United States Department of Agriculture | Animal and Plant Health Inspection Service | Veterinary Services | National Veterinary Services Laboratories

Training Courses

Provided by the

National Veterinary Services Laboratories

Fiscal year 2009

Last Updated 1/08/09

Course titles are active links. Click course name to navigate.

TRAINING COURSES AT THE NATIONAL VETERINARY SERVICES LABORATORIES

(For FISCAL YEAR 2009 – October 1, 2008 – September 30, 2009)

(For courses offered more than once, all dates are listed)

Some courses may require additional fees for special supplies and equipment. ***Fees are subject to change.**

COURSE TITLE	LENGTH	DATES	COST – FY 2009 Prices	PAGE NO.
Anaplasmosis Complement-Fixation Test	4 ½ days	January 5-9, 2009	$1,525.50	8
Brucella abortus Complement-Fixation Test	4 ½ days	January 5-9, 2009	$1,525.50	8
Avian Influenza (AI) Virus Isolation, Subtyping, and Agar Gel Immunodiffusion	5 days	March 30-April 3, 2009	$1,695	16
Bluetongue (BT) and Epizootic Hemorrhagic Disease (EHD) Virus Isolation	5 days	January 26-30, 2009 Or As Scheduled	$1,695	18
Bovine/Porcine Virus Isolation Techniques	2 days or 5 days	February 5-6, 2009 September 14-18, 2009	$678 or $1,695	19
Brucella Isolation and Identification	5 days	January 12-16, 2009	$1,695	5
Brucella Reagent Production	5 days	January 26-30, 2009	$1,695	7
Complement-Fixation Test	4 ½ days	January 5-9, 2009	$1,525.50	8
Equine Infectious Anemia (EIA) Agar Gel Immunodiffusion (AGID) and Enzyme-Linked Immunosorbent Assay (ELISA) Laboratory Methods	1 ½ days	As Scheduled	$508.50	20
Equine Viral Arteritis (EVA) Virus Neutralization (VN)	2 days 2 days	April 17 & 20, 2009 Or As Scheduled	$678 $678	21
Fluorescent Antibody (FA) Conjugate Production	5 days	March 30-April 3, 2009	$1,695	22
Foreign Animal Diseases	Varies	As scheduled	$450/day*	35
Hemagglutinating Encephalomyelitis Hemagglutination-Inhibition (HI) Test	1 day	April 1, 2009	$339	23
Johne's Complement-Fixation Test	4 ½ days	January 5-9, 2009	$1,525.50	8
Johne's Isolation and Identification	4 days	April 6-9, 2009	$1,356	9
Leptospira Microscopic Agglutination	2 days	As scheduled	$678	11
Mycobacteria Isolation and Identification	10 days	March 23 - April 3, 2009	$3,390	12
Newcastle Disease (ND) Virus Isolation and Serology	5 days	October 20-24, 2008	$1,695	24
Paratuberculosis (Johne's) Complement-Fixation Test	4 ½ days	January 5-9, 2009	$1,525.50	8
Porcine Parvovirus (PPV) Hemagglutination-Inhibition (HI) Test	2 days	April 30-May 1, 2009	$678	26
Porcine Reproductive and Respiratory Syndrome (PRRS) Indirect Fluorescent Antibody (IFA) Test	2 day	April 16-17, 2009	$678	27
Pseudorabies (PR) Virus Neutralization Test	3 days	On Request	Non-Billable	28
Pseudorabies (PR) Virus Enzyme-Linked Immunosorbent Assay (ELISA) and Latex Agglutination Test	2 days	On Request	Non-Billable	29
Swine Influenza (SI) Hemagglutination-Inhibition (HI) Test	2 days	March 5-6, 2009	$678	30
Vesicular Stomatitis (VS) Virus (New Jersey and Indiana Serotypes) Complement-Fixation Test	2 days	April 20-21, 2009	$678	31
Vesicular Stomatitis (VS) Virus (New Jersey and Indiana Serotypes) Virus Neutralization Test	3 days	April 22-24, 2009	$1,017	32

- **An application for training should be submitted as soon as possible, but no later than 2 months before the course.**
- **For specialized training or training not listed, contact the Training Office**

Email: Daniel.J.Grause@aphis.usda.gov
Phone: (515) 663-7300/7475 FAX: (515) 663-7332

In response to requests from our customers for more specific information on diagnostic training to protect the health of animals, the National Veterinary Services Laboratories (NVSL) is pleased to provide you with this catalog which outlines some of the training courses provided by the NVSL. We hope this catalog will be helpful to you in identifying your training needs and in determining how the NVSL can assist you in meeting those needs.

While a number of courses are listed, this catalog is not all inclusive as we do provide training in other diseases. Feel free to contact us regarding your training requirements, and the NVSL will be glad to customize training to meet your specific needs. For information on the daily rate for training in Ames, Iowa and Greenport, New York, contact the NVSL training office below.

Requests for training or for more information on training should be sent to:

TRAINING OFFICE
NATIONAL VETERINARY SERVICES LABORATORIES
P.O. BOX 844
AMES, IA 50010

The NVSL Training Office can be reached by e-mail at NVSL Training@aphis.usda.gov, by phone at (515) 663-7300/7475, or by fax at (515) 663-7332.

Information can also be accessed through the Internet at www.aphis.usda.gov/animal_health/lab_info_services/training.shtml.

Let us know how we can meet your training needs.

CONTENTS

Mission and History of the National Veterinary Services Laboratories

MISSION: TO PROTECT THE HEALTH OF ANIMALS AND CONTRIBUTE TO PUBLIC HEALTH BY PROVIDING TIMELY, ACCURATE, AND RELIABLE LABORATORY SUPPORT TO OUR CUSTOMERS.

The National Veterinary Services Laboratories (NVSL) performs animal disease testing for Veterinary Services(VS) and is the only laboratory system in the Animal and Plant Health Inspection Service (APHIS) dedicated to the testing of diagnostic specimens for diagnosis of domestic and foreign animal diseases. The NVSL provides analytical services, disseminates scientific information, conducts developmental activities, and provides training for APHIS programs. It also works closely with APHIS' International Services to provide consultation, reagents, and training for foreign governments. Laboratory support services are provided for many APHIS programs. [Specific responsibilities of the individual laboratories are listed on pages 11, 25, 55, and 57.] The NVSL works closely with VS specialists in program development and program monitoring, and personnel are active on many animal health organization committees. NVSL clients and stakeholders include private, state, Federal, university and various diagnostic laboratories, and other groups, both domestic and international.

