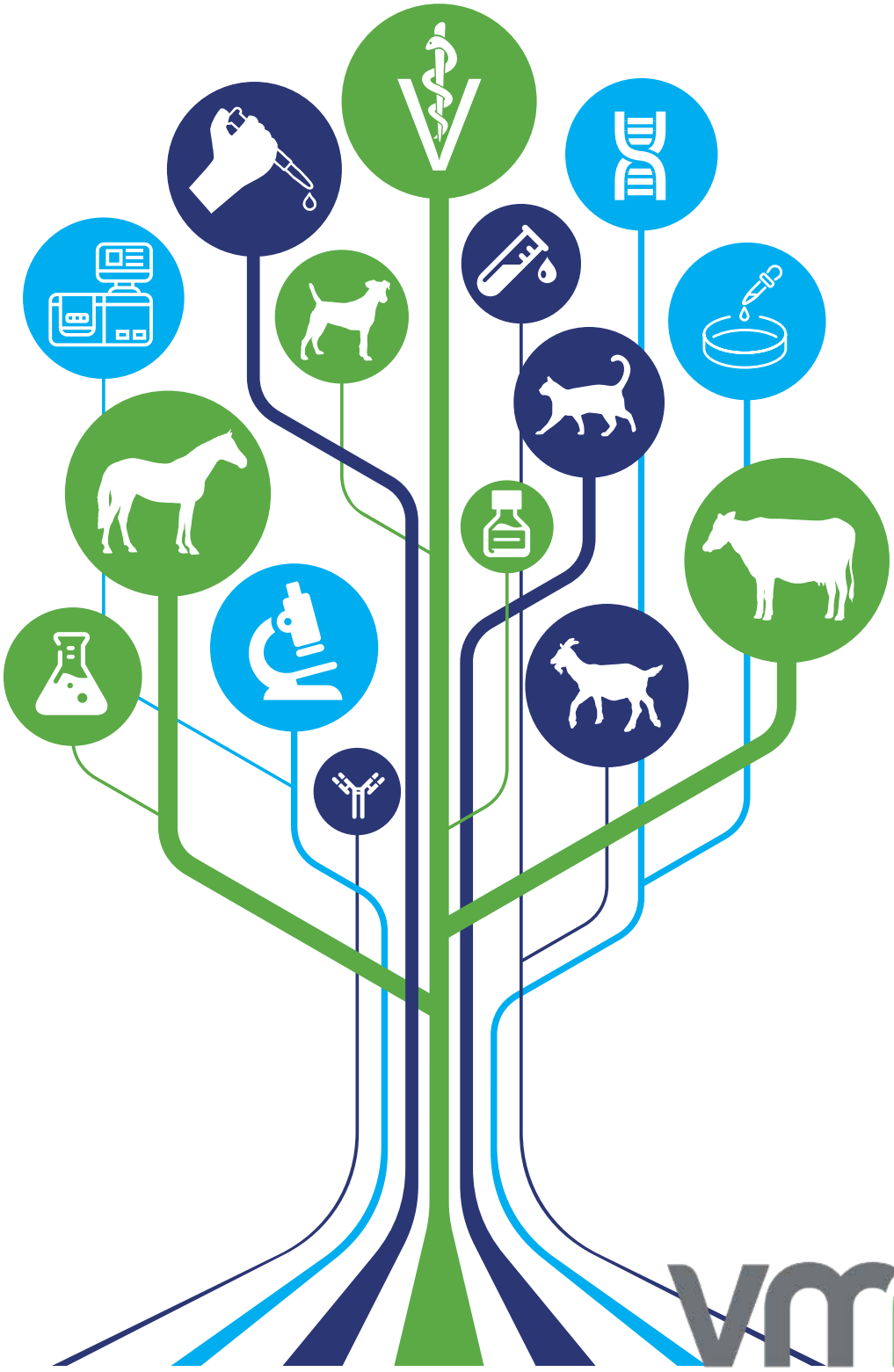
Veterinary Diagnostic Test Kits & Reagents



vmrd

On behalf of the whole VMRD team, thank you for your business! VMRD was founded with the goal of bringing better tests to you, our customers. Better tests yield better diagnoses, better relationships, better outcomes, better bottom lines, and better days.

Our products and services team members strive every day to accomplish the better test goal. If we ever fail to achieve this goal, please do not hesitate to contact any member of the VMRD team, including me personally, so that we can make it right. That is the way we would want to be treated, and we will do our best to treat you that way.

May you have only good days at the bench!

Soli Deo gloria,

Ethan Adams

Ethan Adams, CEO

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Sensitivity & Specificity in Perspective

Relative sensitivity and specificity values are calculated from data generated by diagnostic laboratory field testing (available upon request). These values are provided as guidelines only and should not be construed as the absolute sensitivity and specificity of the test in question for any population subset.

vmrd.com

ANAPLASMOSIS

Anaplasma Antibody Test Kit
cELISA v2

CATALOG NO.
283-2

SPECIES SAMPLE
Bovine

SAMPLE
Serum

SENSITIVITY †
100%

SPECIFICITY †
99.7%

ASSAY TIME
100 minutes

CONFIGURATION
2 stripwell plates

TESTS
182

CATALOG NO.
283-WASH

120mL of lot-specific 10X Wash Solution Concentrate

† See Sensitivity & Specificity in Perspective on TOC page

Setting the Standard in the Diagnosis of Anaplasmosis

VMRD's *Anaplasma* Antibody Test Kit is a competitive, enzyme-linked, immunosorbent assay (cELISA) for the detection of antibodies specific for *Anaplasma* in bovine serum samples. It is intended to provide results that will give guidance about the presence of *Anaplasma* infection in bovine species. Sensitivity and specificity are more than four-fold better than the complement fixation test (CFT) which was the former gold standard test.

This OIE-recommended cELISA is a breakthrough in diagnosis of anaplasmosis in persistently-infected animals. It detects antibodies to *Anaplasma marginale, Anaplasma ovis,* and *Anaplasma centrale.* Notwithstanding some recent publications, we do not believe that the assay should be relied upon for detection of antibodies to *Anaplasma phagocytophilum.* The kit is available in 2-plate format with breakaway stripwells.

About Anaplasmosis

Anaplasmosis is a non-contagious, arthropod-borne, parasitic disease of ruminants that results in significant economic losses to the cattle industry. The disease in cattle is caused by *Anaplasma marginale,* recently classified in geno-group II of *Ehrlichiae. Anaplasma marginale* is an intra-erythrocytic parasite that causes severe anemia, abortion, weight loss, jaundice and death. Diagnosis of the acute disease is based upon clinical signs, anemia and finding of *Anaplasma* inclusion bodies in erythrocytes. Animals surviving the acute phase become lifelong carriers. Ticks transmit the infection from carriers to naïve cattle, which develop clinical disease. Cycles of rickettsemia in carriers fluctuate between $10^{2.5}$ and 10^{7} infected erythrocytes per ml, levels generally undetectable by Giemsa staining. Carriers can be identified by detection of serum antibodies to *A. marginale* with VMRD's *Anaplasma* Antibody Test Kit.

KIT CONTENTS

Component	283-2
A. Antigen-Coated Plates	2 plate
B. Positive Control	3.6 ml
C. Negative Control	3.6 ml
D. 100X Antibody-Peroxidase Conjugate	0.3 ml
E. Conjugate Diluting Buffer	30 ml
F. 10X Wash Solution Concentrate	120 ml
G. Substrate Solution	30 ml
H. Stop Solution	30 ml
Test Kit Insert	

OVERVIEW OF KIT PROCEDURE

1. Transfer 50 µl of samples and controls into wells of Antigen-Coated Plate
2. Incubate 60 minutes at room temperature
3. Wash 2 times with Wash Solution
4. Add 50 µl of Antibody-Peroxidase Conjugate
5. Incubate 20 minutes at room temperature
6. Wash 4 times with Wash Solution
7. Add 50 µl of Substrate Solution
8. Incubate 20 minutes at room temperature
9. Add 50 µl of Stop Solution
10. Read at 620-650 nm

Formula for calculating % inhibition:
%I = 100 [1-(Sample OD ÷ Negative Control OD)]

Samples producing <30% inhibition are negative. Samples producing ≥30% inhibition are positive.

For the test to be valid, the mean OD of the Negative Control must range from 0.40 to 2.10. The percent inhibition of the Positive Control must be ≥30%.

BOVINE LEUKOSIS

Bovine Leukemia Virus Antibody Test Kit
ELISA

CATALOG NO.
284-2

SPECIES SAMPLE
Bovine

SAMPLE
Serum

SENSITIVITY †
98%

SPECIFICITY †
100%

ASSAY TIME
60 minutes

CONFIGURATION
2 stripwell plates

TESTS
182

CATALOG NO.
284-WASH

120mL of lot-specific 10X Wash Solution Concentrate

† See Sensitivity & Specificity in Perspective on TOC page

VMRD's highly-sensitive and specific enzyme-linked, immunosorbent assay (ELISA) kit detects antibodies to bovine leukemia virus (BLV) glycoprotein 51 (gp51) in bovine sera. Sample serum antibodies bind to BLV gp51 molecules attached to the plastic wells of the microtiter plate. Binding of these serum antibodies is detected by reaction with horseradish peroxidase (HRP)-affinity-purified goat antibodies to bovine immunoglobulins. Attached HRP-antibodies are detected by addition of enzyme substrate and quantitated by subsequent blue color product development. Strong color development indicates the presence of antibodies to BLV gp51 in the sample serum. Very weak or no color development indicates the absence of detectable antibodies to BLV gp51 in the sample serum. VMRD's Bovine Leukemia Virus Antibody Test Kit is USDA-approved for export testing and is available in breakaway stripwell format. The assay requires that an ELISA plate reader be used for accurate results.

About Bovine Leukosis

Enzootic Bovine Leukosis (EBL) is an infectious, non-contagious viral disease of cattle. It is caused by BLV, an oncogenic delta retrovirus, which results in proliferation of B lymphocytes. Infection with BLV may lead to persistent lymphocytosis and in some adult cattle to the development of tumors with associated signs. The spread of disease from the introduction into a herd may reach enzootic proportions. Transmission of BLV occurs between animals primarily by transfer of B lymphocytes in blood. Trauma, use of common bleeding needles, and surgical procedures are the main means of transmission. It is rarely vertically transmitted. Most BLV infections are inapparent, with approximately 5% of animals developing clinical signs. AGID and ELISA tests are used to identify carrier cattle. Control programs for EBL include testing and removal of positive animals. Several European countries which have instituted eradication programs also require that imported cattle be free of BLV.

KIT CONTENTS

Component	284-2
A. Antigen-Coated Plates	2 plate
B. Positive Control	4 ml
C. Negative Control	4 ml
D. 100X Antibody-Peroxidase Conjugate	0.3 ml
E. Conjugate Diluting Buffer	30 ml
F. 10X Wash Solution Concentrate	120 ml
G. Serum Diluting Buffer	60 ml
H. Substrate Solution	30 ml
I. Stop Solution	30 ml
Test Kit Insert	

OVERVIEW OF KIT PROCEDURE

1. Dilute serum samples 1/25 with Serum Diluting Buffer
2. Transfer 50 µl of each sample and controls into wells of the Antigen-Coated Plate
3. Incubate 20 minutes at room temperature
4. Wash 3 times with Wash Solution
5. Add 50 µl of Antibody-Peroxidase Conjugate
6. Incubate 20 minutes at room temperature
7. Wash 3 times with Wash Solution
8. Add 50 µl of Substrate Solution
9. Incubate 20 minutes at room temperature
10. Add 50 µl of Stop Solution
11. Read at 620-650 nm

All samples with mean OD values greater than or equal to the mean OD of the Positive Controls are considered positive for BLV. All samples with mean OD values less than the mean of the Positive Controls are negative for BLV.

For the test to be valid, the mean OD of the Negative Controls must be less than 0.200. The mean OD of the Positive Controls must be ≥0.250 and <2.000.

