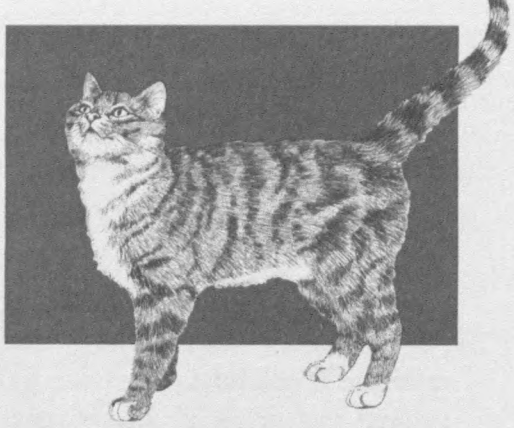
Perspectives On Cats

A Newsletter for Cat Fanciers From The Cornell Feline Health Center

Spring 1990



Understanding Vaccines and Adjuvants

Jeffrey E. Barlough, D.V.M., Ph.D.

In ancient times certain sage physicians claimed that they could protect healthy people against illness by treating them with tissues or fluids obtained from diseased individuals. This seemingly wild notion was based on the observation that patients recovered from a disease often were resistant when subsequently re-exposed. Many successes, but also many failures, were counted among the results of these earliest of medical experiments in immunization. From our presumably enlightened perspective at the latter end of the twentieth century, we can only marvel at the insight (and often the courage) of some of these pioneers in medical and veterinary research — the early Chinese and Turks, Edward Jenner, Louis Pasteur, even Cotton Mather — for it is on the shoulders of their accomplishments that our society's unprecedented high level of health and relative freedom from infectious disease rest.

In veterinary medicine, as in human medicine, inoculation represents the single most important preventive health measure available today. The excellent vaccines against rabies, canine distemper, canine parvovirus, and feline panleukopenia are only a few of the spectacular successes achieved in this area over the past several decades. And the future holds the promise of even greater successes to come.

Types of Vaccines

Two major types of vaccines are currently available to veterinarians for use in their feline patients: **modified-live** vaccines and **inactivated** ("killed") vaccines. Modified-live vaccines contain an attenuated (weakened) strain of the particular disease agent of concern. Attenuated strains have an advantage in that they replicate within the host without producing serious clinical illness, yet still are able to stimulate protective host defenses. Modified-live vaccines often require only a single dose to provide an immunity that is both solid and enduring.

Inactivated vaccines have advantages too. They are much more stable than are modified-live vaccines (i.e., they have a longer shelf-life); they never spread from the vaccinated host to other animals; they cannot revert to a virulent state; and they are safe for use in pregnant animals. Although more than a single dose of vaccine is required and the duration of immunity is shorter, inactivated vaccines and their experimental first cousins, **subunit vaccines**, are regaining importance in this age of retrovirus and herpesvirus infections and concern about the safety of genetically customized microbes.

Inside this issue ...

Designing a successful inactivated vaccine requires that the agent in the vaccine is inert and thus will not replicate in the host. Over the years it has become evident that artificial means must be employed to heighten the response of the host to the injected material. Earlier in this century the basic mechanics for eliciting this improved immune response were devised, using certain specialized mixtures to which the vaccine material was then added. These mixtures are known as adjuvants. (Latin *adjuvans*, "aiding").

Types of Adjuvants

The secret of success of many a commercial vaccine lies in the composition of its adjuvant. An adjuvant is any substance that nonspecifically enhances the immune response to the antigen. A good adjuvant should be safe and should produce an earlier, better, and more enduring immune response than the inactivated vaccine material alone. Unfortunately, the adjuvant component of inactivated vaccines often is responsible for some postvaccination side-effects (fever, malaise, vomiting, muscle soreness). A really good adjuvant thus must minimize side-effects while maximizing its immune boost.

One of the most famous adjuvants is Freund's complete adjuvant. It is a potent stimulator of immune responses and is considered a classical adjuvant. Unfortunately some of its relatively unpleasant side-effects (severe local irritation) preclude its widespread use in animals and human beings. A modification of Freund's complete adjuvant is Freund's incomplete adjuvant, but it is less potent than the complete adjuvant.

