United States Department of Agriculture
Animal and Plant Health Inspection Service

Program Aid No. 1713

Veterinary Biologics:

Use and Regulation

Issued March 2002
Revised July 2006

Cover photo: A microbiologist observes cell cultures grown in a roller bottle.

Photo credits: APHIS photographer R. Anson Eaglin took the image used in figure 3. All the remaining images were taken by USDA photographer Ken Hammond.

Veterinary Biologics:

Use and Regulation

What Are Veterinary Biologics?

Veterinary biologics are products designed to diagnose, prevent, or treat animal diseases. They generally work through some immunological method or process. Immunity is the body's ability to ward off disease, and there are two types: *active* immunity, which can be acquired by the body when it successfully overcomes a natural infection or responds to vaccination, and *passive* immunity, which involves the transfer of antibodies from immunized animals to nonimmune animals. This transfer may be accomplished by serum injection or, in the newborn, by oral administration of serum or the mother's first milk.

Veterinary biologics are used to protect or diagnose disease in a variety of animals, including farm animals, household pets, poultry, fish, and furbearers, both domestic and wild. Most biologics leave no chemical residues in animals, unlike some pharmaceutical products. Furthermore, most disease organisms do not develop resistance to the immune response produced by a veterinary biologic.

Types of Veterinary Biologics

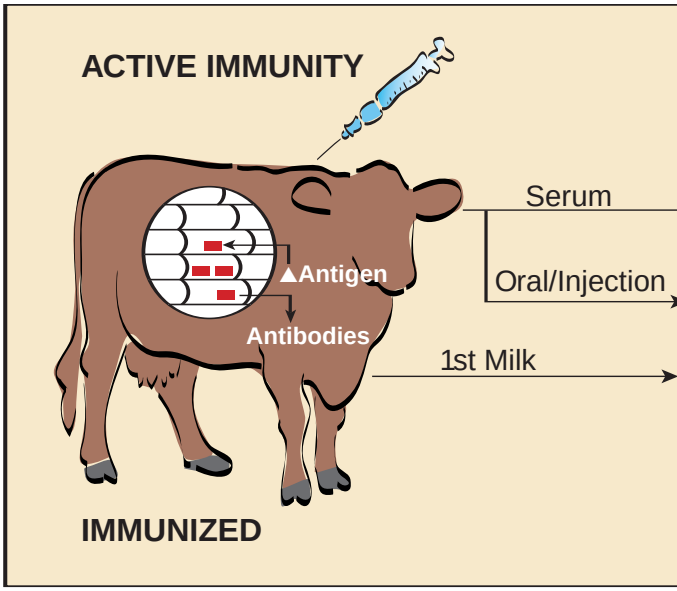
- **Vaccines**—made from viruses, bacteria, spores, or other disease-causing agents. The organisms in a vaccine are always living except in certain viral vaccines, where the agent is killed. The living organisms in a vaccine may be modified by culture or natural selection so that they do not cause disease.

Figure 1—A microbiologist inoculates eggs free of specific diseases to determine the viral titer of a poultry vaccine.

- **Bacterins and Bacterin–Toxoids**—inactivated cultures of bacteria or other nonviral organisms. If the product contains an inactivated toxin that is immunogenic, it is called a bacterin–toxoid.
- **Bacterial Extracts**—purified preparations that contain selected highly immunogenic portions of organisms.
- **Vaccines with Bacterins or Bacterin–Toxoids**—combinations of biological products that may be found in a single container or may be sold in separate containers within the same package.
- **Toxoids**—similar to bacterin-toxoids except that they have been purified to remove bacterial cells.
- **Antiserums and Antitoxins**—products containing antibodies, usually from specifically immunized animals. If the antibody neutralizes a specific toxin, it is called an antitoxin.
- **Allergenic Extracts**—used to diagnose animal allergies to substances like pollen, dust, fleas, and even foods, and to desensitize animals allergic to these substances.

Figure 2—A technician prepares cell cultures for staining.