NEOSPOROSIS

Neospora caninum
Antibody Test Kit
cELISA

CATALOG NO.
280-2

SPECIES SAMPLE
Bovine

SAMPLE
Serum

SENSITIVITY †
96%

SPECIFICITY †
99%

ASSAY TIME
100 minutes

CONFIGURATION
2 stripwell plates

TESTS
184

CATALOG NO.
280-WASH

120mL of
lot-specific 10X
Wash Solution
Concentrate

† See Sensitivity & Specificity in Perspective on TOC page

VMRD's *Neospora* test is a competitive, enzyme-linked immunosorbent assay (cELISA) that detects antibodies against *Neospora caninum* in cattle sera. Our competitive ELISA format allows other species to be tested, but validation has been completed only on cattle. An immunodominant surface protein of 65 kDa is captured on the antigen plate using a monoclonal antibody. Another HRP-conjugated monoclonal antibody competes with serum antibodies for a specific epitope on p65. Sensitivity and specificity studies confirm the high accuracy of this kit. In a mass screening of 4,323 sera of unknown serologic status, only 5% of sera fell within ±5% of the cut-off value, demonstrating a clear distinction between positive and negative sera (bimodal distribution).

About Neosporosis

Neosporosis has been identified across the world in various species, including dogs, cattle, sheep, goats, and horses. It is caused by *Neospora caninum,* a protozoan parasite closely related to *Toxoplasma gondii.* Although canids have been identified as the definitive host for *N. caninum,* it is not known if there are other definitive hosts. No clinical signs are noted in cows that abort due to *N. caninum* either prior to the abortion or post-abortion. Aborted fetuses are usually autolyzed with no gross lesions and placentas are not retained. Abortions have been diagnosed in both heifers and cows from 3 months gestation to term. A majority (78%) of *N. caninum* abortions occur between 4 and 6 months gestation. This pattern of mid-gestation abortion is distinct from other diagnosed causes of infectious abortion in dairy cattle which tend to occur later in gestation. In dogs, *N. caninum* infection causes neuromuscular paralysis. Identification of carrier animals is based upon detection of specific antibody with serological tests while diagnosis of abortions is based upon microscopic examination of the fetus and immunohistochemistry.

KIT CONTENTS

Component	280-2
A. Antigen-Coated Plates	2 plate
B. Positive Control	3.6 ml
C. Negative Control	3.6 ml
D. 100X Antibody-Peroxidase Conjugate	0.3 ml
E. Conjugate Diluting Buffer	30 ml
F. 10X Wash Solution Concentrate	120 ml
G. Substrate Solution	30 ml
H. Stop Solution	30 ml
Test Kit Insert	

OVERVIEW OF KIT PROCEDURE

1. Transfer 50 µl of samples and controls into wells of the Antigen-Coated Plate
2. Incubate 60 minutes at room temperature
3. Wash 3 times with Wash Solution
4. Add 50 µl of Antibody-Peroxidase Conjugate
5. Incubate 20 minutes at room temperature
6. Wash 3 times with Wash Solution
7. Add 50 µl of Substrate Solution
8. Incubate 20 minutes at room temperature
9. Add 50 µl of Stop Solution
10. Read at 620-650 nm

Formula for calculating % inhibition:
% I = 100 [1-(Sample OD ÷ Negative Control OD)]

Samples producing <30% inhibition are negative. Samples producing ≥30% inhibition are positive.

For the test to be valid, the mean OD of the Negative Control must be ≥0.30 and <2.50. The inhibition of the Positive Control must be ≥30%.

EQUINE PIROPLASMOSIS

Babesia caballi Antibody Test Kit **cELISA**

CATALOG NO.
273-2

SPECIES SAMPLE
Equine

SAMPLE
Serum

SENSITIVITY †
100%

SPECIFICITY †
100%

ASSAY TIME
105 minutes

CONFIGURATION
2 stripwell plates

TESTS
182

CATALOG NO.
273-WASH

120mL of lot-specific 10X Wash Solution Concentrate

Theileria equi Antibody Test Kit, **cELISA**

CATALOG NO.
274-2

SPECIES SAMPLE
Equine

SAMPLE
Serum

SENSITIVITY †
95%

SPECIFICITY †
99.5%

ASSAY TIME
105 minutes

CONFIGURATION
2 stripwell plates

TESTS
182

CATALOG NO.
274-WASH

120mL of lot-specific 10X Wash Solution Concentrate

About the *B. caballi* and *T. equi* Test Kits

VMRD's *Babesia caballi* Antibody Test Kit, cELISA and VMRD's *Theileria (Babesia) equi* Antibody Test Kit, cELISA are competitive, enzyme-linked, immunosorbent assays which detect antibodies in equine sera to *B. caballi* or *T. equi,* respectively. Antibody to *B. caballi* or *T. equi* in sample serum inhibiting binding of primary monoclonal antibody. The binding of primary monoclonal antibody to the antigen-coated plate is detected by binding of horseradish peroxidase (HRP)-secondary antibody. Finally, binding of the HRP-secondary antibody is quantified by the addition of enzyme substrate and subsequent color product development. Strong color development indicates little or no inhibition of primary monoclonal antibody binding and therefore the absence of *B. caballi* or *T. equi* antibody in sample sera. Weak color development due to inhibition of the primary monoclonal antibody binding to the antigen on the antigen-coated plate indicates the presence of *B. caballi* or *T. equi* antibodies in sample sera.

† See Sensitivity & Specificity in Perspective on TOC page

NOTE

Despite many similarities, components (including wash), are NOT interchangeable between the *Babesia caballi* and *Theileria equi* test kits. Substituting reagents between these kits can have adverse consequences.

KIT CONTENTS

Component	
A. Antigen-Coated Plates	2 plates
B. Positive Control	2 ml
C. Negative Control	2 ml
D. 100X Primary Antibody	0.3 ml
E. 100X Secondary Antibody Conjugate	0.3 ml
F. Antibody Diluting Buffer	60 ml
G. Serum Diluting Buffer	10.5 ml
H. 10X Wash Solution Concentrate	120 ml
I. Substrate Solution	30 ml
J. Stop Solution	30 ml
Test Kit Insert	

OVERVIEW OF KIT PROCEDURE

1. Dilute serum samples 1/2 with Serum Diluting Buffer.
2. Transfer 50 µl of diluted samples and controls into wells of Antigen-Coated Plate
3. Incubate 30 minutes at room temperature
4. Wash 3 times with Wash Solution
5. Add 50 µl of Primary Antibody
6. Incubate 30 minutes at room temperature
7. Wash 3 times with Wash Solution
8. Add 50 µl of Secondary Antibody Conjugate
9. Incubate 30 minutes at room temperature
10. Wash 3 times with Wash Solution
11. Add 50 µl of Substrate Solution
12. Incubate 15 minutes at room temperature
13. Add 50 µl of Stop Solution
14. Read at 620-650 nm

Formula for calculating % inhibition:
% I = 100 [1-(Sample OD ÷ Negative Control OD)]

Samples producing ≥40% inhibition are positive. Samples producing <40% inhibition are negative.

For the test to be valid, the mean of the Negative Controls must produce an OD >0.300 and <2.000. The mean of the Positive Controls must produce an inhibition ≥40%.

EQUINE INFECTIOUS ANEMIA

Equine Infectious Anemia Virus Antibody Test Kit
AGID

CATALOG NO.
400-200

SPECIES SAMPLE
Equine

SAMPLE
Serum

SENSITIVITY †
99%

SPECIFICITY †
100%

ASSAY TIME
30 minutes*

FORMAT
AGID

TESTS
200

† See Sensitivity & Specificity in Perspective on TOC page

* Incubation period is 24 hours

VMRD's Equine Infectious Anemia Virus (EIAV) agar gel immunodiffusion (AGID) test detects precipitating antibodies in sera of Equidae to a purified recombinant EIAV core protein of 26 kD molecular weight (p26). Use of highly purified recombinant p26 protein antigen reduces problems of interpretation associated with extraneous precipitin lines derived from contamination by non-relevant antigens. The antigen-antibody precipitation reaction takes place in agar gel using the 7-well standard procedure developed by John W. Black and described by Pearson (American Association of Veterinary Laboratory Diagnosticians, 22nd Annual Proceedings, pp. 449-462, 1979). Purified soluble EIAV p26 antigen is placed in the center well and reference positive control serum is placed in three alternating peripheral wells. Sample sera are placed in the three remaining wells. After incubation, reference lines form between the antigen well and the reference positive control serum wells. Sample sera, if positive, will form a line that fuses with reference positive control lines or that deviate the reference positive control lines inward near the sample well without formation of a visible line. Negative sera will neither form a line that fuses with the reference positive control line nor cause deviation of the reference positive control lines.

About Equine Infectious Anemia

Equine infectious anemia (EIA) is caused by a lentivirus. It produces acute episodes of disease that are interspersed with clinically normal periods. The acute episodes usually last for a few days and are associated with fever, thrombocytopenia, and anemia. In most of the infected horses, the disease episodes occur with decreasing frequency until an inapparent carrier state develops. The infection is life-long and, if stressed, inapparent carrier horses may express recurrent viremia and disease. Transmission occurs by transfer of blood from one horse to another by biting insects or contaminated needles and instruments.

Transmission is most likely during episodes of clinical disease when the virus titer is highest in the blood, and is least likely during the inapparent carrier stage. Unfortunately, it is difficult to know at what stage an infected horse may be and when another episode might occur. EIA can be diagnosed by detection of antibody to the capsid p26 protein of the virus. This internal viral protein is relatively conserved among EIA virus strains, allowing detection of antibody in virtually all infected horses.

EIAV Testing Regulations

For USA customers: VMRD, in compliance with federal regulations, will only ship EIAV test kits to USDA-approved laboratories. The sale and use of EIAV test kits in the USA is restricted to laboratories approved by state and federal (USDA) animal health officials. The National Veterinary Services Laboratories will periodically supply coded check test samples to evaluate the competency of the USDA-approved laboratories. For questions about becoming an EIAV-licensed testing lab contact the USDA.

EQUINE INFECTIOUS ANEMIA

Equine Infectious Anemia Virus Antibody Test Kit
ELISA v2

CATALOG NO.
5515.01-1

SPECIES SAMPLE
Equine

SAMPLE
Serum

SENSITIVITY †
100%

SPECIFICITY †
100%

ASSAY TIME
35 minutes

CONFIGURATION
1 stripwell plate

TESTS
94

† See Sensitivity & Specificity in Perspective on TOC page

VMRD's enzyme-linked, immunosorbent assay (ELISA) detects antibodies to Equine Infectious Anemia Virus (EIAV) in equine sera. Sample serum EIAV antibodies bind recombinant EIAV p26 antigen coated on the plastic wells. Non-specific antibody is washed away and plate-bound EIAV-specific antibody captures the HRP-recombinant p26 protein conjugate via free Fab antigen binding sites. Unbound conjugate is washed away and the presence of bound HRP-labeled antigen is detected by the addition of an enzyme substrate with subsequent blue color product development. The addition of stop solution slows the enzyme reaction and changes the color product from blue to yellow. A cutoff positive control provides a color reference for visually reading results as well as an optical density (OD) reference for reading the assay with a microplate absorbance spectrophotometer. Yellow color or OD equal to or greater than the positive control indicates the presence of antibodies to EIAV p26 in sample sera. Color or OD lower than the positive control indicates the absence of detectable antibodies to EIAV p26.

VMRD's EIAV ELISA is rapid and convenient - only 35 minutes total incubation time, no sample dilution, and only two washes - yet it is highly specific and sensitive.

VMRD's ELISA sensitivity is comparable or superior to other USDA-licensed ELISAs on titrations of positive samples and in detection of "weak samples."

EIA Reference Serum

VMRD offers EIA positive reference sera. These equine origin sera contain a level of antibody that gives a strong, medium or weak positive reaction in VMRD's EIA ELISA. Each vial of serum comes complete with a certificate of analysis which includes a photograph of the reaction in AGID as well as the optical densities of the ELISA reaction as run in the VMRD laboratory. These reference sera are intended as reference samples for quality assurance of EIA ELISA tests.