New Vaccine Approaches

Liposomes (microscopic spheres made of phospholipid bilayers separated by aqueous compartments) represent a promising new approach to vaccine antigen delivery. In this system the antigen is trapped within the liposomes, which are then injected into the host. The liposomal delivery system enhances the activation of macrophages which engulf and destroy antigens.

A new and related area of adjuvant research involves **immune-stimulating complexes**, or **ISCOM**. The ISCOM are similar to liposomes, within which the antigenic material is incorporated. An experimental ISCOM-based feline leukemia virus vaccine has been developed by European researchers. This new vaccine has shown great promise thus far in early vaccine trials. The results of further ISCOM research and other adjuvant research are awaited with anticipation. ■

Jeffrey E. Barlough, DVM, PhD, was assistant professor for the department of microbiology, immunology and parasitology at Cornell's College of Veterinary Medicine. He currently is employed by the University of California at Davis.

Perspectives On Cats *A Newsletter for Cat Fanciers From The Cornell Feline Health Center*

The ultimate purpose of the Cornell Feline Health Center is to improve the health of cats everywhere, by developing methods to prevent or cure feline diseases, and by providing continuing education to veterinarians and cat owners. All contributions are tax-deductible.

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Mail Bag

Q. For a year we've been trying to tame and/or catch 8 feral cats. And the number will rise astronomically come the spring breeding season, since our veterinarian says there are no cat contraceptives to administer in food. Nobody, including humane organizations, can or will help us catch the cats. Any suggestions gratefully accepted. — C.N., New York

A. Live trapping is the best method. The trap should be large enough to allow an adult cat to enter the trap easily. Bait the trap with an aromatic canned cat food to entice the cat into entering the trap. If you have been providing food to the feral cats, place the trap within the feeding area, but do not provide any additional food outside of the trap. Live trapping can be frustrating when you discover you have trapped an animal such as a skunk or raccoon instead of a cat. Be very cautious when approaching any trapped animal. They are afraid and their natural response is to attack.

Q. I work at a municipal animal shelter that gives out for adoption about 25 dogs and cats each week. In addition, we have about 5000 surplus animals each year that are euthanized because they are not adopted. In order to reduce the number of animals euthanized, we spay or neuter every animal adopted before it was sent home. However, very young animals were formerly sent home with instructions to be returned at five or six months for the surgery. Despite various incentives, a large number of these pets were not returned for surgery, and consequently bred more (unwanted) offspring.

In order to prevent this, about a year ago I started spaying every animal, regardless of age, before it left the shelter. As of this date, I have not seen any untoward results of this early surgery.

In your last issue of Perspectives on Cats it stated that six months is the earliest age recommended for spaying. I would appreciate your telling me what problems or harmful effects I may be producing in these young animals.— S.R., New York

A. The recommendation to spay or neuter at six months has long been held as the optimal because it will allow the animal to become sexually mature. Many shelter groups are performing the surgery at much earlier ages to stop reproduction before they are placed in home and are reporting no problems. It is too early to determine what, if any, long term side-effects will develop over the course of the animal's life. However, the preliminary research on early neutering (8 to 12 weeks of age) looks promising.

If you would like your question answered in this column, please send it to: POC/Mail Bag, Cornell Feline Health Center, College of Veterinary Medicine, Ithaca, NY 14853-6401.

Rabies Alert!

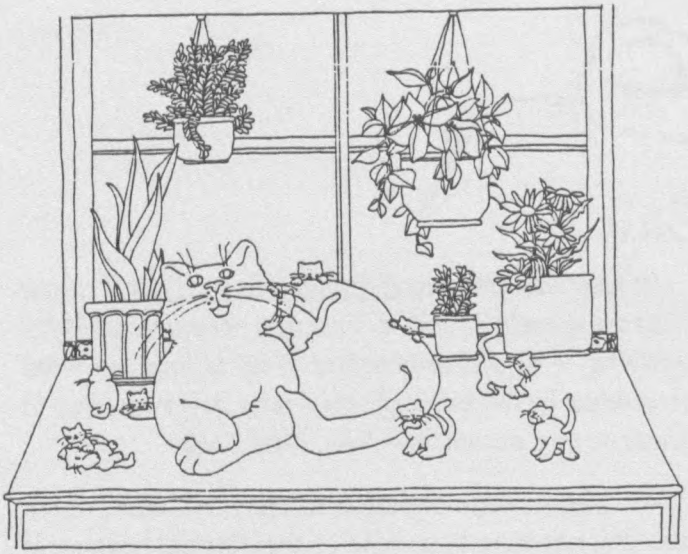
The mid-Atlantic rabies epidemic has swept through Pennsylvania, Maryland and Virginia since the late '70s. Recently it has crossed into New Jersey and it is anticipated that New York counties which border Pennsylvania will be the next to experience an increase in rabies cases.

