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

TRAINING COURSES AT THE NATIONAL VETERINARY SERVICES LABORATORIES

(For FISCAL YEAR 2013 - October 1, 2012 - September 30, 2013)

(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	PAGE
COURSE TITLE	LENGIII	DATES	_ CO31	NO.
Avian Influenza (AI) Virus Isolation, Subtyping, and Agar Gel Immunodiffusion	5 days	By Request	\$1,810	17
Bluetongue (BT) and Epizootic Hemorrhagic Disease (EHD) Virus Isolation	5 days	By Request	\$1,810	19
Bovine/Porcine Virus Isolation Techniques	2 days or 5 days	By Request	\$724 or \$1,810	20
Brucella Isolation and Identification	5 days	By Request	\$1,810	5
Brucella Reagent Production	5 days	By Request	\$1,810	7
Complement-Fixation Test (Anaplasmosis, Brucellosis, Equine Piroplasmosis, and/or Paratuberculosis (Johne's))	4 ½ days	By Request	\$1,629	8
Contagious Equine Metritis (CEM)	2 days	As Scheduled	\$724	9
Equine Infectious Anemia (EIA) Agar Gel Immunodiffusion (AGID) and Enzyme-Linked Immunosorbent Assay (ELISA) Laboratory Methods	1 ½ days	As Scheduled	\$668	21
Equine Viral Arteritis (EVA) Virus Neutralization (VN)	2 days	By Request	\$724	22
Fluorescent Antibody (FA) Conjugate Production	5 days	By Request	\$1,810	23
Foreign Animal Diseases	Varies	As Scheduled	\$450/day*	36
Hemagglutinating Encephalomyelitis Hemagglutination-Inhibition (HI) Test	1 day	By Request	\$362	24
Johne's Isolation and Identification	4 days	By Request	\$1,448	10
Leptospira Microscopic Agglutination Test	2 days	As Scheduled	\$724	12
Mycobacterium Isolation and Identification	10 days	By Request	\$3,620	13
Newcastle Disease (ND) Virus Isolation and Serology	5 days	By Request	\$1,810	25
Porcine Parvovirus (PPV) Hemagglutination- Inhibition (HI) Test	2 days	By Request	\$724	27
Porcine Reproductive and Respiratory Syndrome (PRRS) Indirect Fluorescent Antibody (IFA) Test	1 day	By Request	\$362	28
Pseudorabies (PR) Virus Neutralization Test	2 days	By Request	\$724	29
Pseudorabies (PR) Virus Enzyme-Linked Immunosorbent Assay (ELISA) and Automated Latex Agglutination (ALA) Test	2 days	By Request	\$724	30
Swine Influenza (SI) Hemagglutination-Inhibition (HI) Test	2 days	By Request	\$724	31
Vesicular Stomatitis (VS) Virus (New Jersey and Indiana Serotypes) Complement-Fixation Test	3 days	By Request	\$ 1,086	32
Vesicular Stomatitis (VS) Virus (New Jersey and Indiana Serotypes) Virus Neutralization Test	2 days	By Request	\$724	33

[•] An application for training should be submitted as soon as possible, but no later than <u>2 months</u> before the course.

Email: NCAH.Training@aphis.usda.gov

Phone: (515) 337-7300/7475 FAX: (515) 337-7716

[•] For specialized training or training not listed, contact the NCAH Training Office.

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 Training Office can be reached by e-mail at NCAH.Training@aphis.usda.gov, by phone at (515) 337-7300/7475, or by fax at (515) 337-7716.

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.

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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 4, 14, 33, and 34.] 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.

2004 - Phase 1 of the National Centers for Animal Health (NCAH) Building 21 completed.

2009 – Moved personnel into the combined laboratory facility of NCAH.

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:

Training 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) 337-7716 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) 337-7571, or fax (515) 337-7402.