EIA REFERENCE SERUM	SIZE	CAT. NO.
Weak Positive	0.5 ml	RS-EIA-EW-0.5ML
Medium Positive	0.5 ml	RS-EIA-EM-0.5ML
Strong Positive	0.5 ml	RS-EIA-ES-0.5ML

KIT CONTENTS

Component	5515.01-1
A. Antigen-Coated Plate	1 plate
B. Positive Control	2 ml
C. Negative Control	2 ml
D. Antigen-Peroxidase Conjugate	8 ml
E. Substrate Solution	15 ml
F. Stop Solution	15 ml
Test Kit Insert	

OVERVIEW OF KIT PROCEDURE

1. Transfer 50 µl of samples and controls into wells of the Antigen-Coated Plate
2. Incubate 10 minutes at room temperature
3. Wash 1 time
4. Add 50 µl of Antigen-Peroxidase Conjugate
5. Incubate 10 minutes at room temperature
6. Wash 4 times
7. Add 50 µl of Substrate Solution
8. Incubate 15 minutes at room temperature
9. Add 50 µl of Stop Solution
10. Read at 450 nm or by eye

Samples are positive if they produce an OD greater than or equal to the mean of the positive control.

Samples are negative if they produce an OD less than the mean of the positive control.

For the test to be valid, the OD of the Positive Control should be greater than or equal to 1.5 times the OD of the Negative Control. The OD of the Negative Control should be less than or equal to 0.15.

For the test to be valid when reading by eye, the Positive Control should have visible yellow color and the Negative Control should have no or faint visible color that is less than the Positive Control.

Samples producing positive test results be sent to the National Veterinary Services Laboratories (NVSL) for confirmation.

BLUETONGUE

Bluetongue Virus Antibody Test Kit
cELISA v2

CATALOG NO.
5010.20-2

SPECIES SAMPLE
Ruminants

SAMPLE
Serum

SENSITIVITY †
100%

SPECIFICITY †
99%

ASSAY TIME
40 minutes

CONFIGURATION
2 stripwell plates

TESTS
184

Bluetongue Virus Antibody Test Kit,
AGID

CATALOG NO.
288-100

SPECIES SAMPLE
Ruminants

SAMPLE
Serum

SENSITIVITY †
100%

SPECIFICITY †
99%

ASSAY TIME
30 minutes*

CONFIGURATION
AGID

TESTS
100

† See Sensitivity & Specificity in Perspective on TOC page

* Incubation period is 24 hours

About Bluetongue Virus

Bluetongue is an infectious, non-contagious, arthropodborne, viral disease of wild and domestic ruminants. In cattle it is usually a subclinical infection, while in sheep it is often characterized by acute catarrhal inflammation of mucous membranes and hyperemia of coronary bands. Degenerative changes are present in skeletal and coronary musculature,leading to weakness, prolonged convalescence and significant economic losses.

Bluetongue virus (BTV) belongs to the genus *Orbivirus*, family Reoviridae. Laboratory diagnosis of bluetongue is primarily established by isolation of the virus. Virus is isolated in Vero or BHK 21 cells, and its presence is confirmed by immunofluorescence. Serological methods used in diagnosis of this disease are AGID, ELISA, cELISA and immunofluorescence. Positive results confirm exposure to BTV but not necessarily carrier status.

VMRD's Bluetongue Virus cELISA v2

VMRD's competitive, enzyme-linked, immunosorbent assay (cELISA) detects antibody to bluetongue virus in ruminant sera. It has been demonstrated to detect all 24 known serotypes of bluetongue virus (BTV) and to not detect antibody to serotypes 1 or 2 of epizootic hemorrhagic disease virus (EHDV). The kit has demonstrated excellent sensitivity and specificity in comparison with various benchmarks in several studies. VMRD's new BTV cELISA v2 test kit offers the same rapid and convenient features of the original version (40 minutes total incubation time) along with new features including distilled water wash. The economics of this competitively-priced assay are further enhanced by its USDA-approved 18-month shelf life, also a testimony to the stability of the kit.

VMRD's Bluetongue Virus AGID

VMRD's Bluetongue Virus agar gel immunodiffusion (AGID) test detects precipitating antibodies to bluetongue virus in sera of ruminants. Antibodies to epizootic hemorrhagic disease virus (EHDV) are also detected. If positive, test sera will form a line that fuses with reference lines or that cause deviation of the positive reference lines inward near the test serum well without forming a visible line. Negative sera will neither form a line nor cause deviation of the positive reference lines.

Overview of the ELISA Kit Procedure

1. Samples and controls diluted 1/2 with Antibody Peroxidase Conjugate
2. Transfer 50 µl of samples and controls into wells of Antigen-Coated Plate
3. Incubate 30 minutes at room temperature
4. Wash 3 times with Wash Solution
5. Add 50 µl of Substrate Solution
6. Incubate 10 minutes at room temperature
7. Add 50 µl of Stop Solution
8. Read at 620-650 nm

Samples are positive if they produce an OD less than 50% of the mane of the Negative Controls.

Samples are negative if they produce and OD greater than or equalt to 50% of the mean of the Negative Controls.

For the test to be valid, the mean OD of the Negative Controls must be greater than 0.300 and less than 2.000. The mean OD of the Positive Controls must be less than or equal to 50% of the mean OD of the Negative Controls.

CAPRINE ARTHRITIS-ENCEPHALITIS & OVINE PROGRESSIVE PNEUMONIA

Small Ruminant Lentivirus Antibody Test Kit
cELISA

CATALOG NO.
289-2

SPECIES SAMPLE
Caprine/Ovine

SAMPLE
Serum

SENSITIVITY †
100% (Caprine)
95% (Ovine)

SPECIFICITY †
99.6% (Caprine)
98.4% (Ovine)

ASSAY TIME
110 minutes

CONFIGURATION
2 stripwell plates

TESTS
184

CATALOG NO.
289-WASH

120mL of lot-specific 10X Wash Solution Concentrate

† See Sensitivity & Specificity in Perspective on TOC page

The study of CAEV has a long history at VMRD. Dr. Scott Adams, President of VMRD, was a member of the team that initially isolated CAEV and characterized the disease and its control in the late 1970s and early 1980s. VMRD's competitive, enzyme-linked immunosorbent assay (cELISA) is licensed to detect antibodies to caprine arthritis-encephalitis virus (CAEV) in goat sera and antibodies to ovine progressive pneumonia virus (OPPV) in sheep sera. Our small ruminant lentivirus (SRLV) cELISA test utilizes a proprietary xeno-monoclonal antibody derived by fusion of goat splenocytes and mouse myeloma cells which has excellent characteristics for use in cELISA. This antibody is conjugated to HRP and is used to compete with serum antibodies for antigen bound to the microtiter plate. Validation studies, in addition to those summarized here, have confirmed the superior quality of VMRD's SRLV cELISA test kit.[1]

About CAE and OPP

CAE and OPP (also known as maedi-visna) are persistent lentivirus infections of goats and sheep, respectively. Molecular analysis indicates that these viruses are very similar and they are often grouped together as small ruminant lentivirus (SRLV). Polyarthritis is the main clinical sign of CAEV infection, while OPP typically manifests with labored breathing and emaciation caused by progressive pneumonitis. Most SRLV-infected sheep and goats show no clinical disease, but remain persistent carriers of the virus. The major mode of viral transmission is vertically through milk and colostrum. Respiratory secretions and feces also harbor infectious virus. Good management practices, supported by a reliable diagnostic tool, are the best means of controlling the spread of disease.

REFERENCES

[1] Herrmann, L.M., et al. "Competitive-inhibition enzyme-linked immunosorbent assay for detection of serum antibodies to caprine arthritis-encephalitis virus: Diagnostic tool for successful eradication."
Clin. Diagn. Lab. Immunol. 10(2): 267-271 (2003).

[2] Herrmann, L.M., et al. "Detection of serum antibodies to ovine progressive pneumonia virus in sheep by using a caprine arthritis-encephalitis virus competitive-inhibition enzyme-linked immunosorbent assay."
Clin. Diagn. Lab Immunol. 10(5): 862-865 (2003).

KIT CONTENTS

Component	289-2
A. Antigen-Coated Plates	2 plates
B. Positive Control	3.6 ml
C. Negative Control	3.6 ml
D. 100X Antibody-Peroxidase Conjugate	0.3 ml
E. Conjugate Diluting Buffer	30 ml
F. 10X Wash Solution Concentrate	120 ml
G. Substrate Solution	30 ml
H. Stop Solution	30 ml
Test Kit Insert	

OVERVIEW OF KIT PROCEDURE

1. Transfer 50 µl of samples and controls into wells of the Antigen-Coated Plate
2. Incubate 60 minutes at room temperature
3. Wash 3 times with Wash Solution
4. Add 50 µl of Antibody-Peroxidase Conjugate
5. Incubate 30 minutes at room temperature
6. Wash 3 times with Wash Solution
7. Add 50 µl of Substrate Solution
8. Incubate 20 minutes at room temperature
9. Add 50 µl of Stop Solution
10. Read at 620-650 nm

Formula for calculating % inhibition:
% I = 100 [1-(Sample OD ÷ Negative Control OD)]

Samples producing <35% inhibition are negative. Samples producing ≥35% inhibition are positive.

For the test to be valid, the mean OD of the Negative Controls must be ≥0.300. The mean of the Positive Controls must produce ≥35% inhibition.

FOOT AND MOUTH DISEASE

Foot and Mouth Disease Virus Antibody Test Kit, **cELISA**

CATALOG NO.
5FMO.20-5

SPECIES SAMPLE
Bovine/Ovine/ Porcine

SAMPLE
Serum

SENSITIVITY †
99.6% (Bovine)
98.6% (Ovine)
96.9% (Porcine)

SPECIFICITY †
99.3% (Bovine)
100% (Ovine)
76.1% (Porcine)

ASSAY TIME
140 minutes

CONFIGURATION
5 stripwell plates

TESTS
455

CATALOG NO.
5FM0.20-WASH

120mL of lot-specific 10X Wash Solution Concentrate

† See Sensitivity & Specificity in Perspective on TOC page

VMRD's Foot and Mouth Disease test is a competitive, enzyme-linked immunosorbent assay (cELISA) that detects antibodies against the Foot and Mouth Disease virus non-structural protein (NS) 3ABC. Our assay is able to distinguish between vaccinated and infected animals as a DIVA assay because 3ABC is only present in replicating virus and not included in vaccines. Additionally, VMRD's assay was shown to detect all 7 serotypes (A, O, C, Asia 1, SAT 1, SAT 2, and SAT 3) and has been validated for use in bovine, ovine, and porcine sera. The kit performs better than the most commonly used commercially available NS ELISA tests in the market. It is available in breakway strip-well format, and requires use of an ELISA plate reader for accurate results.

About Foot and Mouth Disease

Foot and Mouth Disease is a highly contagious viral disease of cloven-hoofed animals including cattle, pigs, sheep, goats, deer, and antelope. It is characterized by fever, lameness, and vesicular lesions on the tongue, lips, mouth, feet, snout, and teats. An FMD outbreak can lead to devastating global economic losses that affect all areas of trade, including export and import of animal products. The ELISA is an approved method in determining FMD-free status and is incorporated into FMD surveillance programs to identify active infections as well as carrier animals. The VMRD FMD 3ABC assay has a 99.6% sensitivity and a 99.3% specificity for detecting live infections in cattle and is appropriate for use in vaccinated animal populations for FMD control programs.