HISTORY: The origin of the NVSL can be traced to the Bureau of Animal Industry (BAI). Some of the significant events include:

1961 – Opening of the National Animal Disease Laboratory (NADL) at Ames, Iowa. The original organizational structure provided for a Director and Assistant Director for Research and an Assistant Director for Regulatory Laboratories. The Regulatory Laboratories were assigned 20 percent of the space and were to provide diagnostic services for the Animal Disease Eradication Division. Within a few years, reorganization resulted in three independent units for research, biologics, and diagnostics.

1971 – The Animal Health Division laboratory facilities in Beltsville, Maryland, were assigned to the Diagnostic Services group.

1972 – The Animal and Plant Health Inspection Service (APHIS) was formed as an Agency of the USDA. Diagnostic Services was a part of this Agency.

1973 – The Diagnostic Services Laboratory and the Biologics Laboratory were combined into one and named the Veterinary Services Laboratories.

1977 – The name of the laboratory was changed to NVSL. Growth and planning for construction of a new facility continued.

1978 – Phase I of the NVSL central facility was completed. The biologics laboratory personnel along with administrative services and support personnel moved into the new facility. Personnel from Beltsville along with their testing responsibilities moved to Ames.

1984 – Diagnostic activities at the Plum Island Animal Disease Center, Plum Island, New York, were transferred to APHIS and made a part of the NVSL. The diagnostic laboratory was named Foreign Animal Disease Diagnostic Laboratory (FADDL).

1996 – The NVSL's focus is exclusively on diagnostic activities due to the transfer of biologics testing responsibility to the Center for Veterinary Biologics. The eventual goal is to house all diagnostic personnel at the NVSL Central.

GENERAL INFORMATION

Nomination Procedure
Refer to the course outlines as some training requires the approval of the Federal and/or State Veterinarian in your state. All requests for training should be sent to:

Director's Office
USDA, APHIS, VS
National Veterinary Services
Laboratories (NVSL)
P.O. Box 844
Ames, IA 50010

Register Early
Mail or fax your registration early but no later than 2 months prior to the course to assure availability.

Telephone Registration
Registration will not be accepted by telephone; however, registrations sent by fax to
(515) 663-7332 will be accepted if authorizing signature is included.

Confirmation Notification by the NVSL
A letter confirming receipt of the nomination will be sent to the individual submitting the request. Approximately 1 month before the course, an informational packet containing specific materials on the course will be sent directly to the trainee. The packet will contain an agenda, specifics on the course, an invoice, logistical details on motels and transportation to Ames, etc., a form to be returned to the NVSL to confirm attendance, and any other appropriate information.

Confirmation and Payment by the Trainee
The informational packet will contain a confirmation form that should be returned by the trainee as soon as possible but no later than the date indicated on the form. The full tuition payment is due at this time. Payment can be made by VISA, MasterCard, check, or money order (U.S. dollars payable to the USDA, APHIS). Instructions for paying the tuition will be included in the informational packet.

Substitutions
We encourage substitutions if you cannot attend a course. Employers may substitute another participant until the beginning of the course.

Withdrawals
You may withdraw from the class up to 2 weeks before the course begins with a full refund of tuition. After that date, refunds will be reduced by 1 day's tuition. Substitutions will be accepted up until the beginning of the course with no change to the tuition.

Accessibility
Participants needing special arrangements due to visual, hearing, or mobility impairment should contact the NVSL Training Office at least 4 weeks before the course to discuss specific needs and accommodations.

Interpreters
All courses are taught in English. The trainee must provide his/her own interpreter if one is needed.

Transportation/Housing
Participants are responsible for making their own travel arrangements and paying for their own costs for transportation, housing and food. The NVSL will provide appropriate information on motels and transportation along with the course information prior to the course.

Purchasing Reagents
Unless otherwise indicated by the course outline, reagents for use during the course will be provided. For information on purchasing reagents, call (515) 663-7571, or fax (515) 663-7402.

Equal Opportunity
Training will be provided without discrimination for any nonmerit reason such as race, color, religion, sex, national origin, age, marital status, physical or mental handicap, or membership or nonmembership in an employee organization.

To contact the NVSL Training office

by email: Daniel.J.Grause@aphis.usda.gov
by phone: (515) 663-7300/7475
by fax: (515) 663-7332

U.S. DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
VETERINARY SERVICES
NATIONAL VETERINARY SERVICES LABORATORIES
1800 DAYTON AVENUE
P.O. BOX 844
AMES, IA 50010
Phone (515) 663-7300/7475
FAX: (515) 663-7332
Email: Daniel.J.Grause@aphis.usda.gov

NVSL APPLICATION FOR LABORATORY TRAINING

1. Name and Address of Applicant (Please type or print)

(Dr., Mr., Mrs., Ms.) (Last) (First) (M.I.)

Office Address

City State Zip Code | Country

Telephone: Office: ( ) | FAX: ( )

E-Mail Address:

2. Training Desired

Course Name	Date (If known)	Cost

3. Employer

Organization

Division/Unit

Local Address

	City	State	Zip Code

4. Professional Status

Occupation	Position Title	Specialty

Brief description of your previous experience or training in conducting the requested test(s)

5. Signatures

Applicant's Signature	Date
Authorizing Official's Signature	Date
Name/Title of Authorizing Official (Print or Type)	Phone Number

OVERVIEW OF THE DIAGNOSTIC BACTERIOLOGY LABORATORY (DBL)

The DBL provides assistance to state, Federal, university, and foreign laboratories through the isolation and identification of pathogenic bacteria from animal tissues and fluids and through serologic examination for evidence of exposure to diseases caused by bacteria, fungi, and protozoa. Laboratory support is provided for brucellosis, tuberculosis, *Salmonella enteritidis*, horse importation, and other programs such as the National Animal Health Monitoring System and the National Poultry Improvement Plan by the following sections:

Bacterial Identification Section

- Zoonotic Agent Isolation and Identification
- *Salmonella spp.* Isolation and Serotyping
- Leptospira and Poultry *Mycoplasma* Reagents
- *Salmonella* and *Taylorella* Reference Laboratories
- Pasturella Multocida Typing and Reagents

Brucella & Mycobacterium Reagents Team

- *Brucella & Mycobacterium* Reagent Production
- *B. abortus* Strain 19 World Health Organization Reference (Seed)
- Proficiency Testing Reagents and Panels

