FLEA TREATMENTS

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Killer Drops

Shampoos, powders, sprays and collars all aim to control fleas on pets, but the most popular treatments today are the "spot" medications. Squeeze a few drops on the skin along a dog's or cat's back, and the insecticide will control fleas for a month. The products are available only from veterinarians, in doses adjusted for an animal's weight.

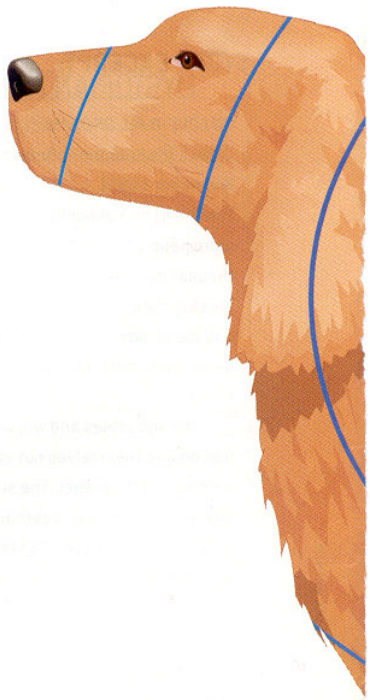
The formulations spread by mixing with a pet's skin oils, which migrate as a result of body movement and gravity. Some products flow into the sebaceous glands of hair follicles, where they are stored and secreted over time; others remain on the skin's surface. Advantage (imidacloprid) from Bayer and Frontline (fipronil) from Merial—the two market leaders—will fan out across the body in less than 12 hours and kill more than 90 percent of fleas by then. Tests by Bayer show that after 28 days, concentrations across a dog's body decrease to as little as one part per million, but less than one tenth of that amount is needed to kill fleas, according to Bob Arther, Bayer's manager of parasitology. And because they reside in or on skin, spot compounds do not readily wash off like treatments that stick to an animal's hair.

Pets can be given anti-flea pills, sending medication into their bloodstream. But a flea must bite the pet to be exposed to the insecticide. Some pills do not kill adult fleas but make their eggs unviable. The spot treatments kill virtually all fleas within 18 hours and prevent eggs from being laid. Buyers should be wary of over-the-counter knockoffs; many contain permethrin, which is less effective on dogs and is toxic to cats.

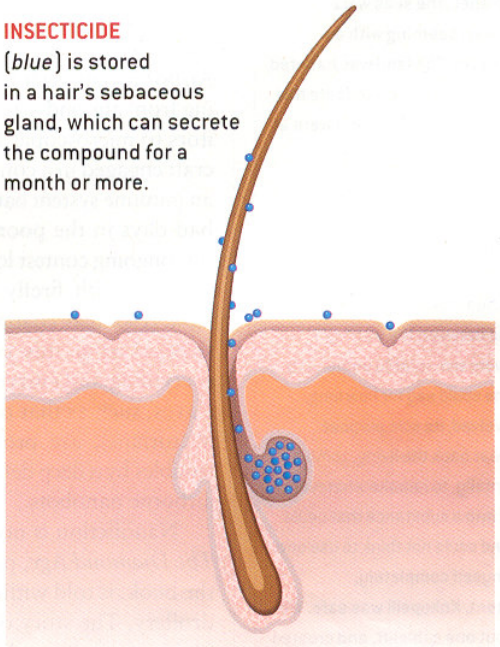
Some critics claim that pets can be harmed by ingesting small amounts of spot treatments as they groom themselves (although the same could be said of a spray, collar or pill). But tests required by the Environmental Protection Agency show that "animals that had received even gross overdosages had no change in their kidney or liver values," says Bruce Klink, manager of veterinary services at Merial. Manufacturers say the active ingredients do not affect people.

No insecticide is 100 percent safe. But be skeptical about "natural" or "chemical-free" alternatives such as vitamin B or garlic. There is little scientific proof that the potions send fleas fleeing. —*Mark Fischetti*

"SPOT" FLEA TREATMENTS mix with a pet's skin oils. A few drops disperse readily. Tests by maker Merial on midsize dogs given the recommended dose of the treatment fipronil show that concentrations quickly spread across the body. And although concentrations are low after 56 days, they are still high enough to kill fleas (95 percent of fleas die when exposed to 0.7 microgram per gram of fur).



INSECTICIDE (*blue*) is stored in a hair's sebaceous gland, which can secrete the compound for a month or more.



ILLUSTRATIONS BY GEORGE RETSECK

DID YOU KNOW . . .

➤ FADING FAD: When a flea bites, it deposits saliva in the skin. Pets can have an allergic reaction that causes redness and severe itching. As they scratch, they develop flea-allergy dermatitis. For years, FAD was the leading skin problem in dogs and cats, but veterinarians report that "spot" treatments, because of their quick kills, have dramatically reduced the incidence of the disorder.

➤ BLACK DEATH: Rat fleas carry bacteria that can cause plague, such as the bubonic plague that wiped out one third of Europe's population in the 14th century. In 1999 microbiologists identified plague in flea-infested squirrels, chipmunks and other wild rodents in 22 counties surrounding Sacramento, Calif.; in 2000 state health officials began issuing regular warnings about plague-prone areas there.

➤ MAN BEFORE BEAST: The French established the world's first veterinary school, in Lyon in 1762. Veterinary science was originally developed not so much to help animals but to improve the understanding of zoonotic diseases in order to prevent their transfer to humans.

FLEA'S NERVE CELL

is the target of the spot medication's active ingredient, which binds to a specific receptor there. The treatment fipronil (*shown at right*) blocks the flow of chloride ions that otherwise interrupts nerve signals. This hyperexcites a flea's central nervous system, sending it into a deadly seizure.