KIT CONTENTS

Component	5FMO.20-5
A. Antigen-Coated Plates	5 plate
B. Positive Control	4 ml
C. Negative Control	4 ml
D. 100X Antibody-Peroxidase Conjugate	0.5 ml
E. Conjugate Diluting Buffer	60 ml
F. 10X Wash Solution Concentrate	2 x 120 ml
G. Serum Diluting Buffer	25 ml
H. Substrate Solution	60 ml
I. Stop Solution	60 ml
Test Kit Insert	

OVERVIEW OF KIT PROCEDURE

1. Dilute serum samples 1/2 with Serum Diluting Buffer
2. Transfer 50 µl of each sample and controls into wells of the Antigen-Coated Plate
3. Incubate 90 minutes at room temperature
4. Wash 3 times with Wash Solution
5. Add 50 µl of Antibody-Peroxidase Conjugate
6. Incubate 30 minutes at room temperature
7. Wash 3 times with Wash Solution
8. Add 50 µl of Substrate Solution
9. Incubate 20 minutes at room temperature
10. Add 50 µl of Stop Solution
11. Read at 450 nm

Formula for calculating % inhibition:
% I = 100 [1-(Sample OD ÷ Negative Control OD)]

Samples producing <40% inhibition are negative. Samples producing ≥40% inhibition are positive.

For the test to be valid, the mean of the Negative Controls (NC) must produce an optical density of ≥0.40 and ≥1.60. The %CV of the Negative Controls must be ≥15%.The mean of the Positive Controls must have an inhibition of 50-70%.

JOHNE'S DISEASE

Mycobacterium avium subspecies *paratuberculosis* Antibody Test Kit
ELISA

CATALOG NO.
5064.20-2

SPECIES SAMPLE
Bovine serum & milk, caprine serum

SENSITIVITY †
93.1% (Bovine serum)
84.8% (Bovine milk)
100% (Caprine serum)

SPECIFICITY †
90% (Bovine serum)
82.1% (Bovine milk)
95.5% (Caprine serum)

ASSAY TIME
70 minutes
(75 min. w/automation)

CONFIGURATION
2 stripwell plates

TESTS
184

CATALOG NO.
5064.20-WASH

120mL of lot-specific 10X Wash Solution Concentrate

† See Sensitivity & Specificity in Perspective on TOC page

This enzyme-linked immunosorbent assay (ELISA) detects antibodies in caprine serum, bovine serum and bovine milk to *Mycobacterium avium* subsp. *paratuberculosis* (MAP), the causative agent of Johne's disease. Sample antibodies bind to MAP antigen attached to the plastic wells of the microtiter plate. Binding of these antibodies is detected by reaction with horseradish peroxidase (HRP)-labeled secondary antibody. Attached HRP-labeled antibodies are detected by addition of enzyme substrate and quantified by subsequent color product development. Strong color development indicates the presence of antibody to MAP in the sample. Very weak or no color development indicates the absence of antibody to MAP in the sample.

About Johne's Disease

Johne's disease is a chronic and highly contagious wasting disease of all ruminants caused by *Mycobacterium avium* subsp. *paratuberculosis* (MAP). Major clinical signs include weight loss, pipestream diarrhea, edema, decreased milk production, and eventually death. In the US, Johne's disease affects: 70% of dairy herds,[1] costing the industry up to $250 million per year in production loss.[2] An estimated 5-10% of beef herds are also affected.[3]

Currently, no effective vaccines or specific treatments are available, making proper diagnostic testing pivotal for management efforts.

REFERENCES

[1] USDA. National Animal Health Monitoring System (NAHMS) - *Dairy*, 2008.

[2] Ott SL, et al. *Prev Vet Med.* , June 1999.

[3] USDA. NAHMS - *Beef*, 1999.

KIT CONTENTS

Component	5064.20-2
A. Antigen-Coated Plates	2 plate
B. Positive Control	4 ml
C. Negative Control	4 ml
D. Peroxidase Conjugate	40 ml
E. Sample Diluting Buffer	60 ml
F. 10X Wash Solution Concentrate	120 ml
G. Substrate Solution	30 ml
H. Stop Solution	30 ml
Test Kit Insert	

OVERVIEW OF KIT PROCEDURE

1. Transfer 50 µl of samples and controls into wells of the antigen-coated plate
2. Incubate 30 minutes at room temperature
3. Wash 3 times with Wash Solution
4. Add 50 µl of Antibody Peroxidase Conjugate
5. Incubate 30 minutes at room temperature
6. Wash 3 times with Wash Solution
7. Add 50 µl of Substrate Solution
8. Incubate 10 minutes at room temperature
9. Add 50 µl of Stop Solution
10. Read at 450 nm

Formula for calculating % inhibition:
% I = 100 [1-(Sample OD ÷ Negative Control OD)]

Bovine serum samples producing S/P < 0.30 are negative. Samples producing S/P ≥ 0.30 are positive.

Bovine milk samples producing S/P < 0.13 are negative. Samples producing S/P ≥ 0.13 are positive.

Caprine serum samples producing S/P < 0.80 are negative. Samples producing S/P ≥ 0.80 are positive.

For the test to be valid, the mean of the Negative Control OD must be < 0.200. The mean of the Positive Control OD must be ≥ 0.300.

EQUINE SERUM AMYLOID A (SAA)

Equine Serum Amyloid A Test, **LATERAL FLOW**

CATALOG NO.
LFD-SAA

SPECIES SAMPLE
Equine

SAMPLES
Fresh blood

Anticoagulated blood

Serum/Plasma w/accessory Measurement Pack

TESTS
15

Early identification of systemic inflammation and infection can be challenging, as the clinical signs are often subtle.

Serum amyloid A (SAA) is an indispensable tool to aid equine veterinarians in this challenge, as it is rapidly responsive to clinical changes. Virtually undetectable in normal horses, it increases within 6-12 hours following an acute inflammatory insult and peaks at 1000-fold baseline values[1-3] – far quicker and more dramatic than fibrinogen or WBC count. As soon as disease begins to resolve, it begins dropping within 12-24 hours.[3]

This dynamic nature of SAA makes it an ideal marker for objective monitoring of clinical condition and treatment efficacy in cases of infection causing acute, systemic inflammation.[1,2]

VMRD SAA for equine is a lateral flow test that quantifies SAA in equine blood, serum, or plasma. Each self-contained test pouch contains: (1) test cartridge, (1) tube with dilution buffer, and (1) capillary device for measurement of a whole blood sample (either fresh or anticoagulated in EDTA or heparin). For testing serum or plasma, the serum/plasma measurement pack (below) can be purchased as an accessory item.

Samples are measured with a small capillary tube, then diluted in buffer and applied to the test cartridge via dropper. Anti-SAA antibody labeled with colloidal gold becomes bound to any SAA protein in the sample as it flows through the membrane. This labeled SAA is then captured by membrane-bound antibody on two test lines, allowing accurate quantitation of SAA over a broad range. With increasing SAA concentration, more SAA is captured, and these lines become increasingly dark. The Control line ("C") binds any leftover gold-conjugated antibody, and therefore becomes less dark as SAA concentration increases. The VMRD reader, with the test- and lot-specific calibration card affixed, measures the darkness of all lines and provides a numerical reading of SAA concentration in the patient sample.

REFERENCES

[1] Belgrave RL, et al. 2013. *JAVMA* 243(1):113-119.

[2] Nolen-Walston R. 2015. *AAEP Proc* 61:130-137.

[3] Witkowska-Pilaszewicz OD, et al. 2019. *Eq Vet J* 51(3):293-298.

Serum/Plasma Measurement Pack for **Equine Serum Amyloid A (SAA)**

CATALOG NO.
LFD-SAA-SERUM

SPECIES SAMPLE
Equine

SAMPLES
Serum/Plasma

TESTS
15

This accessory pack enables serum, EDTA plasma, or heparin plasma to be used in the Equine Serum Amyloid A (SAA) test. The standard SAA test pouches are set up for use with whole blood, however serum and plasma samples require greater dilution for accurate results. This pack includes (15) sampling devices that measure the exact amount of serum or plasma needed to achieve this dilution when coupled with the dilution tubes from the standard test pouches.

Not for use with Feline Serum Amyloid A.

FELINE SERUM AMYLOID A (SAA)

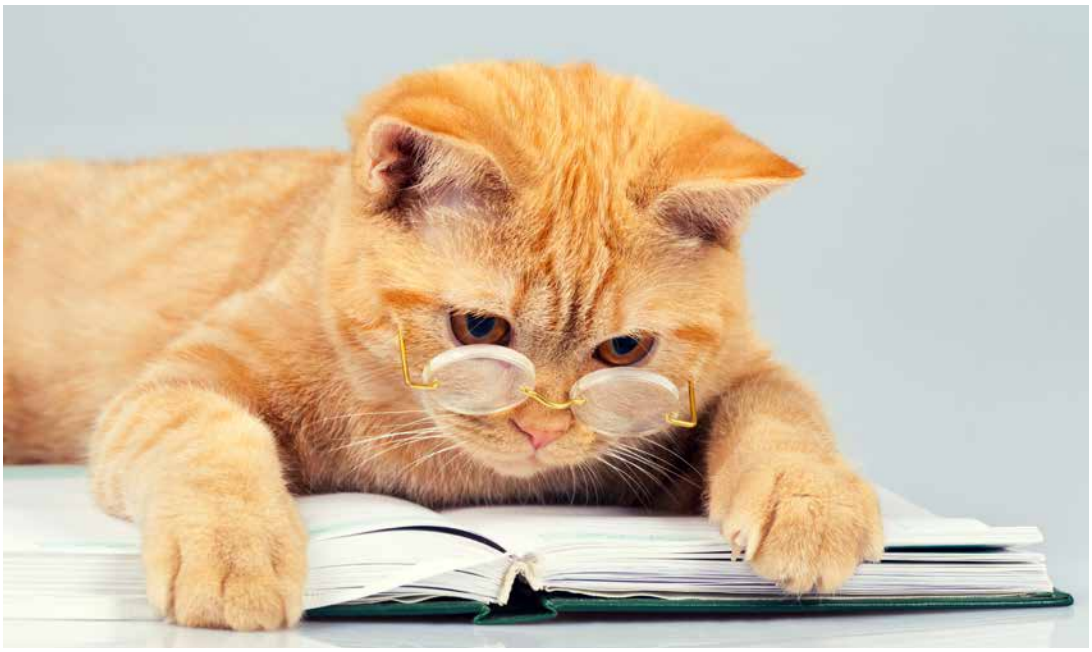
Feline Serum Amyloid A (SAA) Test
LATERAL FLOW

CATALOG NO.
LFD-SAA-FELINE

SPECIES
Feline

SAMPLES
Serum/Plasma

TESTS
15



Cats are notoriously stoic and hide illness well, often to their own detriment. This presents challenges for veterinarians when trying to diagnose and manage disease. Serum amyloid A (SAA) is the most sensitive acute phase protein in cats[1], which makes it particularly valuable for early detection of infection, differentiating from other etiologies[1], and monitoring response to treatment[2].

As with equine SAA, feline SAA closely mirrors clinical condition. It is virtually undetectable in normal animals but increases rapidly and dramatically with acute, systemic inflammation[3], which is most frequently the result of bacterial or viral infection. Values are commonly normal with chronic or highly localized disease such as allergies, localized tumors[1], and uncomplicated endocrinopathy or cardiopathy[1]. Once inflammation begins to resolve, as with effective treatment, SAA quickly decreases back to baseline level. Tracking SAA allows objective monitoring of treatment efficacy and can detect re-emergence of disease or other complications[2], sometimes even before they become clinically evident.

VMRD SAA for Feline is a lateral flow test that quantifies SAA in feline serum, EDTA plasma, or heparin plasma. Each test uses: (1) test cartridge, (1) tube with dilution buffer, and (1) capillary device for measurement of a plasma or serum sample.

Samples are measured with the small capillary tube, then diluted in buffer and applied to the test cartridge via dropper. Anti-SAA antibody labeled with colloidal gold becomes bound to any SAA protein in the sample as it flows through the membrane. This labeled SAA is then captured by membrane-bound antibody on two test lines, allowing accurate quantitation of SAA over the full range typically observed in cats. With increasing SAA concentration, more SAA is captured, and these lines become increasingly dark. The Control line ("C") binds any leftover gold-conjugated antibody, and therefore becomes less dark as SAA concentration increases. The VMRD reader, with the test- and lot-specific calibration card affixed, measures the darkness of all lines and provides a numerical reading of SAA concentration in the patient sample.