Mycobacteria and Brucella Section

- *Brucella* and *Mycobacteria* Isolation & Identification
- Proficiency Testing of State Laboratories for Johnes Disease and Brucellosis
- Johne's Disease Isolation and Identification

Serology Section

- Brucellosis Program Testing
- Import/Export Program Testing
- Proficiency Test of State Laboratories
- Tuberculosis and *Brucella spp*. Serum Banks

Technical Support Section

- Prepares/sterilizes all bacterial, viral, and other media, buffers, and solutions
- Maintains 900 computerized formulations for media and solutions
- Cleans and provides special treatment to glassware and other laboratory instruments

COURSES OFFERED

BRUCELLA ISOLATION AND IDENTIFICATION ***January 12-16, 2009***

♦ Description

This training will provide practical hands-on experience enabling participants to process tissue specimens for the isolation and identification of *Brucella spp.*

♦ Objectives

At the conclusion of this training, participants will be able to perform the following skills:

- Process tissue, milk, and blood specimens for the isolation of *Brucella spp.*
- Identify the colonial morphology of *Brucella* on various media
- Obtain pure cultures of *Brucella* and perform various biochemical tests required for identification
- Interpret the biochemical results and identify the species and biovars of the genus *Brucella*
- Obtain a basic understanding of the procedures used in a Biosafety Level III laboratory

♦ Topics to be Covered

The following laboratory sessions will be provided:

Demonstrations and hands-on laboratory activities including:

- Processing various animal specimens including tissue, milk, blood, and swabs
- Sample preparation
- Biochemical tests required for the isolation of *Brucella*
- Observing bacterial growth characteristics
- Cellular morphology
- Biotyping various species of *Brucella*
- Media used
- Identifying unknowns

Lectures and/or discussions will include:

- Clinical and epidemiological aspects of bovine brucellosis
- Interpretation of atypical biochemical results
- Laboratory safety
- Trouble shooting
- Emerging technologies
- Animal inoculations
- Quality assurance

(continued on next page)

Demonstrations and tours (optional):

- NVSL/DBL – Media preparation laboratory
- NVSL/PL – Pathobiology Laboratory
- NADC – Brucellosis Laboratory
- ISU – Pathology and Microbiology

♦ Target Audience

Technicians, technologists, microbiologists, laboratory supervisors, laboratory trainers other scientists who desire current knowledge of the brucellosis diagnostic procedures. Class is limited to 2 trainees.

♦ Time Requirements

5 days

♦ Restrictions

The training is conducted in a Biosafety Level III laboratory that requires a brucellosis blood test before admittance. Laboratory clothing will be provided for use during this course. Persons who are immunocompromised or immunosuppressed may be at risk of acquiring infections.

♦ Contact Person

For technical information: Head, Mycobacteria and Brucella Section
Diagnostic Bacteriology Laboratory
(515) 663-7676

For logistical information: NVSL Training Office (515) 663-7300/7475

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BRUCELLA REAGENT PRODUCTION ***January 26 – 30, 2009***

- ♦ Description

  This training will provide information and experience necessary for participants to propagate, process, standardize, and evaluate *Brucella abortus* cells and antigens

- ♦ Objectives

  - To produce and evaluate antigens for the detection of antibodies to *B. abortus*

- ♦ Topics to be Covered

  Overview of antigen production and evaluation including:
  - Background information on the various antigens produced and their applications in laboratory and field settings
  - Preparation of seed stock
  - Propogation of cells on solid and in liquid media
  - Purity and dissociation of cells repairing dyes and straining cells
  - Standardization of cell concentration
  - Sterility testing
  - Serologic evaluation of antigens

- ♦ Target Audience

  Technicians, technologists, microbiologists, laboratory supervisors, laboratory trainers other scientists who desire current knowledge of the *brucella* reagent production. Class size limited to 2.

- ♦ Time Requirements

  5 days

- ♦ Contact Person

  For technical information: Leader, Brucella & Mycobacterium Reagents Team
  Diagnostic Bacteriology Laboratory
  (515) 663-7981

  For logistical information: Training Office (515) 663-7300/7475

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COMPLEMENT-FIXATION TEST [ANAPLASMOSIS, BRUCELLA ABORTUS, AND/OR PARATUBERCULOSIS (JOHNE'S)] ***January 5-9, 2009***

- Description: This is a hands-on training course that provides the opportunity for participants to learn the complement-fixation technique for the detection of antibodies against anaplasmosis, brucellosis, and/or paratuberculosis (Johne's).
- Objective: Participants will review and update their knowledge of the complement-fixation test by observing and practicing specific techniques for the detection of antibodies against anaplasmosis, brucellosis, and/or paratuberculosis (Johne's)
- Topics to be Covered: Testing procedures including:
  - Complement-fixation principles
  - Hemolysin titrations
  - Complement titrations
  - Complement-fixation tests for anaplasmosis, brucellosis, and/or paratuberculosis (Johne's)
- Target Audience: Diagnostic laboratory technicians, supervisors, and epidemiologists. Class size is limited to 6.
- Time Requirements: 4½ days
- Contact Person: For technical information: Head, Serology Section
  Diagnostic Bacteriology Laboratory
  (515) 663-7565

  For logistical information: Training Office (515) 663-7300/7475

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JOHNE'S ISOLATION AND IDENTIFICATION ***April 6-9, 2009***

♦ Description

This training will provide practical hands-on experience enabling participants to process fecal or tissue specimens for the isolation and identification of *Mycobacterium paratuberculosis.*

♦ Objective

Upon successful completion of this course, the student will be able to:

- Indicate the current significant epidemiological trends of paratuberculosis in the United States
- Demonstrate laboratory practices for safely working with *mycobacteria*
- Discuss important aspects of quality assurance
- Discuss specimen collection and transport
- Perform acid-fast microscopy
- Perform specimen processing
- Discuss effective communication with clinicians
- Discuss reporting laboratory results
- Perform the IDEXX *M. paratuberculosis* DNA test kit
- Describe new testing methods giving applications and limitations

♦ Topics to be Covered

Laboratory sessions include the following demonstrations and hands-on laboratory activities:

- Processing fecal and tissue specimens
- Sample preparation
- Ziehl-Neelsen stain procedures
- Observing bacteriological growth characteristics
- Media used
- Using DNA probes
- Identifying unknowns

Lectures/Discussions Include:

- Clinical and epidemiological aspects of paratuberculosis
- Test interpretations
- Laboratory safety
- Quality assurance
- Trouble shooting
- Emerging technologies

(continued on next page)

Demonstration and tours (optional)

- NVSL-DBL media laboratory
- NADC paratuberculosis laboratory and library
- NVSL-DBL serology laboratory
- ISU paratuberculosis laboratory and library

♦ Target Audience

Technicians, technologists, microbiologists, laboratory supervisors, laboratory trainers and/or other scientists who desire current knowledge of the Johne's diagnostic procedures. Class is limited to 4 trainees.