Last year there was a total of 700 rabies cases in Pennsylvania and 54 rabies cases in New York State.

Whether you live in a rabies epidemic state or not, be sure your cat is current on its rabies vaccination.

Growing an Edible

June E



Gardening is one of the leisure activities I enjoy during the spring and summer months. This year I have decided to try a new gardening concept — a garden for my cats. Last year I caught my cats eating several of my bedding plants. Although frustrating, it motivated me to develop a nontoxic garden for my three cats to enjoy.

Planning is the first step to any good garden. My edible garden for cats will be grown in a container. Since the garden will be located indoors in a visible area, I will combine plant textures and colors to make the garden visually attractive. A basic planting layout should be drawn after the plants are selected. This insures that adequate growing space is provided and the plants are arranged in the best way possible.

Plant Selection

When selecting the plants for my cat container garden I consulted numerous gardening books and toxic plant books to insure that my plant selection would be nontoxic to my cats. Some of the selections were based on plants that my cats like to eat without adverse reactions. My selection includes catnip, grass, parsley, and dwarf varieties of marigolds and zinnias.

Catnip is always first choice when one thinks about plants which cats enjoy. Catnip is a member of the mint family and cats relish both fresh and dried leaves. This perennial plant has silver gray foliage and lavender flowers. Catnip grown indoors becomes straggly and may require pruning if the cats do not keep it adequately trimmed.

Grass is another feline favorite. However, cats that eat grass may vomit due to gastrointestinal irritation from awns and rough leaves. Therefore harsh grasses, particularly those of the *Graminae* family, should be avoided. I prefer Kentucky bluegrass since it has a finer blade texture and is not as rough as some of the other grasses. Kentucky bluegrass grows both horizontally by rhizomes and upright by sending roots vertically down from each stem. Because of this growth pattern it can easily overwhelm a container garden. Therefore, thinning it is necessary after it is established. Also, periodically cutting the grass will promote new, succulent growth for your cats to enjoy.

(Oats can be used instead of grass. Plants will require replacing every 4 to 6 weeks to prevent the stems and leaves from becoming tough and ungainly.)

Parsley is a well-known herb which has medium green, curly foliage. My cats only enjoy fresh parsley leaves.

Marigolds have dark green foliage which contrasts with the bright yellow, gold and mahogany flowers. My cats are attracted to this plant despite its pungent odor. Marigolds are the organic gardener's friend since they deter a variety of garden pests.

Zinnias are easy-to-grow flowering plants and will provide a color contrast with the marigolds. My cats particularly enjoy munching on the leaves and do not touch the flowers.

Garden for Cats

ttle, B.S.

When purchasing seeds, be sure to select chemically untreated seeds. Chemicals such as Thiram and Captan are transported systemically as the seedling grows. Those chemicals are potentially harmful if the cat consumes them when eating the foliage.

Containers

Any type of container will work, provided it has drainage holes. There are a variety of shapes, sizes, and construction materials available for container gardens. When choosing a container I consider its purpose. For my cat garden I have selected a plastic window box. I chose this type of container because I want the cats to have easy access to their garden. Also, I sometimes have a tendency to forget to water plants on a regular basis and the plastic will retain soil moisture longer than clay or ceramic pots. Finally, plastic's unbreakable properties give it a distinct safety advantage over pottery containers.