REFERENCES

[1] Yuki M, et. al. 2020. *Vet Clin Pathol* 38(1):83-86.

[2] Tamamoto T, et. al. 2009. *Vet Clin Pathol* (38(1):83-86.

[3] Tamamoto T, et. al. 2008. *J Vet Med Sci* 70(11):1247-1252.

VMRD READER

VMRD Reader
LATERAL FLOW

CATALOG NO.
LFD-CUBE

CONFIGURATION
1 Reader
w/Travel Case

COMPATIBILITY
LFD-SAA
LFD-SAA-FELINE

The VMRD Reader is a portable palm-sized device that can be used with multiple lateral flow tests to provide numerical results. No more guessing about the darkness of a line or dot – the VMRD Reader will measure the intensity of the line(s) and calculate a result so that no visual Interpretation is required!

In addition to the convenient size, this reader comes in a compact travel kit that protects the reader and can store up to 5 test pouches. It requires (3) CR 2032 batteries for operation, with an easily accessible battery compartment (no tools required). The reading window is also easy to access and clean if needed. Importantly, the reader will save the result from the previous test until a new test is started, so no important information is lost.

In keeping with our VMRD standards of quality, the VMRD Reader is equipped with a calibration system that maintains consistency of results from one lot of tests to the next. This is accomplished through use of a lot-specific calibration card that stays affixed to the side of the reader and is changed out when a new lot of tests is opened. The calibration card also allows the reader to be used for different tests, since the specific information for the individual test and lot is programmed onto the card. This lot- and test-specific information is transmitted to the reader via RFID technology every time a test is run, requiring minimal effort by the user.

The reader also stores at least 100 results, which can be transferred to a computer via a reader-specific program and exported to Excel in a tab delimited (tsv) format. This requires a USB cable that is available from VMRD as an accessory item.

MAGNETIC BEAD EXTRACTION

Magnetic Bead Nucleic Acid
EXTRACTION KIT

CATALOG NO.
MOL-EXTRACT-MAG

SPECIES
All

SAMPLES
Serum/Plasma
Semen
Milk
Saliva (oral fluids)
Swabs
Feces
Tissues

PREPS
96

The VMRD Magnetic Bead Nucleic Acid Extraction Kit is suitable for manual or automated extraction of pathogen nucleic acids from a wide range of veterinary sample types. Purified RNA/DNA from viruses, bacteria, and parasites are ready-for-use in downstream reactions. Starting sample material may include bodily fluids such as blood, serum, plasma, semen, milk, and saliva (oral fluids), as well as swabs, feces, and tissues.

The principles behind Magnetic Bead Extraction are Lyse, Bind/Adsorb, Separate, Wash, Elute. In the first step, nucleic acids are released from the sample upon lysis with the lysis master mix (SLS or ELS) containing Proteinase K. Binding Buffer and paramagnetic beads are next added to the lysate to facilitate nucleic acid binding to the beads. The magnetic beads are then separated from the remaining sample material by applying a magnetic field to the sample tubes or plate. (In automated plate systems, the beads are collected with 96 magnetized rods/pins.) After magnetic separation, unbound contaminants and salts are washed away from the beads/nucleic acids with Wash Buffers 1 and 2, then 80% ethanol. Residual ethanol is removed by brief air drying of the separated beads. Purified nucleic acids are eluted from the magnetic beads under low salt conditions.

NOTE
The Magnetic Bead Nucleic Acid Extraction Kit extracts both RNA and DNA. It is not intended for genomic DNA extractions.

Magnetic Separator Nucleic Acid
EXTRACTION KIT

CATALOG NO.
MOL-EXTRACT-SEPARATOR

The magnetic separator is designed for use with the magnetic bead extraction kits in either the U-bottom or square well block plates. To separate the beads from the solution, the separation plate is seated/placed onto the magnetic separator. The beads are attracted to the magnet and collect against the walls of the plate wells (or tube), allowing for removal of wash buffers and/or recovery of elution liquid.

The individual times for complete attraction of the beads to the magnetic pins should be determined independently for each system. It is recommended to use the separation plates or tubes specified in the appropriate kit protocol.

NOTE
The separator contains strong permanent magnets! Avoid direct contact with beads or other loose ferrous material. Avoid contact with magnetic sensitive devices or with other magnetic separators.

SPIN COLUMN EXTRACTION

Spin Column Nucleic Acid EXTRACTION KIT

CATALOG NO.
MOL-EXTRACT-SPIN

SPECIES
All

SAMPLES
Serum/Plasma
Tissue homogenates
Oral fluids
Swabs
- BAL swabs
- Oropharyngeal swabs
- Nasal swabs

Blood: for pathogens only

PREPS
50

The VMRD Spin Column Nucleic Acid Extraction Kit is designed for the rapid preparation of highly pure viral nucleic acids (e.g., Influenza, EHV, PRRS, SARS-CoV-2) from swabs, tissue homogenates, and biological fluid such as plasma and serum.

The principles behind Spin Column Extraction are Lyse, Bind, Wash, Elute. Lysis breaks open the cells of the biological sample and the viral particles themselves to release nucleic acids. Liquid Proteinase K is included to facilitate adequate lysis of protein in the samples.

Lysis Buffer and ethanol create appropriate conditions for binding of the released nucleic acids to the silica-membrane columns. Carrier RNA improves binding and recovery of low-concentrated viral nucleic acids. Contaminants (potential PCR inhibitors) like salts, metabolites, and other cellular components are removed in simple wash steps with alcoholic Wash Buffers. Nucleic acids are eluted in water and are ready-for-use in subsequent reactions. Little to no cross-contamination of samples is ensured due to closed system conditions.

This Spin kit is suited to process either 200 µL or 400 µL sample fluid. The spin column centrifugation method allows a small elution volume (30 µL) for highly concentrated viral nucleic acids. The prepared nucleic acids are suitable for applications, such as automated fluorescent DNA sequencing, RT-PCR, PCR, or any kind of enzymatic reaction.

NOTE
Whole blood samples may be used for detection of pathogen DNA/RNA only.

Lysis Beads for Nucleic Acid EXTRACTION KIT

CATALOG NO.
MOL-EXTRACT-BEADS

SIZE
Pack of 50

The VMRD MOL-EXTRACT-BEADS are individual 2 mL screw cap plastic tubes containing glass beads for the disruption of biological sample material and subsequent nucleic acid purification.

These glass beads are recommended for bacterial disruption. Other sample types must be independently evaluated.

NOTE
The use of disruption devices must be evaluated to determine stability of the tube during intense agitation. Perform initial tests with water to avoid spillage of reagents or contamination by pathogenic material.

PRIMESTORE® MTM

Primestore® MTM
VIAL

CATALOG NO.
MOL-MTM-VIAL

SPECIES
All

VOLUME
1.5 ml Solution

SIZE
Pack of 50

Primestore® MTM
1L

CATALOG NO.
MOL-MTM-1 L

SPECIES
All

VOLUME
1 L Solution

SIZE
1 Bottle

Primestore® MTM
20 L

CATALOG NO.
MOL-MTM-20L

SPECIES
All

VOLUME
VOLUME
20 L / 5 GAL

SIZE
1 Box

PrimeStore® Molecular Transport Medium (MTM) is a clear, colorless liquid composed of a proprietary blend of reagents for collection, transport, and storage of infectious samples for molecular applications.

- Effectively disrupts/lyses lipid membranes
- Inactivates infectious biological pathogens in samples for safe pooling, shipping, and handling
- Complete inactivation of nucleases and proteases
- Preserves and stabilizes both DNA and RNA even at elevated temperatures
- Eliminates need for cold-storage and cold-transport since stable at room temperature up to 30 days
- Compatible with spin columns and molecular bead extraction kits
- Enables complex sequencing and RNA/proteomics analysis

CAUTION

Contains guanidine thiocyanate. DO NOT MIX WITH BLEACH: guanidine and bleach create cyanide gas. Refer to the SDS for additional information on proper handling.

MTM has been evaluated for use in the following sample types:

Respiratory swabs, saliva, sputum, swine oral fluids, stool/feces, urine, blood, serum, plasma, processing fluids, meat juices, skin & homogenized tissue, soils, liquid & aerosol environmental samples, remnants for biobanking, whole mosquitoes, mask punches

REFERENCES

[1] Daum, L T et al. "A clinical specimen collection and transport medium for molecular diagnostic and genomic applications." *Epidemiology and Infection* vol. 139, 11 (2011): 1764-73.

[2] Omar, Shaheed V et al. "Laboratory evaluation of a specimen transport medium for downstream molecular processing of sputum samples to detect Mycobacterium tuberculosis." *Journal of Microbiological Methods* vol. 117 (2015): 57-63.

[3] Welch, Stephen R, et. al. "Analysis of Inactivation of SARS-CoV-2 by Specimen Transport Media, Nucleic Acid Extraction Reagents, Detergents, and Fixatives." *Journal of Clinical Microbiology* vol. 58, 11 (2020): 1713-20.

[4] Ricci, Francesca, et. al. "A Novel Processing-Free Method for RNAseq Analysis of Spontaneous Sputum in Chronic Obstructive Pulmonary Disease." *Frontiers in Pharmacology* vol. 12 (2021): Article 704969.

[5] Deng, Kaiping et al. "Interlaboratory comparison of SARS-CoV2 molecular detection assays in use by U.S. veterinary diagnostic laboratories." *Journal of Veterinary Diagnostic Investigation : Official Publication of the American Association of Veterinary Laboratory Diagnosticians, Inc* vol. 33, 6 (2021): 1039-1051.

COOMBS REAGENTS

The Coombs test, also called direct antiglobulin test, is designed to detect immune-mediated erythrocyte destruction which occurs in autoimmune hemolytic anemias, and in some cases with infections and neoplastic disorders. Hemolysis in these diseases is caused by the erythrocytes being coated with antibody (IgG, IgM) and/or complement components (C3). Coated erythrocytes are either lysed in the bloodstream or removed by phagocytes.

VMRD's Coombs reagent is a caprine-origin antiserum against IgG, IgM, and C3. It does not agglutinate normal erythrocytes, but does agglutinate erythrocytes coated with IgG, IgM, and/or C3. Agglutination, which may be observed macroscopically or microscopically, is indicative of a Coombs positive.

Canine Coombs

All dogs with anemia (including that caused by intravascular and extravascular hemolysis) of unknown origin are reasonable candidates for evaluation by Coombs testing. VMRD's Canine Anti-Sheep Red Blood Cell (SRBC) reagent is used to prepare a positive control.

Equine Coombs

All horses with anemia (including that caused by intravascular and extravascular hemolysis) of unknown origin are reasonable candidates for evaluation by Coombs testing. Foals with neonatal isoerythrolysis are often Coombs positive. VMRD's Equine Anti-Sheep Red Blood Cell (SRBC) reagent is used to prepare a positive control.

Feline Coombs

All cats with anemia (including that caused by intravascular and extravascular hemolysis) of unknown origin are reasonable candidates for evaluation by Coombs testing.

CANINE COOMBS TEST	SIZE	CATALOG NUMBER
Canine Coombs Reagent	2 ml	392-2
Canine Coombs Reagent	5 ml	392-5
Canine Coombs Positive Control Canine anti-SRBC	1 ml	372-2

EQUINE COOMBS TEST	SIZE	CATALOG NUMBER
Equine Coombs Reagent	2 ml	492-2
Equine Coombs Positive Control Equine anti-SRBC	1 ml	472-2

FELINE COOMBS TEST	SIZE	CATALOG NUMBER
Feline Coombs Reagent	2 ml	592-2

IMMUNOFLUORESCENCE REAGENTS

The most extensive range of veterinary fluorescent antibody products available anywhere

Fluorescent antibody (FA) techniques, direct and indirect, are standby procedures that remain unsurpassed for versatility and accurate detection of either antigen or antibodies. The FA technique offers rapid deployment of new assays with minimal development time. It has the distinct advantage over other assay methods of enabling the operator to visually distinguish between specific and non-specific reactions.