♦ Time Requirements

4 days

♦ Contact Person

For technical information: Head, Mycobacteria and Brucella Section
Diagnostic Bacteriology Laboratory
(515) 663-7676

For logistical information: Training Office (515) 663-7300/7475

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LEPTOSPIRA MICROSCOPIC AGGLUTINATION TEST ***As Scheduled***

♦ Description	This is a hands-on training course that provides the opportunity for participants to learn the *Leptospira* microscopic agglutination test (MAT) for the detection of antibodies against *Leptospira*
♦ Objective	Participants will review and update their knowledge of the test by observing and practicing specific techniques.
♦ Topics to be Covered	Topics will include: • *Leptospira* culture maintenance • Dealing with contaminated cultures • Impact of different dark field microscopes • Quality control of *Leptospira* medium
♦ Target Audience	Diagnostic laboratory technicians, supervisors, and epidemiologists. Class size is limited to 6.
♦ Time Requirements	2 days
♦ Contact Person	For technical information: Head, Bacteriological Identification Section Diagnostic Bacteriology Laboratory (515) 663-7565 For logistical information: Training Office (515) 663-7300/7475

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MYCOBACTERIA ISOLATION AND IDENTIFICATION ***March 23 – April 3, 2009***

♦ Description

This training will provide practical hands-on experience enabling participants to process tissue specimens for the isolation and identification of *Mycobacterium bovis*

♦ Objective

Upon successful completion of this course, the student will be able to:

- Indicate the current significant epidemiological trends of bovine tuberculosis in the United States
- Demonstrate laboratory practices for safely working with *mycobacteria*
- Discuss important aspects of quality assurance
- Discuss specimen collection and transport
- Perform acid-fast microscopy
- Perform specimen processing
- Discuss effective communication with clinician
- Discuss reporting laboratory results
- Perform Gen Probe *M. tuberculosis* complex DNA test kit
- Describe new testing methods giving applications and limitations

♦ Topics to be Covered

Laboratory sessions include the following demonstrations and hands-on laboratory activities:

- Processing tissue specimens
- Sample preparations
- Ziehl-Neelsen stain procedures
- Observing bacteriological growth characteristics
- Media used
- Using DNA probes
- Identifying unknowns
- Using Bactec media
- Gas chromatography for identifying *mycobacteria*
- Drug susceptibility testing
- Biochemical tests required for identifying *mycobacterial* species
- Colonial morphology
- Cellular morphology

(continued on next page)

Lectures/Discussions include:

- Clinical and epidemiological aspects of bovine tuberculosis
- Test interpretations
- Laboratory safety
- Quality assurance
- Trouble shooting
- Emerging technologies
- Guinea pig inoculation

Demonstrations and tours (optional)

- NVSL-DBL media laboratory
- NADC tuberculosis laboratory and library
- NVSL-PL laboratory

♦ Target Audience

Technicians, technologists, microbiologists, laboratory supervisors, laboratory trainers or other scientists who desire current knowledge of the bovine tuberculosis diagnostic procedures. Class is limited to 4 trainees.

♦ Time Requirements

10 days: 5 days – Processing Portion
5 days – Identification Portion

♦ Restrictions

A tuberculin skin test will be administered to trainees on the first day of the class unless they have previously been vaccinated for tuberculosis with BCG vaccine. Trainees will be provided with laboratory clothing which will be worn during the training.

♦ Contact Person

For technical information: Head, Mycobacteria & Brucella Section
Diagnostic Bacteriology Laboratory
(515) 663-7676

For logistical information: Training Office (515) 663-7300/7475

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OVERVIEW OF THE DIAGNOSTIC VIROLOGY LABORATORY (DVL)

The DVL provides diagnostic support for APHIS programs and foreign animal diseases (FAD) as well as diagnosis of domestic diseases by virus isolation and identification, serologic tests, and electron microscopy. The DVL conducts surveillance, import/export testing, and reference and reagent production. They provide diagnostic assistance in domestic diseases for private, state, Federal, and university laboratories, and train scientists from national and international laboratories.

The DVL is a national reference laboratory for bluetongue (BT), equine infectious anemia (EIA), highly pathogenic avian influenza (HPAI), Newcastle disease (ND), pseudorabies (PR), and vesicular stomatitis (VS) viruses. The DVL is also an Office International des Epizooties reference laboratory for BT, EIA, HPAI, exotic ND, PR, Venezuelan equine encephalomyelitis and VS viruses.

Avian Viruses Section

- Isolation and Identification of Avian Virus Pathogens
- Reference Laboratory for Highly Pathogenic Avian Influenza and Exotic Newcastle Disease

Bovine and Porcine Viruses Section

- Isolation and Identification of Bovine and Porcine Viruses, and viruses from aquatic organisms such as fish and shrimp
- Reference Laboratory for Pseudorabies Virus and Vesicular Stomatitis Virus.

Equine and Ovine Viruses Section

- Isolation of Equine and Small Ruminant Viruses, Equine Encephalomyelitis, and West Nile Virus
- Reference Laboratory for Equine Infectious Anemia, Bluetongue, and Epizootic Hemorrhagic Diseases Viruses

COURSES OFFERED

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AVIAN INFLUENZA (AI) VIRUS ISOLATION, SUBTYPING, AND AGAR GEL IMMUNODIFFUSION ***March 30 - April 3, 2009***

♦ Description

This training will provide the participant(s) hands-on experience in the isolation, identification, and characterization of an avian influenza virus and in the detection of antibodies by the agar gel immunodiffusion test.