Starting seeds

I always use a soilless mix for starting seeds. The mix has been sterilized to kill diseases, pests, and noxious weeds (which would compete with the seedlings for

Table 1. Plants and Their Growing Conditions

Plant	Planting & Care Instructions	Germination	Height
Catnip (*Nepeta cataria*)	Sowing depth is 1/4 inch. Prefers full sun.Allow about 12 inches around plant for growth.	15 days	2 to 3 feet
Parsley (*Petroselium crispum*)	Sowing depth is 1/4 inch. Prefers full sun or light shade. Space plants 8 inches apart.	4 to 6 weeks	10 to 12 inches
Marigold, dwarf (*Tagetes*)	Sowing depth is 1/4 inch. Tolerates full sun or partial shade. Space plants 6 inches apart.	10 to 14 days	6 inches
Zinnia, dwarf (*Zinnia*)	Sowing depth is 1/2 inch. Prefers full sun.	10 days	6 inches
Kentucky bluegrass (*Poa pratensis*)	Sprinkle seeds on top of the soil, barely covering with soil. Prefers full sun.	7 to 10 days	4 to 6 inches

nutrients and moisture).

Seeds can be sown directly in the garden container. However, I prefer to start my seeds separately and then transplant the seedlings into their final container. I prefer this method since germination time varies and often the seeds have different requirements for warmth, moisture and light to germinate properly (see Table 1).

Firmly press the soilless mix into a seed flat and then carefully sprinkle the seeds in rows. Milled sphagnum moss is used to cover the seeds to the recommended depth. (The moss is a deterrent to the formation of mold and mildew which kills newly emerged seedlings.) The seed flat is then placed in a pan of tepid water. Remove the seed flat after the moss becomes moist, but not saturated with water. Afterwards I enclose the seed flat within a plastic bag or plastic wrap and place the flat in a warm location (70 to 75 degrees) to aid in germination. Once the seedlings emerge, I remove the plastic to prevent the formation of mold and mildew.

After the seedlings have at least three true leaves, transplant them into their garden container. First prepare the garden container by placing small pebbles or broken pieces of clay pottery in the bottom to aid drainage. Then firmly pack the soilless mix to within a half-inch of the container top. Make holes in the soil based on the location from your plant layout. The holes need to be deep enough to accomodate each plant. Seedlings can be removed carefully by lifting the plant from the soil using a fork or blunt knife. Insert the seedling into the depression and cover its roots with soil. After the plants are transplanted, water with a soluble fertilizer to give the plants a boost after the trauma of transplanting. (See the insert for additional gardening tips.)

I will not let my cats explore their new garden until all the plants are established in their container. I can only hope that the cats will enjoy their new edible garden and leave *my gardens* alone. ■

Special thanks to Dr. Wayne Schwark and Dr. Mary Smith at the Cornell College of Veterinary Medicine for their assistance in the preparation of this article.

Gardening Tips

Fertilizers: Eventually growing plants will deplete the soil of its nutrients. Signs of nutrient depletion include yellowing leaves and lack of vigor. Plants can be fertilized every four to six weeks using an all purpose fertilizer such as 5-10-5 or 4-12-4. If a pellet fertilizer is used, be sure to thoroughly mix it into the soil. Accidentally ingested fertilizer can cause irritation and chemical burning of the cat's mucous membranes.

Pesticides: Since the purpose of the garden is to have your cats nibble on the greenery, you want to be extremely careful if you use chemical pesticides. Malathion is the chemical pesticide which kills the most common insect pests such as aphids and spider mites. If you choose to use a chemical pesticide be sure to remove the container garden from the cat's reach. Do not allow the cat to come into contact with the plants until after the specified time listed on the label. (For example, when Sevin is applied a waiting time of 7 to 10 days is required.)

An organic method which kills most insects is washing the leaves with soapy water and rinsing the plants. The soapy water interferes with the insect's breathing, causing suffocation.

Rejuvenating the garden: Some plants will begin to lose their vigor and become weak, others will begin to overrun the container, and others will be severely ravaged by the cats. At some point the garden will need rejuvenation by replacing deteriorating plants with new plants. Plan ahead by replacing deteriorating plants with new plants. Plan ahead and start new seedlings to replace old plants.

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Since the Center does not receive financial support directly from the state, college, or university, private contributions are vitally important to the Center. Therefore, we gratefully acknowledge the generosity of the following individuals who have contributed $100 or more to support the Center's work. We also wish to thank those individuals who have also contributed, but who are not listed on the honor roll.

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Cornell Feline Health Center
Cornell University
College of Veterinary Medicine
Ithaca, New York 14853