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: NCAH.Training@aphis.usda.gov

by phone: (515) 337-7300/7475

by fax: (515) 337-7716

U.S. DEPARTMENT OF AGRICULTURE

ANIMAL AND PLANT HEALTH INSPECTION SERVICE

VETERINARY SERVICES

NATIONAL VETERINARY SERVICES LABORATORIES 1920 DAYTON AVENUE

P.O. BOX 844 Phone (515) 337-7300/7475 **AMES, IA 50010**

FAX: (515) 337-7716 Email: NCAH.Training@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	Zim Codo		Country	
City State	Zip Code			
Telephone: Office: () E-Mail Address:		FAX: ()		
E Man Madress.				
2. Training Desired				
Course Name		Date (If known)		Cost
3. Employer		1		
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 request	ed test(s)		
5. Signatures				
			Date	
Applicant's Signature				
			Date	
Authorizing Official's Signature			DI 37	1
Name/Title of Authorizing Official (Print or Type)			Phone Nui	mber
			1	

OVERVIEW OF THE DIAGNOSTIC BACTERIOLOGY LABORATORY (DBL)

The DBL provides assistance to state, Federal, university, industry, and foreign laboratories through the isolation and identification of pathogenic bacteria from animal tissues and fluids, serologic testing for diseases caused by bacteria, fungi, and protozoa, provision of reagents and proficiency tests, and offering of training courses. 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

- Veterinary, Zoonotic, and Select Bacterial Agent Isolation and Identification
- Salmonella spp. Isolation and Serotyping
- Leptospira, Pasteurella multocida, and Avian Mycoplasma Testing and Reagents
- Salmonella, Leptospira, anthrax, and contagious equine metritis Reference Laboratories

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 Johne's 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

COURSES OFFERED

♦	Brucella Isolation and Identification	5
♦	Brucella Reagent Production.	7
	Complement-Fixation Test.	
♦	Contagious Equine Metritis.	9
♦	Johne's Isolation and Identification.	10
*	Leptospira Microscopic Agglutination Test.	12
	Mycobacterium Isolation and Identification	

♦ 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:
- Obtain a basic understanding of the procedures used in a Biosafety Level III laboratory
- 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
- Perform the AMOS PCR for identification of species and biovars of the genus *Brucella*
- Perform genotyping for Brucella.
- ♦ 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
- AMOS PCR
- Media used
- Identifying unknowns
- Genotyping Brucella strains

Lectures and/or discussions will include:

- Clinical and epidemiological aspects of bovine brucellosis
- Interpretation of atypical laboratory results for biochemical reactions and PCR tests
- Interpretation of Genotyping results for Brucella
- · 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) 337-7388

BRUCELLA REAGENT PRODUCTION

By Request

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) 337-7181

COMPLEMENT-FIXATION TEST [ANAPLASMOSIS, BRUCELLA ABORTUS, EQUINE PIROPLASMOSIS AND/OR PARATUBERCULOSIS (JOHNE'S)]

By Request

♦ 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, equine piroplasmosis, 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, equine piroplasmosis, 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, equine piroplasmosis, and/or paratuberculosis (Johne's)

Diagnostic laboratory technicians, supervisors, and epidemiologists. Class size

is limited to 6.

♦ Time Requirements 4½ days

Target Audience

♦ Contact Person For technical information: Head, Serology Section

Diagnostic Bacteriology Laboratory

(515) 337-7951

CONTAGIOUS EQUINE METRITIS (CEM)

As Scheduled

♦ Description

This training will provide information and experience necessary for participants to isolate and partially identify *Taylorella equigenitalis*

♦ Objectives

• To prepare enrollees to conduct approved CEM testing

♦ Topics to be Covered

Overview of CEM including:

- Background information on the organism and disease
- Associated regulations
- Isolation of the organism
- Identification of the organism
- NVSL SOPs
- Proficiency testing

♦ Target Audience

Technicians, technologists, microbiologists, laboratory supervisors, or other scientists seeking knowledge or official approval as a CEM testing laboratory.

♦ Time Requirements

2 days

♦ Contact Person

For technical information: Head, Bacterial Identification Section Diagnostic Bacteriology Laboratory

(515) 337-7565

♦ Description

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

♦ 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 staining and microscopic interpretation
- Perform specimen processing and culturing methods.
- Perform confirmatory PCR for identification of suspect cultures as MAP.
- Perform the current *M. avium* subsp *paratuberculosis* direct PCR tests.
- Describe new testing methods giving applications and limitations
- Perform current genotyping methods available for MAP.
- Discuss reporting laboratory results
- Discuss effective communication with clinicians

♦ Topics to be Covered

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

- Sample preparation and processing fecal and tissue specimens
- Ziehl-Neelsen stain procedures
- Observing bacteriological growth characteristics
- Media used
- Using direct PCR methods
- Identifying unknowns using confirmatory PCR.
- Genotyping and molecular epidemiology.