♦ Objective

Upon successful completion of this course, the student will be able to:

- Demonstrate laboratory safety practices in handling avian influenza virus
- Discuss important aspects of quality assurance related to the procedures used
- Perform virus isolation using chicken embryos
- Perform the hemagglutination test
- Perform the hemagglutination-inhibition test
- Perform the agar gel immunodiffusion test
- Discuss pathogenicity criteria
- Discuss and understand subtyping methods including hemagglutination-inhibition and neuraminidase-inhibition tests

♦ Topics to be Covered

Laboratory sessions will include the following demonstrations and hands-on training:

- Tissue selection and preparation for virus isolation
- Antibiotic and media formulations
- Embryo inoculation via allantoic sac route
- Embryo candling and collection of allantoic fluid
- Hemagglutination test
- Hemagglutination-inhibition test for virus identification
- Agar gel immunodiffusion test
- Subtype (hemagglutination-inhibition and neuraminidase-inhibition tests) determination by determination

(continued on next page)

Discussions will include:

- Epidemiology of avian influenza
- Good laboratory practices
- Techniques to prevent laboratory contamination
- Quality assurance
- Trouble shooting
- Test interpretations
- Pathogenicity tests and interpretations
- Reagent preparation
- Subtyping procedure

♦ Target Audience

Technicians, microbiologists, and veterinarians who wish to improve current laboratory skills or who will actually perform the test in the laboratory. Class size is limited to 2.

♦ Time Requirements

Training will be provided Monday through Friday. Trainee should be prepared to be in the laboratory for 5 full days.

♦ Restrictions

The training will be conducted in a high security laboratory. Trainees will be required to change clothing to enter and shower to leave. Participants must sign an agreement not to go near or handle livestock or poultry during the training and for 5 days after completion of the training.

♦ Contact Person

For technical information: Head, Avian Viruses Section
Diagnostic Virology Laboratory
(515) 663-7551

For logistical information: Training Office (515) 663-730/7475

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BLUETONGUE (BT) AND EPIZOOTIC HEMORRHAGIC DISEASE (EHD) VIRUS ISOLATION

January 26 – 30, 2009
Or As Scheduled

- **Description**

  This hands-on training allows the participants an opportunity to isolate and identify BT and EHD viruses from field specimens.

- **Objective**

  To enable participants to follow and perform procedures to isolate and identify BT and EHD.

- **Topics to be Covered**

  Overview of virus isolation techniques including:
  - Processing of specimens
  - Preparation and inoculation of cell cultures
  - Preparation and inoculation of embryonating chicken eggs
  - Fluorescent antibody procedures
  - Serotyping procedures

- **Target Audience**

  Laboratory personnel familiar with virus isolation techniques.
  Class size is limited to 2.

- **Time Requirements**

  5 days

- **Restrictions**

  The training will be conducted in a high-security laboratory. Trainees will be required to change clothing to enter and shower to leave. Participants must sign an agreement not to go near or handle livestock or poultry during the training and for 5 days after completion of the training.

- **Contact Person**

  For technical information: Head, Equine and Ovine Viruses Section
  Diagnostic Virology Laboratory
  (515) 663-7551

  For logistical information: Training Office: (515) 663-7300/7475

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BOVINE/PORCINE VIRUS ISOLATION TECHNIQUES ***February 5-6, 2009***
September 14-18, 2009

- Description: This training will provide practical, hands-on experience in techniques used to isolate common bovine and/or porcine viral agents from tissues, swabs, and other diagnostic specimens.

- Objective: To learn procedures for the isolation of bovine and/or porcine viruses

- Topics to be Covered: An overview of techniques including:
  - Tissue selection, preparation, and homogenization techniques
  - Cell culture preparation and inoculation
  - Observation of cultures for cytopathic effects
  - Procedures for blind passage
  - Identification strategies, including direct and indirect immunofluorescence assays, serum-virus neutralization, and electron microscopy

- Target Audience: Technicians, microbiologists, and veterinarians who are performing or who wish to perform virus isolation in cell culture from bovine and/or porcine diagnostic specimens. Class size is limited to 2.

- Time Requirements: 2 days or 5 days*

  *Note: The general overview of basic virus isolation techniques for bovine or porcine viruses requires 5 days. Training for isolation techniques for one type of virus, e.g., porcine reproductive and respiratory syndrome (PRRS) virus isolation techniques, can be completed in 2 days.

- Restrictions: The training will be conducted in a high-security laboratory. Trainees will be required to change clothing to enter and shower to leave. Participants must sign an agreement not to go near or handle livestock or poultry during the training and for 5 days after completion of the training.

- Contact Person:
  For technical information: Head, Bovine & Porcine Viruses Section
  Diagnostic Virology Laboratory
  (515) 663-7551

  For logistical information: Training Office (515) 663-7300/7475

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EQUINE INFECTIOUS ANEMIA (EIA) AGAR GEL IMMUNODIFFUSION (AGID) AND ENZYME-LINKED IMMUNOSORBENT ASSAY (ELISA) LABORATORY METHODS ***As Scheduled***

- Description: This is a hands-on course that gives participants complete training in EIA AGID setup and interpretation as well as the opportunity to set up demonstrations on the currently approved ELISA systems.
- Objective: To provide trainees with the information and skills to set up and interpret EIA AGID reactions and earn certification to do USDA-approved testing.
- Topics to be Covered: Topics include:
  - EIA testing and regulatory concerns
  - Status reports
  - Pouring, cutting, and inoculating immunodiffusion (ID) plates
  - Reading and interpretation of ID plates
  - Agar preparation
  - Setup and interpretation of EIA ELISA tests
- Target Audience: Technicians, microbiologists, and/or veterinarians who want EIA testing certification. Class size is limited to 12.
- Time Requirements: 1 ½ days
- Nomination Procedure: Requests for training must be co-signed by the applicant's State Veterinarian and Federal Veterinarian before sending to the Director's Office, National Veterinary Services Laboratories.
- Contact Person: For technical information: Head, Equine & Ovine Viruses Section
  Diagnostic Virology Laboratory
  (515) 663-7551

  For logistical information: Training Office (515) 663-7300/7475

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EQUINE VIRAL ARTERITIS (EVA) VIRUS NEUTRALIZATION (VN) ***April 17 & 20, 2009***
Or As Scheduled

- ♦ Description: A hands-on training course designed to give students an opportunity to learn microtiter VN techniques and successfully complete an EVA check test set.
- ♦ Objective: To enable trainees to successfully perform the EVA VN test
- ♦ Topics to be Covered: Topics include:
  - Overview of microtiter VN testing
  - Overview of tissue culture techniques
  - Specific procedures and requirements for EVA VN testing
- ♦ Target Audience: Technicians, microbiologists, and veterinarians who will actually perform the test in the laboratory. Class size limited to 2.
- ♦ Time Requirements: The test requires 2 days – 1 day for overview and setup and 1 day to read results. Results are read 72 hours later. Training will be provided on Friday, with results read the following Monday.
- ♦ Restrictions: The training will be conducted in a high-security laboratory. Trainees will be required to change clothing to enter and shower to leave. Participants must sign an agreement not to go near or handle livestock or poultry during the training and for 5 days after completion of the training.
- ♦ Contact Person:
  - For technical information: Head, Equine & Ovine Viruses Section, Diagnostic Virology Laboratory, (515) 663-7551
  - For logistical information: Training Office (515) 663-7300/7475