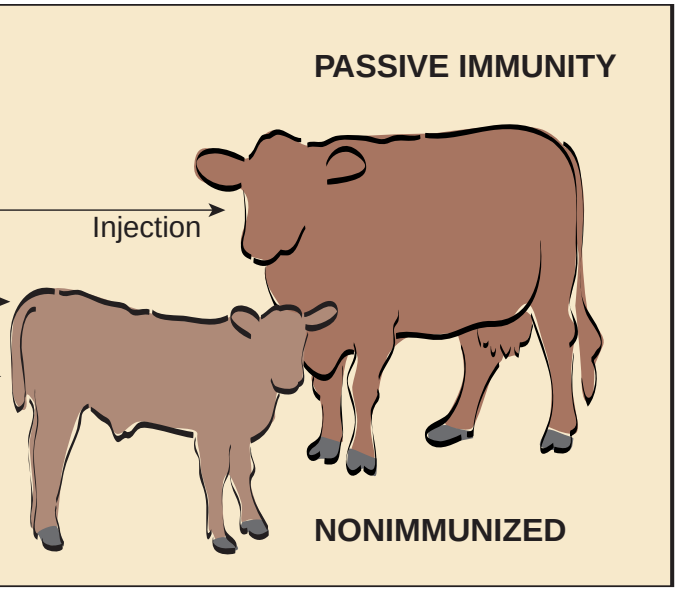
- **Diagnostics**—substances that help detect infection by causing a telltale reaction in animals or in laboratory test systems.
- **Miscellaneous Products**—a category that includes immune stimulants which, when properly administered, may be used to treat certain types of tumors and resistant skin infections.



About 60 years ago, there were perhaps half a dozen of these products available; at the end of 2001, there were 2,494 different biologics available for use against 197 different animal diseases. This ever-expanding array of veterinary biologics means better animal health care but also reinforces the need for strict regulation. Biologics must be handled with care from the initial stages of manufacturing to their final usage. Improperly stored or administered biologics could cause adverse reactions, failure to immunize, inaccurate diagnoses, or other harm to animals.

How Veterinary Biologics Are Regulated

Regulation of veterinary biologics began soon after the turn of the twentieth century because farmers and animal health officials were having poor results with many biological products. Some were ineffective; worse yet, others were contaminated. The most costly such instance was an outbreak of foot-and-mouth disease in 1909, caused by a contaminated vaccinia virus imported into the United States to produce smallpox vaccine.



Under the 1913 Virus–Serum–Toxin Act, further amended by the 1985 Food Security Act, the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) is responsible for ensuring that all veterinary biologics produced in or imported into the United States are pure, safe, potent, and effective. This regulatory activity is accomplished by the Center for Veterinary Biologics (CVB) in Ames, IA.

A Federal license is required in order to manufacture biologics for domestic use and for most exports. A USDA permit is required in order to import biologics for transit shipment, research, or distribution and sale in the United States. Manufacturers must obtain an establishment license and an individual license for each product marketed. These licenses and permits are issued by CVB.

Biologics Exempt From Federal Licensure

- Products manufactured by veterinarians that are intended solely for use with their clients' animals under a veterinarian–client–patient relationship
- Products manufactured by individuals or companies for use only in their own animals
- Products manufactured in States with acceptable veterinary biologics regulatory programs and for sale only in those States
- Products manufactured for export in accordance with the Federal Food, Drug, and Cosmetic Act as amended by the Export Reform Enhancement Act of 1996.

Other veterinary biological products used in the United States are licensed or permitted by USDA–APHIS–CVB.

APHIS' Role in Safeguarding Biologics

APHIS inspects licensed and permitted manufacturers to be sure that facilities are adequate and properly maintained. Officials examine production methods and records to assure that they comply with Federal requirements. Such close supervision is vital because biologics are produced in live systems that have the potential for change if not properly controlled and maintained. Each production run of a biologic—not just the initial one—must be tested to assure that consistent satisfactory production is being maintained.

APHIS is responsible for assuring that licensees maintain proper quality control of the veterinary biologics they produce and continually develop reference standards and test methods to improve product evaluation. Each serial or batch of veterinary biological products is tested for purity, safety, and potency by the licensee. Samples of each serial are also submitted for random quality assurance testing by APHIS. No licensed biological product may be released until APHIS officials substantiate that all required tests have been satisfactorily concluded.