Essential equipment and facilities to perform FA:

- Quality epifluorescence microscope with a mercury, xenon, HID, or LED lamp located in a dark room to obtain optimum visualization.
- Standard biomedical laboratory equipment

Set Apart by Quality, Consistency, Standardization and Support

- Our secondary antibody conjugates are optimized for use in all of the applicable IFA systems that we sell. No further dilution is necessary or advised.
- Anti-pathogen conjugates, positive controls and negative controls are provided at a ready-to-use dilution.
- Diluents are tested in all of our systems in which they might be used to avoid problems with background, non-specificity, or lack of signal.
- Positive and negative controls are provided for virtually all of our IFA systems.
- Positive controls are adjusted to an antibody concentration two to four two-fold dilutions below endpoint to avoid an excessively strong positive control contaminating a negative sample.
- Great care is taken with every step of conjugate production from antibody development to purification to conjugation to maximize specificity.
- Detailed, lot-specific, certificates of analysis provide information such as screening dilution, specific reactions, and expiration date.
- Photographs of positive reactions are provided on most technical data sheets.
- Expert consulting and technical support are provided for all FA products.

INDIRECT IMMUNOFLUORESCENCE

Indirect immunofluorescence assay (IFA), also known as indirect fluorescent antibody, is used to detect antibodies in body fluids of diseased animals.

Materials for IFA include:

- **FA Substrate Slide**
  Contains 12 wells spotted with an antigen.
- **FA Positive & Negative Controls**
  Used on each slide for the purpose of comparison.
- **Serum Diluting Buffer**
  Used to dilute samples to working dilution. (Catalog No. FASDB-100ML or SSDB-100ML)
- **Anti-Immunoglobulin FITC Conjugate**
  Used to detect bound antibody on the slide.
- **FA Rinse Buffer**
  Used for washing off unbound antibodies and conjugates. (Catalog No. FARB-4X)
- **FA Mounting Fluid**
  Used to enhance visualization of fluorescence. (Catalog No. FAMF-10ML)

Recommended Procedure for IFA

1. Warm slide to room temperature before removing from foil pouch.
2. Dilute serum in serum diluting buffer, pH 7.2. Place diluted serum on the designated wells.
3. Incubate slide in humid chamber at 37°C for 30 minutes.
4. Using a wash bottle, gently rinse slide briefly in FA rinse buffer, pH 9.0, and then soak for 10 minutes in FA rinse buffer, pH 9.0 at room temperature.
5. Drain slide and dry around wells by pressing blotter (included in pouch) to front surface.
   Place FITC-conjugated anti-IgG or -IgM conjugate on the wells.
6. Incubate as in step 3.
7. Rinse as in step 4.
8. Drain slide and dry back and edges with a paper towel. Do not allow stained surface to dry. Do not rinse with water.
9. Mount with mounting fluid, cover with a cover slip, and view with a good quality fluorescence microscope at 100-250X. Confirmation may be made at 400X.

DIRECT IMMUNOFLUORESCENCE

Direct immunofluorescence assay (FA), also known as direct fluorescent antibody, is used to detect antigens.

Materials for direct immunofluorescence (FA) include:

- **Direct FA FITC Conjugate**
  Antibodies conjugated to FITC.
- **Control Slide**
  Used to verify performance of a conjugate. Contains two wells: one positive and
  one negative.
- **FA Rinse Buffer**
  Used for washing off unbound antibodies and conjugates. (Catalog No. FARB-4X)
- **FA Mounting Fluid**
  Used to enhance visualization of fluorescence. (Catalog No. FAMF-10ML)

Recommended Procedure for FA

1. Warm slide to room temperature before removing from foil pouch.
2. Place direct FA conjugate on the designated wells.
3. Incubate slide in humid chamber at 37°C for 30 minutes.
4. Using a wash bottle, gently rinse slide briefly in FA rinse buffer, pH 9.0, and then soak for 10 minutes in FA rinse buffer, pH 9.0.
5. Drain slide and dry back and edges with a paper towel. Do not allow stained surface to dry. Do not rinse with water.
6. Mount with mounting fluid, cover with cover slip, and view with good quality fluorescence microscope at 100-250X. Confirmation may be made at 400X.

BOVINE IMMUNOFLUORESCENCE REAGENTS

INFECTIOUS AGENT	PRODUCT TYPE (ORIGIN)	SIZE	CATALOG NUMBER
Bluetongue Virus (BTV)	FA Substrate Slide	12 well	SLD-IFA-BTV
	FA Positive Control (bovine)	1 ml	PC-IFA-BTV
	FA Negative Control (bovine)	1 ml	NC-IFA-BTV
	FITC Conjugate MAb (murine)	10 ml	CJ-F-BTV-MAB-10ML
Bovine Adenovirus Type 1 (BAV-1)	FITC Conjugate (caprine)	10 ml	CJ-F-BAV1-10ML
Bovine Adenovirus Type 3 (BAV-3)	FA Control Slide	2 well	SLD-FAC-BAV3
	FITC Conjugate (caprine)	10 ml	CJ-F-BAV3-10ML
Bovine Adenovirus Type 5 (BAV-5)	FA Control Slide	2 well	SLD-FAC-BAV5
	FITC Conjugate (bovine)	10 ml	CJ-F-BAV5-10ML
Bovine Coronavirus (BCV)	FA Control Slide	2 well	SLD-FAC-BCV
	FITC Conjugate (porcine)	10 ml	CJ-F-BCV-10ML
Bovine Herpesvirus Type 1 (BHV-1/IBR)	FA Control Slide	2 well	SLD-FAC-IBR
	FITC Conjugate (caprine)	10 ml	CJ-F-IBR-10ML
Parainfluenza Virus Type 3 (PI-3)	FA Control Slide	2 well	SLD-FAC-PI3
	FITC Conjugate (caprine)	10 ml	CJ-F-PI3-10ML
Bovine Parvovirus (BPV)	FA Control Slide	2 well	SLD-FAC-BPV
	FITC Conjugate (caprine)	10 ml	CJ-F-BPV-10ML
Bovine Respiratory Syncytial Virus (BRSV)	FA Control Slide	2 well	SLD-FAC-BRSV
	FA Substrate Slide	12 well	SLD-IFA-BRSV
	FA Positive Control (bovine)	1 ml	PC-IFA-BRSV
	FA Negative Control (bovine)	1 ml	NC-IFA-BRSV
	FITC Conjugate (caprine)	10 ml	CJ-F-BRSV-10ML
Bovine Viral Diarrhea Virus (BVDV)	FA Control Slide	2 well	SLD-FAC-BVD
	FA Negative Control (bovine)	1 ml	NC-IFA-BVD
	FITC Conjugate (porcine)	10 ml	CJ-F-BVD-10ML
Reovirus (REO)	FA Control Slide	2 well	SLD-FAC-REO
	FITC Conjugate (caprine)	10 ml	CJ-F-REO-10ML

CANINE IMMUNOFLUORESCENCE REAGENTS

INFECTIOUS AGENT	PRODUCT TYPE (ORIGIN)	SIZE	CATALOG NUMBER
Brucella canis	FA Substrate Slide	12 well	SLD-IFA-CB
	FA Positive Control (canine)	1 ml	PC-IFA-CB
	FA Negative Control (canine)	1 ml	NC-IFA-CB
Canine Adenovirus (CAV-2)	FITC Conjugate (porcine)	10 ml	CJ-F-CAV-10ML
Canine Coronavirus (CCV)	FA Control Slide	2 well	SLD-FAC-CCV
	FA Substrate Slide	12 well	SLD-IFA-CCV
	FITC Conjugate (porcine)	10 ml	CJ-F-CCV-10ML
Canine Distemper Virus (CDV)	FA Control Slide	2 well	SLD-FAC-CDV
	FA Substrate Slide	12 well	SLD-IFA-CDV
	IgG FA Positive Control (canine)	1 ml	PC-IFA-CDV-G
	IgM FA Positive Control (canine)	1 ml	PC-IFA-CDV-M
	FITC Conjugate (caprine)	10 ml	CJ-F-CDV-10ML
	FITC Conjugate MAb (murine)	10 ml	CJ-F-CDV-MAB-10ML
	Positive Blood Smear Slide	each	SLD-BSP-CDV
	Negative Blood Smear Slide	each	SLD-BSN-CDV
Canine Herpesvirus Type 1 (CHV-1)	FA Substrate Slide	12 well	SLD-IFA-CHV
	FA Positive Control (canine)	1 ml	PC-IFA-CHV
	FITC Conjugate (canine)	10 ml	CJ-F-CHV-10ML
Canine Parainfluenza Virus Type 2 (CPI-2)	FA Control Slide	2 well	SLD-FAC-CPI
	FA Positive Control (canine)	1 ml	PC-IFA-CPI
	FITC Conjugate (porcine)	10 ml	CJ-F-CPI-10ML
Canine Parvovirus (CPV)	FA Control Slide	2 well	SLD-FAC-CPV
	FA Substrate Slide	12 well	SLD-IFA-CPV
	IgG FA Positive Control (canine)	1 ml	PC-IFA-CPV-G
	IgM FA Positive Control (canine)	1 ml	PC-IFA-CPV-M
	FITC Conjugate (murine)	10 ml	CJ-F-CPV-MAB-10ML
Ehrlichia canis	FA Substrate Slide	12 well	SLD-IFA-EC
	FA Positive Control (canine)	1 ml	PC-IFA-EC
	FA Negative Control (canine)	1 ml	NC-IFA-EC
Leishmania infantum	FA Substrate Slide	12 well	SLD-IFA-LSH
	FA Positive Control (canine)	1 ml	PC-IFA-LSH
	FA Negative Control (canine)	1 ml	NC-IFA-LSH
Rickettsia rickettsii **Rocky Mountain Spotted Fever** (RMSF)	FA Substrate Slide	12 well	SLD-IFA-RMSF
	FA Positive Control (canine)	1 ml	PC-IFA-RMSF
	FA Negative Control (canine)	1 ml	NC-IFA-RMSF