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FLOURESCENT ANTIBODY (FA) CONJUGATE PRODUCTION ***March 30- April 3, 2009***

- Description: Hands-on training to prepare an FA conjugate using flourescein isothiocyanate (FITC) dye. Serum antibody used in this course was produced against a viral agent, but the FA-labeling technique can also be applied to antiserum produced against other agents.
- Objective: To enable participants to conjugate and evaluate FITC-labeled antibody.
- Topics to be Covered: The production and evaluation of conjugate including:
  - Discussion of antiserum production
  - Preparation of reagents used in procedure
  - SAS fraction of serum
  - Dialysis
  - Protein determination
  - Gel filtration with Sephadex
  - Evaluation of FA conjugates
- Target Audience: Technicians, microbiologists, and/or veterinarians who want training in FA conjugate production. Restricted to 2 trainees.
- Time Requirements: 5 days
- Restrictions: The training will be conducted in a high-security laboratory. Trainees will be required to change clothing to enter and shower to leave. Participants must sign an agreement not to go near or handle livestock or poultry during the training and for 5 days after completion of the training.
- Contact Person:
  - For technical information: Reagent Production Unit, Diagnostic Virology Laboratory, (515) 663-7551
  - For logistical information: Training Office (515) 663-7300/7475

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HEMAGGLUTINATING ENCEPHALOMYELITIS HEMAGGLUTINATION-INHIBITION (HI) TEST ***April 1, 2009***

- Description: Explanation of the complete procedure and hands-on practical experience will enable the trainee to perform the HI test for detection of antibodies against hemagglutinating encephalomyelitis virus (HEV).
- Objective: At the conclusion of the training, course participants will be able to perform the HI for detection of antibodies against HEV.
- Topics to be Covered: Overview of test procedures including:
  - Propagation of virus stocks
  - Virus titration to determine virus concentration
  - Sample preparation and titration for determination of endpoint titer
  - Challenge virus dilution and preparation of back titrations
  - Reading and evaluation of test plates
  - Use of controls to monitor performance of the test
  - Reporting of test results
- Target Audience: Laboratory personnel who wish to conduct testing. Class size is limited to 2.
- Time Requirements: 1 day
- Restrictions: The training will be conducted in a high-security laboratory. Trainees will be required to change clothing to enter and shower to leave. Participants must sign an agreement not to go near or handle livestock or poultry during the training and for 5 days after completion of the training.
- Contact Person:
  - For technical information: Head, Bovine & Porcine Viruses Section, Diagnostic Virology Laboratory, (515) 663-7551
  - For logistical information: Training Office (515) 663-7300/7475

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NEWCASTLE DISEASE (ND) ***October 20-24, 2008***
VIRUS ISOLATION AND SEROLOGY

♦ Description

This training will provide hands-on experience enabling participants to process samples for isolation, identification, and characterization of the ND virus.

♦ Objective

Upon successful completion of the course, the student will be able to:
- Demonstrate laboratory safety practices in handling the ND virus
- Discuss important aspects of quality assurance related to the procedures used
- Perform virus isolation using chicken embryos
- Perform the hemagglutination test
- Perform the hemagglutination-inhibition test
- Determine the mean death time(MDT) in embryos as a measure of pathogenicity
- Discuss pathogenicity criteria

♦ Topics to be Covered

Laboratory sessions include the following demonstrations and hands-on training:
- Selection and processing of tissue specimens
- Antibiotic and media formulations
- Embryo inoculation via allantoic sac route
- Egg candling and collection of allantoic fluid
- Hemagglutination test
- Hemagglutination-inhibition test for virus identification
- Hemagglutination-inhibition test for detection of antibodies
- Determination of MDT

Discussions include:
- Epidemiology of ND
- Laboratory Safety Practices
- Techniques to prevent laboratory contamination
- Quality assurance
- Trouble shooting
- Test interpretations
- Pathogenicity tests and interpretations
- Reagent production and preparation

(continued on next page)

- **Target Audience**: Technicians, microbiologists, and veterinarians who wish to improve current laboratory skills or who will actually perform the test in the laboratory. Class size limited to 2.
- **Time Requirements**: Training will be provided Monday through Friday. Trainees should be prepared to be in the laboratory for 5 full days.
- **Restrictions**: The training will be conducted in a high-security laboratory. Trainees will be required to change clothing to enter and shower to leave. Participants must sign an agreement not to go near or handle livestock or poultry during the training and for 5 days after completion of the training.
- **Contact Person**:
  - For technical information: Head, Avian Viruses Section, Diagnostic Virology Laboratory, (515) 663-7551
  - For logistical information: Training Office (515) 663-7300/7475

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PORCINE PARVOVIRUS (PPV) ***April 30 - May 1, 2009***
HEMAGGLUTINATION-INHIBITION (HI) TEST

- Description: Explanation of the complete procedure and hands-on practical experience will provide trainee the opportunity to perform the HI test for detection of antibodies against PPV
- Objective: At the conclusion of the training, course participants will be able to perform the HI test for detection of antibodies against PPV.
- Topics to be Covered: An overview of the HI test including:
  - Propagation of virus stocks
  - Virus titrations to determine virus concentration
  - Sample preparation and titration for determination of endpoint titer
  - Challenge virus dilution and preparation of back titrations
  - Reading and evaluation of test plates
  - Use controls to monitor performance of the test
  - Reporting of test results
- Target Audience: Laboratory personnel desiring to learn and implement the HI test. Class size is limited to 2.
- Time Requirements: 2 days
- Restrictions: The training will be conducted in a high-security laboratory. Trainees will be required to change clothing to enter and shower to leave. Participants must sign an agreement not to go near or handle livestock or poultry during the training and for 5 days after completion of the training.
- Contact Person:
  - For technical information: Head, Bovine & Porcine Viruses Section, Diagnostic Virology Laboratory, (515) 663-7551
  - For logistical information: Training Office (515) 663-7300/7475