Figure 3—The ultimate goal is to provide pure, safe, potent, and efficacious products in the hands of the end user.

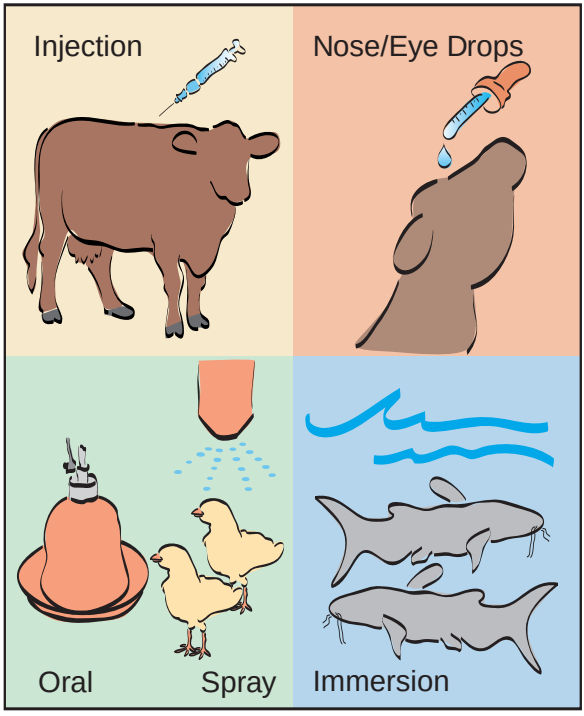
What You Can Do To Keep Biologics Safe and Effective

Look for the U.S. veterinary license number on the product label when buying veterinary biologics. This assures that the product has been manufactured and tested under USDA standards. Under Federal law, all information on the labels of USDA-licensed biologics and in accompanying literature must be approved by APHIS. Labels should include the product's name and serial number, complete directions for use, the name and address of the manufacturer, license or permit number, the number of doses and quantity of contents, storage instructions, precautions, and expiration date. Labels for products used in meat-producing animals will also contain withholding instructions for waiting a certain number of days before slaughtering the animal.

Purchase biologics from a reputable outlet. Careful handling by wholesalers and retailers is essential to the potency and effectiveness of these products. Buy only as much product as is needed for a specific job; an oversupply that must be stored beyond the expiration date could lose potency and become worthless. Never use a biological product after the expiration date on the label.

Use care in storing and handling veterinary biologics. Most products must be kept chilled throughout shipment and stored in a refrigerated area at 35 to 45 degrees Fahrenheit.

ROUTES OF VACCINATION



Consult your veterinarian before beginning an immunization program. Only someone with special training and knowledge of animal diseases and experience in using veterinary biologics can advise you on which products to use. Make sure animals are healthy before vaccinating them; overwork, exposure to inclement weather, and lack of proper feed may interfere with animals' ability to develop immunity.

Some General Rules for Administration of Veterinary Biologics

1. Read and follow label recommendations.
2. Use sanitary procedures and avoid contamination.
3. Carefully cleanse and disinfect site of inoculation.
4. Use sterile instruments for injectable products.
5. Administer the full recommendation dose.
6. Mix biologics *only* if the instructions specify to do so.
7. Observe withholding times when administering products to meat-producing animals.
8. Do not save unused contents of multiple-dose containers.

Followup is extremely important. Keep records of vaccinations, including serial numbers of products. This information may be used in tracing the cause of unsatisfactory results if a product fails to do what the label said it would, or if it produces unexpected results or adverse side effects.

Should a veterinary biologic prove ineffective, notify the licensed manufacturer and also the CVB. The toll-free phone number at the Center is (800) 752–6255. Because few products are tested as thoroughly as federally licensed or permitted veterinary biologics, it is important to notify USDA of any problems so appropriate action may be taken.

For More Information

More information about the APHIS role in regulating veterinary biologics is available from:

Center for Veterinary Biologics
USDA–APHIS–Veterinary Services
510 South 17th St., Suite 104
Ames, IA 50010
(515) 232–5785

CVB's Web site is **<www.aphis.usda.gov/vs/cvb>**.

You may also communicate via e-mail to this address: <cvb@aphis.usda.gov>.