EQUINE IMMUNOFLUORESCENCE REAGENTS

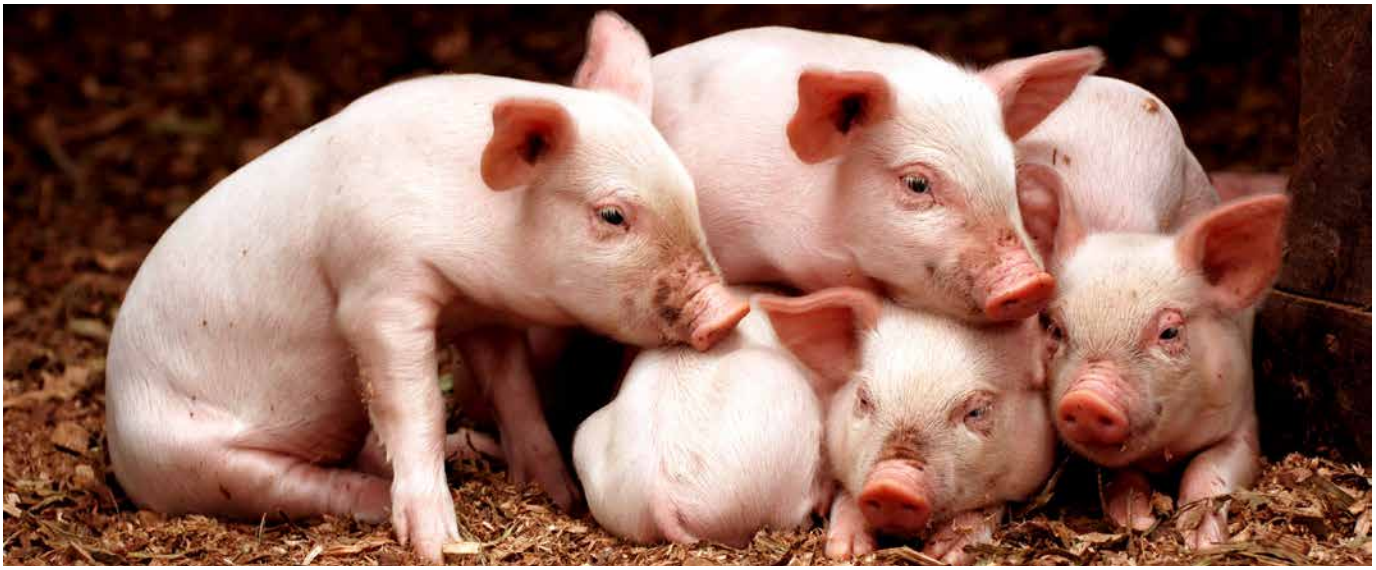
INFECTIOUS AGENT	PRODUCT TYPE (ORIGIN)	SIZE	CATALOG NUMBER
Equine Herpesvirus Type 1 (EHV-1/ERV)	FA Control Slide	2 well	SLD-FAC-ERV
	FA Positive Control (equine)	1 ml	PC-IFA-ERV-EQ
	FITC Conjugate (caprine)	10 ml	CJ-F-ERV-10ML
Influenza Virus Type A (FLUA)	FA Control Slide	2 well	SLD-FAC-FLUA
	FA Substrate Slide	12 well	SLD-IFA-FLUA

FELINE IMMUNOFLUORESCENCE REAGENTS

INFECTIOUS AGENT	PRODUCT TYPE (ORIGIN)	SIZE	CATALOG NUMBER
Bartonella henselae	FA Substrate Slide	12 well	SLD-IFA-BH
	IgM FA Positive Control (feline)	1 ml	PC-IFA-BH-M
Feline Calicivirus (FCV)	FA Control Slide	2 well	SLD-FAC-FCV
	FA Substrate Slide	12 well	SLD-IFA-FCV
	FA Positive Control (feline)	1 ml	PC-IFA-FCV
	FA Negative Control (feline)	1 ml	NC-IFA-FCV
Feline Infectious Peritonitis Virus Type 1 (FIP-1)	FIP-1 FA Control Slide	2 well	SLD-FAC-FIP1
	FIP-1 FA Substrate Slide	12 well	SLD-IFA-FIP1
	FIP-1 FA Positive Control (feline)	1 ml	PC-IFA-FIP1
	FIP-1 FA Negative Control (feline)	1 ml	NC-IFA-FIP1
Feline Infectious Peritonitis Virus Type 2 (FIP-2)	FIP-2 FA Control Slide	2 well	SLD-FAC-FIP2
	FIP-2 FA Substrate Slide	12 well	SLD-IFA-FIP2
	FIP-2 FA Positive Control (feline)	1 ml	PC-IFA-FIP2
	FIP-2 FA Negative Control (feline)	1 ml	NC-IFA-FIP2
Feline Infectious Peritonitis Virus Types 1 & 2 (FIP-1&2)	FITC Conjugate (feline & porcine)	10 ml	CJ-F-FIP-10ML
Feline Herpesvirus Type 1 (FHV-1/FVR)	FA Control Slide	2 well	SLD-FAC-FVR
	FA Substrate Slide	12 well	SLD-IFA-FVR
	FA Positive Control (feline)	1 ml	PC-IFA-FVR
	FITC Conjugate (feline)	10 ml	CJ-F-FVR-10ML
Feline Immunodeficiency Virus (FIV)	FA Substrate Slide	12 well	SLD-IFA-FIV
	FA Positive Control	1 ml	PC-IFA-FIV
	FA Negative Control	1 ml	NC-IFA-FIV
Feline Leukemia Virus (FeLV)	FA Control Slide	2 well	SLD-FAC-FELV
	Primary Antibody (caprine)	10 ml	AB1-FELV
	Secondary FITC Conjugate (equine)	10 ml	AB2-FELV
	Negative Blood Smear Slide	each	SLD-BSN-FELV
Feline Panleukopenia Virus (FPLV)	FA Control Slide	2 well	SLD-FAC-FPL
	FA Substrate Slide	12 well	SLD-IFA-FPL
	FITC Conjugate MAb (murine)	10 ml	CJ-F-FPL-MAB-10ML

PORCINE IMMUNOFLUORESCENCE REAGENTS

INFECTIOUS AGENT	PRODUCT TYPE (ORIGIN)	SIZE	CATALOG NUMBER
Porcine Adenovirus (PAV)	FITC Conjugate (porcine)	10 ml	CJ-F-PAV-10ML
Porcine Circovirus Type 1 (PCV-1)	FA Control Slide	2 well	SLD-FAC-PCV1
Porcine Circovirus Type 2 (PCV-2)	FA Control Slide	2 well	SLD-FAC-PCV2
	FA Substrate Slide	12 well	SLD-IFA-PCV2
	FA Positive Control (porcine)	1 ml	PC-IFA-PCV2
	FA Negative Control (porcine)	1 ml	NC-IFA-PCV2
	FITC Conjugate (porcine)	10 ml	CJ-F-PCV2-10ML
Porcine Circovirus Type 1 & 2 (PCV1&2)	FITC Conjugate (porcine)	10 ml	CJ-F-PCV1&2-10ML
Porcine Epidemic Diarrhea Virus (PEDV)	FA Control Slide	2 well	SLD-FAC-PEDV
	FA Substrate Slide	12 well	SLD-IFA-PEDV
	FA Positive Control	1 ml	PC-IFA-PEDV
	FA Negative Control	1 ml	NC-IFA-PEDV
Porcine Hemagglutinating Encephalomyelitis Virus (PHEV)	FITC Conjugate (porcine)	10 ml	CJ-F-PHEV-10ML
Porcine Parvovirus (PPV)	FITC Conjugate (porcine)	10 ml	CJ-F-PPV-10ML
Porcine Reproductive and Respiratory Syndrome Virus (PRRSV-NA) North American Strain	FA Substrate Slide	12 well	SLD-IFA-PRRS-NA
	FA Positive Control (porcine)	1 ml	PC-IFA-PRRS-NA
	FA Negative Control (porcine)	1 ml	NC-IFA-PRRS
Porcine Reproductive and Respiratory Syndrome Virus (PRRSV-EU) European Strain	FA Substrate Slide	12 well	SLD-IFA-PRRS-EU
	FA Negative Control (porcine)	1 ml	NC-IFA-PRRS
Transmissible Gastroenteritis Virus (TGEV)	FITC Conjugate (porcine)	10 ml	CJ-F-TGE-10ML



MULTIPLE SPECIES IMMUNOFLUORESCENCE REAGENTS

INFECTIOUS AGENT	PRODUCT TYPE (ORIGIN)	SIZE	CATALOG NUMBER
Anaplasma phagocytophilum (formerly *Ehrlichia equi*)	FA Substrate Slide	12 well	SLD-IFA-AP
	FA Positive Control	1 ml	PC-IFA-AP
	FA Negative Control	1 ml	NC-IFA-AP
Borrelia burgdorferi (Lyme Disease)	FA Substrate Slide	12 well	SLD-IFA-LD
	FA Positive Control	1 ml	PC-IFA-LD
	FA Negative Control	1 ml	NC-IFA-LD
Clostridium chauvoei	FA Substrate Slide	12 well	SLD-IFA-CCO
	FITC Conjugate	10 ml	CJ-F-CCO-10ML
Clostridium novyi	FITC Conjugate	10 ml	CJ-F-CNO-10ML
Clostridium septicum	FA Substrate Slide	12 well	SLD-IFA-CSE
	FITC Conjugate	10 ml	CJ-F-CSE-10ML
Clostridium sordellii	FA Substrate Slide	12 well	SLD-IFA-CSO
	FITC Conjugate	10 ml	CJ-F-CSO-10ML
***Clostridium* spp 4-way**	FA Substrate Slide	4 well	SLD-IFA-C4
Neospora caninum	FA Substrate Slide	12 well	SLD-IFA-NC
	FA Positive Control	1 ml	PC-IFA-NC-BOV
	FA Positive Control	1 ml	PC-IFA-NC-CAN
	FA Negative Control	1 ml	NC-IFA-NC-BOV
	FA Negative Control	1 ml	NC-IFA-NC-CAN
	FITC Conjugate	10 ml	CJ-F-NC-10ML
Rabies Recombinant Nucleoprotein (rNP)	FA Control Slide	2 well	SLD-FAC-RAB
Toxoplasma gondii	FA Substrate Slide	12 well	SLD-IFA-TOXO
	IgG FA Positive Control	1 ml	PC-IFA-TOXO-FEL-G
	FA Negative Control	1 ml	NC-IFA-TOXO-FEL
Vesicular Stomatitis Virus (VSV)	FITC Conjugate	10 ml	CJ-F-VSV-10ML

IMMUNOFLUORESCENCE BUFFERS & MOUNTING FLUID

RINSE BUFFERS & MOUNTING FLUID	SIZE	CATALOG NUMBER
FA Conjugate Diluting Buffer	100 ml	FACDB-100ML
FA Serum Diluting Buffer	100 ml	FASDB-100ML
FA Special Serum Diluting Buffer	100 ml	SSDB-100ML
FA Mounting Fluid	10 ml	FAMF-10ML
4X FA Powered Rinse Buffer (makes 4 L)	1 pkg	FARB-4X

IMMUNOFLUORESCENCE REAGENT SECONDARY CONJUGATES

FITC ANTI-IMMUNOGLOBULIN CONJUGATES	SIZE	CATALOG NUMBER
Anti-Bovine IgG1,2 (heavy and light chains) **FITC conjugate, affinity purified** (caprine origin)	10 ml	CJ-F-BOVG-AP-10ML
Anti-Canine IgG FITC conjugate, affinity purified (rabbit origin)	10 ml	CJ-F-CANG-AP-10ML
Anti-Canine IgM (heavy chain specific) **FITC conjugate, affinity purified** (caprine origin)	10 ml	CJ-F-CANM-AP-10ML
Anti-Equine IgG FITC conjugate, affinity purified (caprine origin)	10 ml	CJ-F-EQUG-AP-10ML
Anti-Feline IgG (heavy and light chains) **FITC conjugate, affinity purified** (caprine origin)	10 ml	CJ-F-FELG-AP-10ML
Anti-Feline IgM (heavy chain specific) **FITC conjugate, affinity purified** (caprine origin)	10 ml	CJ-F-FELM-AP-10ML
Anti-Caprine IgG FITC conjugate (rabbit origin)	10 ml	CJ-F-CAPG-10ML
Anti-Camelid IgG (heavy and light chains) **FITC conjugate, affinity purified** (caprine origin)	10 ml	CJ-F-CAMG-AP-10ML
Anti-Murine IgG FITC conjugate, affinity purified (rabbit origin)	10 ml	CJ-F-MURG-AP-10ML
Anti-Porcine IgG (heavy and light chains) **FITC conjugate, affinity purified** (caprine origin)	10 ml	CJ-F-PORG-AP-10ML

POLYCLONAL AND MONOCLONAL ANTIBODIES

Monolconal antibodies

Most of VMRD's monoclonal antibodies are produced as murine ascites and sold clarified, filtered, and preserved with sodium azide. Monoclonals are packaged in liquid form, usually at a concentration of 1.0 mg/ml and are available in 0.1 mg increments.

Monoclonal antibodies will be shipped within one business day when the order is received before 12 pm (Pacific Time Zone). Orders received after this time will be shipped the following day.

We can also provide customized antibodies to meet your specific needs. Please call or e-mail for more information.