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PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME (PRRS) INDIRECT FLOURESCENT ANTIBODY (IFA) TEST ***April 16-17, 2009***

- ♦ Description: This training will provide an explanation of the testing procedure and provide practical hands-on experience which will enable participants to conduct the IFA test for detection of antibodies against PRRS virus.
- ♦ Objective: To perform the IFA test for detection of antibodies against PRRS.
- ♦ Topics to be Covered: Overview of testing procedures including:
  - Propagation of virus stocks
  - Virus titrations to determine virus concentration
  - Preparation of IFA slides
  - Sample preparation and titration for determination of endpoint titer
  - Reading and evaluation of slides
  - Use of controls to monitor performance of the test
  - Reporting of test results
- ♦ Target Audience: Laboratory personnel who wish to conduct testing. Class size is limited to 2.
- ♦ Time Requirements: 1 days
- ♦ Restrictions: The training will be conducted in a high-security laboratory. Trainees will be required to change clothing to enter and shower to leave. Participants must sign an agreement not to go near or handle livestock or poultry during the training and for 5 days after completion of the training.
- ♦ Contact Person:
  - For technical information: Head, Bovine & Porcine Viruses Section, Diagnostic Virology Laboratory, (515) 663-7551
  - For logistical information: Training Office (515) 663-7300/7475

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PSEUDORABIES (PR) VIRUS NEUTRALIZATION TEST ***On Request***

- Description: This training will provide an explanation of the complete testing procedure and provide practical hands-on experience to enable the participants to conduct the virus neutralization test for detection of antibodies against PR virus.
- Objective: To perform the virus neutralization test for detection of antibodies against PR virus.
- Topics to be Covered: Overview of virus neutralization testing procedures including
  - Propagation of virus stocks
  - Virus preparation and titration for determination of endpoint titer
  - Challenge virus dilution and preparation of back titrations
  - Cell culture methods
  - Reading and evaluation of test plates
  - Use of controls to monitor performance of the test
  - Reporting of the test results
- Target Audience: Laboratory personnel who wish to conduct testing. Class size is limited to 2.
- Time Requirements: 3 days
- Restrictions: The training will be conducted in a high-security laboratory. Trainees will be required to change clothing to enter and shower to leave. Participants must sign an agreement not to go near or handle livestock or poultry during the training and for 5 days after completion of the training.
- Contact Person:
  - For technical information: Head, Bovine & Porcine Viruses Section, Diagnostic Virology Laboratory, (515) 663-7551
  - For logistical information: Training Office (515) 663-7300/7475

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PSEUDORABIES (PR) VIRUS ENZYME-LINKED IMMUNOSORBENT ASSAY (ELISA) AND LATEX AGGLUTINATION (LA) TEST ***On Request***

- Description: This training will provide an explanation of the complete testing procedure and provide practical hands-on experience to enable the participants to conduct the latex agglutination test and enzyme-linked immunosorbent assay for detection of antibodies against PR virus.
- Objective: To perform the PR ELISA and LA test for detection of antibodies against PR virus.
- Topics to be Covered: Overview of ELISA and LA testing procedures.
- Target Audience: Laboratory personnel who wish to conduct testing. Class size is limited to 2.
- Time Requirements: 2 days If training only on 1 test, only 1day reqired.
- Restrictions: The training will be conducted in a high-security laboratory. Trainees will be required to change clothing to enter and shower to leave. Participants must sign an agreement not to go near or handle livestock or poultry during the training and for 5 days after completion of the training.
- Contact Person:
  - For technical information: Head, Bovine & Porcine Viruses Section, Diagnostic Virology Laboratory, (515) 663-7551
  - For logistical information: Training Office (515) 663-7300/7475

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SWINE INFLUENZA (SI) HEMAGGLUTINATION-INHIBITION (HI) TEST ***March 5-6, 2009***

- Description: This training will provide an explanation of the testing procedure and provide practical hands-on experience which will enable participants to conduct the HI test for detection of antibodies against SI virus (H1N1, H3N2).
- Objective: To perform the HI test for detection of antibodies against SI virus.
- Topics to be Covered:
  Overview of HI testing procedures including:
  - Propagation of virus stocks
  - Virus titrations to determine virus concentration
  - Sample preparation and titration for determination of endpoint titer
  - Challenge virus dilution and preparation of back titrations
  - Reading and evaluation of test plates
  - Use of controls to monitor performance of the test
  - Reporting of test results
  - Public health issues involved with these viruses
- Target Audience: Laboratory personnel who wish to conduct testing. Class size is limited to 2.
- Time Requirements: 2 days
- Restrictions: The training will be conducted in a high-security laboratory. Trainees will be required to change clothing to enter and shower to leave. Participants must sign an agreement not to go near or handle livestock or poultry during the training and for 5 days after completion of the training.
- Contact Person:
  For technical information: Head, Bovine & Porcine Viruses Section, Diagnostic Virology Laboratory, (515) 663-7551
  For logistical information: Training Office (515) 663-7300/7475

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VESICULAR STOMATITIS (VS) VIRUS ***April 20-21, 2009***
(NEW JERSEY AND INDIANA SEROTYPES)
COMPLEMENT-FIXATION TEST

- **Description**

  This training will provide an explanation of the testing procedure and provide practical hands-on experience which will enable participants to conduct the complement-fixation test for detection of antibodies against VS virus (New Jersey and Indiana serotypes).

- **Objective**

  To perform the complement-fixation test for detection of antibodies against VS virus (New Jersey and Indiana serotypes).

- **Topics to be Covered**

  Overview of complement-fixation testing procedures including:
  - Preparation and titration of test results
  - Sample preparation and test procedures
  - Reading and evaluation of test plates
  - Use of controls to monitor performance of the test
  - Reporting of the test results
  - Public health issues involved with this virus

- **Target Audience**

  Technicians, microbiologists, and/or veterinarians who wish to conduct testing to qualify animals for export or interstate shipment. Class size limited to 2.

- **Time Requirements**

  3 days

- **Restrictions**

  The training will be conducted in a high-security laboratory. Trainees will be required to change clothing to enter and shower to leave. Participants must sign an agreement not to go near or handle livestock or poultry during the training and for 5 days after completion of the training.