Lectures/Discussions Include:

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

Demonstration and tours (optional)

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

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♦ 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

For technical information: Head, Mycobacteria and Brucella Section

Diagnostic Bacteriology Laboratory

(515) 337-7388

♦ 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
- Performance and variability of test
- Proper standardization of cultures
- One on one training of test interpretation
- Short term and long term storage of cultures
- Impact of different dark field microscopes
- Quality control of Leptospira medium
- NVSL SOPs
- Proficiency Testing
- Other information available upon request (i.e. Production of *Leptospira* antiserum in rabbits etc.)

♦ 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) 337-7565

♦ Description

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

♦ 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 staining and microscopy
- Perform specimen processing
- Perform Gen Probe M. tuberculosis complex DNA test kit
- Perform spoligotyping and other genotyping methods for M. bovis
- Discuss effective communication with clinician
- Discuss reporting laboratory results 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 acid-fast stain procedures
- Observing bacteriological growth characteristics
- Media used for recovery of Mycobacteria from diagnostic samples
- Colonial morphology
- Cellular morphology
- Using DNA probes
- 16s rDNA sequencing to identify unknown acid-fast bacteria
- PCR identification of M. tuberculosis complex bacteria

Lectures/Discussions include:

- Clinical and epidemiological aspects of bovine tuberculosis
- Test interpretations
- Laboratory safety
- Quality assurance
- Trouble shooting
- Genotyping methods
- Emerging technologies

Demonstrations and tours (optional)

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

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♦ 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) 337-7388

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, Eastern, Western, and Venezuelan equine encephalomyelitis, West Nile, 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, Porcine & Aquaculture 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, Swine Influenza Virus, and Vesicular Stomatitis Virus.

Equine and Ovine Viruses Section

- Isolation, identification, and serologic testing for Equine and Small Ruminant Viruses, Equine Encephalomyelitis, and West Nile Virus
- Reference Laboratory for Equine Infectious Anemia, Bluetongue, Epizootic Hemorrhagic Disease, Eastern, Western, Venezuelan equine encephalomyelitis, and West Nile Viruses

COURSES OFFERED

♦	Avian Influenza (AI) Virus Isolation, Subtyping, and Agar Gel Immunodiffusion	17
•	Bluetongue (BT) and Epizootic Hemorrhagic Disease (EHD) Virus Isolation	19
•	Bovine/Porcine Virus Isolation Techniques	20
•	Equine Infectious Anemia (EIA) Agar Gel Immunodiffusion (AGID and	
	Enzyme-Linked Immunosorbent Assay (ELISA), Laboratory Methods	21
•	Equine Viral Arteritis (EVA) Virus Neutralization (VN)	. 22
•	Fluorescent Antibody (FA) Conjugate Production	23
•	Hemagglutinating Encephalomyelitis Hemagglutination-Inhibition (HI) Test	24
♦	Newcastle Disease (ND) Virus Isolation and Serology	25
*	Porcine Parvovirus (PPV) Hemagglutination-Inhibition (HI) Test	27
*	Porcine Reproductive and Respiratory Syndrome (PRRS) Indirect Fluorescent	
	Antibody (IFA) Test	. 28

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♦	Pseudorabies (PR) Virus Neutralization Test	29
♦	Pseudorabies (PR) Virus Enzyme-Linked Immunosorbent Assay (ELISA) and	
	Latex Agglutination (ALA) Test	.30
♦	Swine Influenza (SI) Hemagglutination-Inhibition (HI) Test	31
♦	Vesicular Stomatitis (VS) Virus (New Jersey and Indiana Serotypes)	
	Complement-Fixation Test	32
♦	Vesicular Stomatitis (VS) Virus (New Jersey and Indiana Serotypes)	
	Virus Neutralization Test	33

AVIAN INFLUENZA (AI) VIRUS ISOLATION, SUBTYPING, AND AGAR GEL IMMUNODIFFUSION

By Request

♦ 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 hemagglutinationinhibition 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

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

(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 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) 337-7551