POLYCLONAL ANTIBODIES TO INFECTIOUS AGENTS

SPECIFICITY	SIZE	CATALOG NUMBER
Bovine Herpesvirus Type 1 (BHV-1/IBR), caprine origin	2 ml	PAB-IBR
Bovine Viral Diarrhea Virus (BVDV), caprine origin	2 ml	PAB-BVD
Canine Parainfluenza Virus Type 2 (CPI-2), porcine origin	2 ml	PAB-CPI
Equine Herpesvirus Type 1 (EHV-1/ERV), caprine origin	2 ml	PAB-ERV
Parainfluenza Virus Type 3 (PI-3), caprine origin	2 ml	PAB-PI3
Porcine Circovirus Type 2 (PCV-2), porcine origin	2 ml	PAB-PCV2

MONOCLONAL ANTIBODIES TO INFECTIOUS AGENTS

SPECIFICITY	ORIGIN	ISOTYPE	CELL LINE
Anaplasma marginale (MSP1)	Mouse Ascites	IgG3	15D2
Anaplasma marginale (MSP2)	Mouse Ascites	IgG1	O50A2
Bovine Herpesvirus Type 1 (BHV-1/IBR) (gB - gI)	Mouse Ascites	IgG2b	D9E7
Bovine Herpesvirus Type 1 (BHV-1/IBR) (gB - gI)	Mouse Ascites	IgG2b	H2
Bovine Herpesvirus Type 1 (BHV-1/IBR) (gC - gIII)	Mouse Ascites	IgG1	G2
Bovine Herpesvirus Type 1 (BHV-1/IBR) (gC - gIII)	Mouse Ascites	IgG2b	F2
Bovine Herpesvirus Type 1 (BHV-1/IBR) (gD - gIV)	Mouse Ascites	IgG1	1B8-F11
Bovine Herpesvirus Type 5 (BHV-5) (gC)	Mouse Ascites	IgM	L6G
Bovine Leukemia Virus (BLV) (gp51 - G)	Mouse Ascites	IgG1	BLV1
Bovine Leukemia Virus (BLV) (gp51 - D-D')	Mouse Ascites	IgG1	BLV2
Bovine Leukemia Virus (BLV) (p24)	Mouse Ascites	IgG1	BLV3
Bovine Viral Diarrhea Virus (BVDV) (gp55)	Mouse Ascites	IgG2a	D89
Bovine Viral Diarrhea Virus Type 1 (BVDV-1) E2 (gp53)	Mouse Ascites	IgG2a	157
Bovine Viral Diarrhea Virus Type 2 (BVDV-2) E2 (gp53)	Mouse Ascites	IgG2a	BA-29
Bovine Viral Diarrhea Virus Types 1 & 2 (BVDV-1&2)	Mouse Ascites	IgG1	3.12F1
Bovine Viral Diarrhea Virus Types 1 & 2 (BVDV-1&2) E2 (gp53)	Mouse Ascites	IgG2a	BA-2
Bovine Viral Diarrhea Virus Types 1 & 2 (BVDV-1&2) E2 (gp53)	Mouse Ascites	IgG1	BA-26(a)
Bovine Viral Diarrhea Virus Types 1 & 2 (BVDV-1&2) E2 (gp53)	Mouse Ascites	IgG2b	348
Canine Adenovirus Type 1 (CAV-1)	Mouse Ascites	IgG1	2E10-H2
Canine Adenovirus Type 2 (CAV-2)	Mouse Ascites	IgG2a	4H1-A7
Canine Distemper Virus (CDV) (nucleoprotein)	Mouse Ascites	IgG2b	CDV-NP
Canine Distemper Virus (CDV) (envelope)	Mouse Ascites	IgG1	1C42H11
Canine Parainfluenza Virus Type 2 (CPI-2)	Cell Culture Supernatant	IgG1, K	CPI-A-CA
Canine Parvovirus (CPV)	Mouse Ascites	IgG2a	A3B10
Caprine Arthritis Encephalitis Virus (CAEV-63, CAEV-Co, MVV, OPPV)	Mouse Ascites	IgG1	CAEP5A1
Caprine Arthritis Encephalitis Virus (CAEV-63, CAEV-Co, MVV)	Mouse Ascites	IgG1	CAEP10A1
Caprine Arthritis Encephalitis Virus (CAEV-63, CAEV-Co, MVV)	Mouse Ascites	IgG1	CAEP8B1
Caprine Arthritis Encephalitis Virus (CAEV-63, CAEV-Co)	Mouse Ascites	IgG1	CAEP13B1
Caprine Arthritis Encephalitis Virus (CAEV-63)	Mouse Ascites	IgG1	CAEP12A1
Equine Arteritis Virus (EAV) (nucleocapsid)	Mouse Ascites	IgG1	17D3
Neospora caninum (gp65)	Mouse Ascites	gG1	5B6-25
Parainfluenza Virus Type 3 (PI-3) (p69)	Mouse Ascites	IgG2a	1B6
Parainfluenza Virus Type 3 (PI-3) (p69)	Mouse Ascites	IgG2a	2A2
Porcine Parvovirus (PPV)	Mouse Ascites	IgG1	3C9D11H11
Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) (nucleocapsid)	Mouse Ascites	IgG2b	2D6
Prion Protein (IHFG)	Mouse Ascites	IgG1	F89/160.1.5
Prion Protein (QYQRES)	Cell Culture Supernatant	IgG1	F99/97.6.1
Pseudorabies Virus (PRV) (gIII)	Mouse Ascites	IgG2b	3G9F3

EQUIPMENT | TOOLS, SOFTWARE

ELISAWare™ by VMRD

Microplate reading software

VMRD ELISAWare™ microplate-reading software supports all VMRD ELISA test kits. It retrieves data from a microplate absorbance reader, displays the data, validates the assay, calculates the qualitative results, displays the results, stores sample identifications and results, and generates reports. Report options include a detailed analytical report for internal laboratory use or a client report displaying only the informationrelevant to a particular client. Exporting OD values to Microsoft® Excel® is as easy as clicking your mouse!

Currently, ELISAWare™ supports microplate readers from four major manufacturers. If your reader is not supported, please contact VMRD by phone, or e-mail and we will do our best to add your driver to ELISAWare™.

ELISAWare™ validates and calculates results for all of VMRD's test kits. It can retrieve ODs from a plate reader for any given ELISA but only validates and calculates results for VMRD's assays. As we bring new kits to the market we will offer upgrades that keep your software current with all of our newest ELISA kits.

ELISAWare™ displays its reports in your Internet browser, providing multiple options for displaying, exporting, and analyzing ELISA results.

We welcome your feedback on ELISAWare™.

EQUIPMENT | INSTRUMENTS

ELISAPro by VMRD

Automated ELISA Processor

The ELISAPro is a fully automated and lightweight processor that will run an ELISA from start to finish. Installation is quick and all necessary equipment is included: laptop, sample and reagent racks, a reader loaded with 5 wavelengths, and a probe that conducts sample dilutions, washing, and reagent dispense.

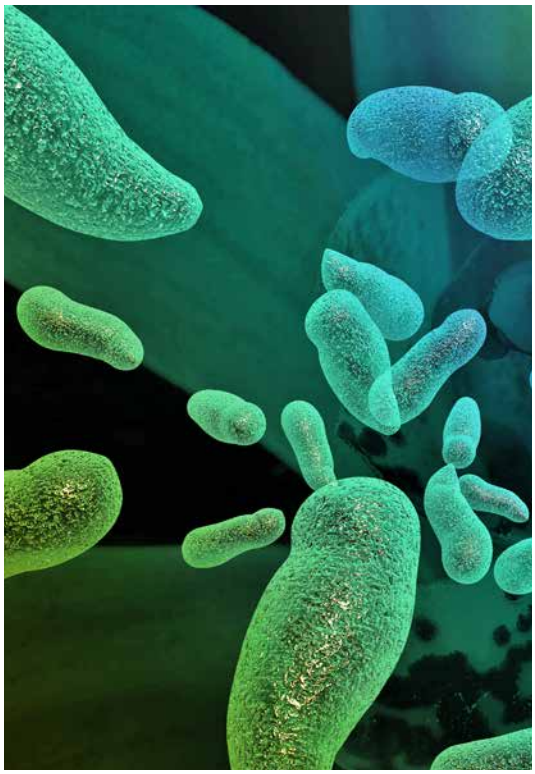
Features & Benefits

- Intuitive user interface
- Space saving design - fits standard 60 cm lab bench
- 96 sample capacity
- High precision syringes
- Exterior status indicator light
- LIS Connectivity
- Competitive pricing
- Low consumable costs (no disposable tips)
- Software keeps records of all assay results and maintenance performed

Validated programs are available to run VMRD assays

- *Anaplasma* v2
- *Babesia caballi*
- Bovine Leukemia Virus
- Bluetongue Virus v2
- Equine Infectious Anemia v2
- Johne's bovine serum
- Johne's caprine serum
- *Neospora caninum*
- Small Ruminant Lentivirus
- *Theileria equi*

BIOLOGICS TESTING SERVICES



VMRD's Testing Services division specializes in testing of raw materials and seeds for the presence of adventitious agents to satisfy various regulatory requirements and quality assurance needs for the global serum, veterinary and pharmaceutical industries.

Regulatory compliance testing for adventitious agents in virus seeds of various species follows 9CFR guidance. These materials may be used in research or final products.

The following are a list of tests available. For complete details on these tests, go to our website: **www.vmrd.com/services**

Raw Material & Serum Testing

- 9CFR Virus Testing
- Sterility Testing
- EMA & EP Virus Testing
- *Mycoplasma* Testing
- Bovine Polyomavirus (BPyV)
- Senecavirus A (SVA)

Virus Bank Characterization

- 9CFR Virus Testing
- Sterility Testing
- *Mycoplasma* Testing
- Bovine Polyomavirus (BPyV)
- Senecavirus A (SVA)

Cell Line Characterization

- 9CFR Virus Testing
- Sterility Testing
- *Mycoplasma* Testing
- Bovine Polyomavirus (BPyV)
- Senecavirus A (SVA)

Testing Resources

- Custom Testing
- Testing with VMRD
- Biologics Testing Submission
- Customer Portal

Interested in learning more?

Our technical library has years of data, articles, and FAQ to help you understand your project's needs. Search our online Technical Library for more information: **www.vmrd.com/technical-library**

ORDER INFORMATION

Orders may be placed by e-mail or telephone.

E: order@vmrd.com

T: 509.334.5815
(Toll free)
800.222.8673

Business Hours

Monday - Friday, 7 am - 3 pm (Pacific Time Zone)

Backorders

Out-of-stock items are placed on backorder and shipped as soon as available unless otherwise requested.

Custom Orders

Custom orders are prepared on a contract basis only. Please contact us for information.

Returns

Call for authorization prior to returning any item. Custom orders may not be returned.

Technical Assistance

Our technical support team is available to assist as needed. You can reach them at support@vmrd.com. Consulting and research services are also available on a contract basis.

Product Information

For information throughout the year on VMRD products visit our website, www.vmrd.com; send an e-mail to order@vmrd.com; or call 800.222.8673.

Ordering Procedures

When placing an order, please supply the appropriate customer identification number, catalog number(s), quantity of the items needed, and a brief description of each product.

Invoicing Procedures

Billing invoices are emailed immediately after order fulfillment unless an alternative submission method is preferred. Default payment terms are Net 30 days, payable in U.S. Dollars. Please inquire to arrange payment by wire transfer. Payment may also be made by Visa, MasterCard, or American Express credit cards. Please specify payment by credit card when the order is placed. Do not use email to send credit card information. Invoice questions may be directed to our Customer Service Department at +1-509-334-5815 or 1-800-222-8673. Bank Wire Transfer Notification and payment Instructions are available upon request.

Shipping Procedures

Most items ship within one business day from the date the order is received, except where special certificates are required. Shipping fees are prepaid and added to the invoice, unless the recipient provides courier account information.

International Orders

International orders should include a copy of any necessary import permits or other documentation required for customs clearance. Payment of duties and taxes are the responsibility of the recipient.

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