- **Contact Person**

  For technical information: Head, Bovine & Porcine Viruses Section
  Diagnostic Virology Laboratory
  (515) 663-7551

  For logistical information: Training Office (515) 663-7300/7475

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VESICULAR STOMATITIS (VS) VIRUS ***April 22-24, 2009***
(NEW JERSEY AND INDIANA SEROTYPES)
VIRUS NEUTRALIZATION TEST

- ♦ Description

  This training will provide an explanation of the testing procedure and provide practical hands-on experience which will enable participants to conduct the virus neutralization test for detection of antibodies against VS virus (New Jersey and Indiana serotypes).

- ♦ Objective

  To perform the virus neutralization test for detection of antibodies against VS virus (New Jersey and Indiana serotypes).

- ♦ Topics to be Covered

  Overview of virus neutralization testing procedures including:
  - Propagation of virus stock
  - Virus titrations to determine virus concentration
  - Sample preparation and titration for determination of endpoint titer
  - Challenge virus dilution and preparation of back titration
  - Cell culture methods
  - Reading and evaluation of test plates
  - Use of controls to monitor performance of the test
  - Reporting of the test results
  - Public health issues involved with this virus

- ♦ Target Audience

  Technicians, microbiologists, and/or veterinarians who wish to conduct testing to qualify animals for export or interstate shipment. Class size limited to 2.

- ♦ Time Requirements

  2 days

- ♦ Restrictions

  The training will be conducted in a high-security laboratory. Trainees will be required to change clothing to enter and shower to leave. Participants must sign an agreement not to go near or handle livestock or poultry during the training and for 5 days after completion of the training.

- ♦ Contact Person

  For technical information: Head, Bovine & Porcine Viruses Section
  Diagnostic Virology Laboratory
  (515) 663-7551

  For logistical information: Training Office (515) 663-7300/7475

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OVERVIEW OF THE PATHOLOGY LABORATORY (PL)

The PL provides differential diagnostic studies of Foreign Animal Disease (FAD) and domestic animal diseases. The laboratory's clients and stakeholders include several Federal programs, various diagnostic laboratories, and other groups, both domestic and international.

This laboratory is the national reference center for confirmation and/or diagnosis of various VS program diseases (e.g., transmissible spongiform encephalopathies, bovine tuberculosis, screwworm myiasis, and cattle fever ticks). It is an international center for analytical services and provides pathology, clinical pathology, parasitology, entomology, and chemistry services.

General Pathology and Pathology Investigations Section

- Histopathology Support for the Bovine Tuberculosis Eradication/Control Program
- Gross Pathology/Histopathology Support for Diagnosis of Foreign Animal Diseases and Enzootic Diseases
- Histopathology/Immunohistochemistry for Scrapie and Chronic Wasting Disease Diagnosis
- Surveillance Histopathology IHC for Bovine Spongiform Encephalopathy
- Gross Pathology/Histopathology Reference Support for State Diagnostic Laboratories
- Histological and Immunohistochemical Preparations

Chemistry and Analytical Services (CAS) Section

- Chemical Identification and Quantitation of Program-related Agents
- Analysis of Pesticide Concentrations for APHIS Programs
- Chemical Analysis of Veterinary Biologics Products
- Standardization of Analytical Methologies
- Coordination of Veterinary Services Disinfectant Issues
- Coordination of Comprehensive Diagnostic Cases

Parasitology and Clinical Pathology Team

- Exotic and Domestic Parasite Identification (e.g., Ticks, Myiasis Flies, Mites, Hemoparasites)
- Center for National Tick Surveillance Program
- Hematology and Clinical Chemistry
- Fraudulent Blood Screening

Animal Resources Section

- Animal Care, Handling, and Management
- Staff Members Have American Association for Laboratory Animal Science Certification
- Operation of Biosafety Level II and III Animal Housing Facilities
- Accredited by the American Association for Assessment and Accreditation of Laboratory Animal Care since 1994

COURSES OFFERED

- Specialized training available upon request. Contact the Training Office, telephone (515) 663-7300/7475 or email: NVSL Training@aphis.usda.gov

OVERVIEW OF THE FOREIGN ANIMAL DISEASE DIAGNOSTIC LABORATORY (FADDL)

The FADDL is responsible for the diagnosis of animal diseases foreign to the United States by testing samples submitted from within and outside the United States. Tests are also conducted on imported animals and animal products for the presence of exotic animal disease agents.

Diagnostic Services Section

- Diagnosis of Foreign Animal Diseases (FAD)
- Testing of Imported Animals for FAD
- Safety Testing of Imported Biological Materials
- Gamma Irradiation Sterilization of Biomaterials
- Histologic Studies on Diagnostic Cases
- Electron Microscopic Examination of Pathogen

Reagents and Vaccine Services Section

- New Methods Evaluation and Implementation
- Production, Maintenance, and Distribution of Diagnostic Reagents
- Maintenance of North American Foot-and-Mouth (FMD) Vaccine Bank

TRAINING OFFERED

FOREIGN ANIMAL DISEASES ***As Scheduled***

Training in the diagnosis and recognition of diseases not present in the United States is offered at the Foreign Animal Disease Diagnostic Laboratory (FADDL) on a request basis. The primary areas of interest in the past have included:

1. Vesicular Disease Diagnosis	Detection of antibodies to foot-and-mouth disease virus (FMDV), vesicular stomatitis virus (VSV), vesicular exanthema of swine (VES), and swine vesicular disease virus (SVDV) by agarose gel immunodiffusion, virus neutralization, and/or ELISA. Detection of viral antigens of FMDV, VSV, VES, and SVDV by ELISA, complement-fixation, polymerase chain reaction (PCR), virus isolation (using tissue culture and/or live animal systems), and electron microscopy (EM).
2. Swine Disease Diagnosis	Detection of classical swine fever (CSF) (hog cholera) and African swine fever (ASF) virus by indirect florescent antibody (IFA) staining of cut tissue sections and/or virus isolation in tissue culture or live animals. Detection of CSF virus and ASF virus by avidin-biotin complex (ABC) staining and IFA staining of cut tissue sections and/or virus isolation in tissue culture or live animals.
3. African Horse Sickness	Detection of antibodies to African horse sickness (AHS) virus by ELISA, complement-fixation, virus neutralization, and IFA.
4. Rinderprest and Peste des Petits Ruminants (PPR)	Detection of antibodies to Rinderpest virus and PPR virus by virus neutralization and detection of virus by virus isolation in tissue culture.
5. Histopathology	Training in the recognition of important microscopic lesions present in tissues from animals infected with agents exotic to the United States.
6. Others	Training in the diagnosis of other foreign animal diseases can be arranged.