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

By Request

♦ 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) 337-7551

BOVINE/PORCINE VIRUS ISOLATION TECHNIQUES

By Request

♦ 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 & Aquaculture

Viruses Section

Diagnostic Virology Laboratory

(515) 337-7551

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 and ELISA 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 signed by the applicant's 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) 337-7551

For logistical information: Training Office (515) 337-7300/7475

FY 2013 Training Catalog

♦ 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 testingOverview 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) 337-7551

FLUORESCENT ANTIBODY (FA) CONJUGATE PRODUCTION

By Request

♦ Description Hands-on training to prepare an FA conjugate using fluorescein 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
- Production of acetone extraction for rabbit liver powder and need for production 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 BSL-2 laboratory. 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) 337-7551

HEMAGGLUTINATING ENCEPHALOMYELITIS HEMAGGLUTINATION-INHIBITION (HI) TEST

By Request

♦ 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 & Aquaculture

Viruses Section

Diagnostic Virology Laboratory

(515) 337-7551

NEWCASTLE DISEASE (ND) VIRUS ISOLATION AND SEROLOGY

By Request

♦ 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) 337-7551

PORCINE PARVOVIRUS (PPV) HEMAGGLUTINATION-INHIBITION (HI) TEST

By Request

♦ 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 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 & Aquaculture

Viruses Section

Diagnostic Virology Laboratory

(515) 337-7551

PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME (PRRS) INDIRECT FLUORESCENT ANTIBODY (IFA) TEST

By Request

♦ 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 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 & Aquaculture

Viruses Section

Diagnostic Virology Laboratory

(515) 337-7551

 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 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 & Aquaculture

Viruses Section

Diagnostic Virology Laboratory

(515) 337-7551

PSEUDORABIES (PR) VIRUS ENZYME-LINKED IMMUNOSORBENT ASSAY (ELISA) AND AUTOMATED LATEX AGGLUTINATION (ALA) TEST

By 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 automated latex agglutination test and enzyme-linked immunosorbent assay for

detection of antibodies against PR virus.

Objective To perform the PR ELISA and ALA test for detection of antibodies against PR

virus.

♦ Topics to be Covered Overview of ELISA and ALA testing procedures.

♦ Target Audience Laboratory personnel who wish to conduct testing. Class size is limited to 2.

♦ Time Requirements 2 days (If training on one test, only 1 day required)

♦ 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 & Aquaculture

Viruses Section

Diagnostic Virology Laboratory

(515) 337-7551

SWINE INFLUENZA (SI) HEMAGGLUTINATION-INHIBITION (HI) TEST

By Request

 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.

♦ 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 & Aquaculture

Viruses Section

Diagnostic Virology Laboratory

(515) 337-7551

VESICULAR STOMATITIS (VS) VIRUS (NEW JERSEY AND INDIANA SEROTYPES) COMPLEMENT-FIXATION TEST

By Request

♦ 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 reagents
- 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 & Aquaculture

Viruses Section

Diagnostic Virology Laboratory

(515) 337-7551

VESICULAR STOMATITIS (VS) VIRUS (NEW JERSEY AND INDIANA SEROTYPES) VIRUS NEUTRALIZATION TEST

By Request

♦ 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 & Aquaculture

Viruses Section

Diagnostic Virology Laboratory

(515) 337-7551

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, parasitology, entomology, and analytical chemistry services.

Pathology, Parasitology, and Entomology 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, ELISA, and western blot for Bovine Spongiform Encephalopathy
- Gross Pathology/Histopathology Reference Support for State Diagnostic Laboratories
- Histological and Immunohistochemical Preparations
- Exotic and Domestic Parasite Identification (e.g., Ticks, Myiasis Flies, Mites, Hemoparasites)
- Center for National Tick Surveillance Program

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
- Fraudulent Blood Screening

COURSES OFFERED

♦ Specialized training available upon request. Contact the Training Office, telephone (515) 337-7300/7475 or email: NCAH.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

Proficiency and Vaccine Services Section

- New Methods Evaluation and Implementation
- Proficiency Test Administration
- Genetic characterization of FADs (microarray and sequence analyses)
- International Capacity Building and Validation Studies on FAD Diagnostics
- Bioforensics

TRAINING OFFERED

Foreign Animal Diseases	26
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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.	Rinderpest 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.