat breeders, in which virtually all of the cats had antibodies, no difference was found in the development of FIP between the vaccinated group and the placebo group.²⁰ Thus, vaccination in households with known cases of FIP or in an FCoV-endemic (and thus high-risk) environment is not effective. In one placebo-controlled double-blind trial in a group of cats lacking FCoV antibodies before vaccination, a small but statistically significant reduction in the number of cats that subsequently developed FIP was noted.²¹ There might be certain special circumstances (eg, a cat that has never been exposed to FCoV entering a shelter in which FCoV is endemic) in which the vaccine might induce some level of protection.

Vaccine safety

Field studies have demonstrated that the commercially available vaccine is safe if used in cats over 16 weeks of age. ADE leading to faster development of disease in vaccinates was demonstrated in experimental challenge exposure studies;^{18,22} however, ADE likely does not occur in a natural setting. In neither of the two placebo-controlled, double-blind field trials were signs of ADE or induction of FIP noted.^{20,23}

Other vaccine considerations

Most kittens born and reared in environments in which FCoV infection is endemic are infected prior to 16 weeks of age. This may be one reason for the lack of vaccine efficacy in the field.^{24,25}

If vaccination is considered, FCoV antibody testing should be performed before vaccinating as the vaccine is ineffective once cats have been exposed to the virus. However, many factors, both intrinsic to the cat as well as associated with testing methodology, make interpretation of titers challenging.

Antibody titers develop subsequent to vaccination, making the establishment and monitoring of an FCoV-free household difficult.

Advisory Panel Recommendations

At this time, there is insufficient evidence that the vaccine induces clinically relevant protection, and use of the vaccine is not recommended.

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DISEASE INFORMATION FACT SHEETS

- ❖ Feline herpesvirus 1
- ❖ Feline calicivirus
- ❖ Feline panleukopenia
- ❖ Rabies
- ❖ Feline leukemia virus
- ❖ Feline immunodeficiency virus
- ❖ Feline infectious peritonitis
- ❖ *Chlamydomphila felis*
- ❖ *Bordetella bronchiseptica*

GENERAL INFORMATION FACT SHEET

- ❖ The immune response to vaccination: a brief review

SUPPLEMENTARY FILES

Fact Sheets accompanying the 2013 AAEP Feline Vaccination Advisory Panel Report are available, together with the Pet Owner Guide included in Appendix 2, at <http://jfms.com>
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PET OWNER GUIDE (APPENDIX 2, pp 807–808)

- ❖ Vaccinations for Your Cat