RUMINANT DIAGNOSTIC SUBMISSION GUIDE

Pathogen/Disease suspected	Specimen	Sample Preparation	Diagnostic Method
BACTERIAL PATHOGEN / DISEASE			
Actinobacillus lignieresii (Actinobacillosis)	swabs from altered organs, abscessed tissue and exudate	refrigerated	culture, sensitivity testing
Actinomyces bovis (Actinomycosis)	swabs from altered organs/bones, abscessed tissue and exudate	refrigerated **Culture: swabs with specific anaerobic medium!**	specific culture, sensitivity testing on request
Bibersteinia trehalosi	nasal/tracheal swabs, BALF, lungs	refrigerated	culture, sensitivity testing
Campylobacter spp., thermophile (C. coli, C. jejuni, C. lari)	fecal samples/swabs, intestine	refrigerated **DO NOT FREEZE!**	specific culture, sensitivity testing
		refrigerated **DO NOT FREEZE!**	PCR
Chlamydiaceae	aborted fetuses, placental membranes, uterus, cervical swabs, joints, joint fluid, lungs, conjunctival swabs, FTA-cards* (PCR only)	refrigerated/frozen	PCR (screening for pathogenic Chlamydia spp.)
	serum	refrigerated	serology (KBR)
Chlamydia abortus	aborted fetuses, placental membranes, uterus, cervical swabs, FTA-cards* (PCR-only)	refrigerated/frozen	PCR
Clostridium difficile	fecal samples, intestine (large intestine)	refrigerated	specific culture, sensitivity testing, typing via PCR (toxin genes A and B)
Clostridium perfringens Toxovar A-E	fecal samples/swabs, abomasum, intestine (small intestine), liver	refrigerated	specific culture, sensitivity testing, typing via PCR (toxovar, major-/minor-toxin genes)
Colibacillosis	fecal samples/swabs, intestine (small intestine)	refrigerated	culture, sensitivity testing, typing via PCR (virulence and adherence factors)
Colisepsis	lungs, liver, spleen, kidneys, intestine, brain	refrigerated	culture, sensitivity testing, typing via PCR (virulence and adherence factors)
Corynebacterium pseudotuberculosis (CLA) 	swabs from altered organs (preferably affected lymph nodes), abscessed tissue and exudate, FTA-cards* (PCR only)	refrigerated	culture, sensitivity testing
		refrigerated/frozen	PCR
Coxiella burnetii (Q-fever)	aborted fetuses, placental membranes, uterus, cervical swabs, milk samples, FTA-cards* (PCR-only)	refrigerated/frozen	PCR
	serum, milk samples	refrigerated	serology
Dichelobacter nodosus (Footrot)	swabs from affected claws, claws in total, liver, FTA-cards* (PCR only)	refrigerated **Culture: swabs with specific anaerobic medium!**	specific culture, sensitivity testing on request
		refrigerated/frozen	PCR (screening PCR, differentiation of virulent and benign strains)
Erysipelas (Erysipelothrix rhusiopathiae)	joints, joint fluids + cartilage, skin, heart, liver, spleen, lymph nodes, blood, FTA-cards* (PCR only)	refrigerated	culture, sensitivity testing
		refrigerated/frozen	PCR
	serum	refrigerated	serology

If no animal pikto is added the pathogen is relevant for all ruminants.
*no special storing or shipment requirements

R.5.01, 2019.01.15. | Rev001

RUMINANT DIAGNOSTIC SUBMISSION GUIDE

Pathogen/Disease suspected	Specimen	Sample Preparation	Diagnostic Method
Histophilus somni	lungs, heart, brain, joints, joint fluids + cartilage, FTA-cards* (PCR only)	refrigerated	culture, sensitivity testing
		refrigerated/frozen	PCR
Leptospirosis (Pathogenic Leptospira spp.)	aborted fetuses, placental membranes, uterus, cervical swabs, urine, kidneys, FTA-cards* (PCR-only)	refrigerated/frozen	PCR (screening for 38 Leptospira spp. incl. L. Hardjo, L. Tarassovi, L. Autumnalis, L. Bratislava, L. Canicola, L. Copenhageni, L. Grippotyphosa, L. Icterohaemorrhagiae, L. Muenchen, L. Pomona, L. Sejroe)
		refrigerated/fixed in formalin **DO NOT FREEZE!**	immunohistochemistry
	serum	refrigerated	serology (microagglutination test (MAT), differentiation of L. Australis, Bratislava, Autumnalis, Canicola, Grippotyphosa, Icterohaemorrhagiae, Pomona, Hardjo, Tarassovi)
Listeria monocytogenes	brain, liver, aborted fetuses, eye swabs	refrigerated **DO NOT FREEZE!**	specific culture, sensitivity testing
		refrigerated **DO NOT FREEZE!**	PCR
Mannheimia haemolytica	nasal/tracheal swabs, lungs, BALF, mediastinal/bronchial lymph nodes	refrigerated	culture, sensitivity testing, typing via PCR (serotypes 1, 2/5, 6/8)
Moraxella spp. (Pinkeye)	corneal swabs	refrigerated	culture, sensitivity testing
Mycobacterium avium subsp. paratuberculosis (MAP/Johne´s disease)	fecal samples, ileum, milk samples	refrigerated/frozen	PCR
	serum, milk samples	refrigerated	serology
Mycoplasma spp.	altered tissue/organs, milk samples, FTA-cards* (PCR only)	refrigerated **DO NOT FREEZE! Culture: swabs with specific Mycoplasma medium!**	specific culture (sensitivity testing on request)
		refrigerated/frozen	PCR
Mycoplasma bovirhinis	nasal/tracheal swabs, BALF, lungs	refrigerated **DO NOT FREEZE! Culture: swabs with specific Mycoplasma medium!**	specific culture (sensitivity testing on request)
Mycoplasma bovis	nasal/tracheal swabs, lungs, BALF, joints, joint fluids, swabs or exudate from middle ear, milk samples FTA-cards* (PCR only)	refrigerated **DO NOT FREEZE! Culture: swabs with specific Mycoplasma medium!**	specific culture (sensitivity testing on request)
		refrigerated/frozen	PCR
	serum	refrigerated	serology

If no animal pikto is added the pathogen is relevant for all ruminants.
*no special storing or shipment requirements

R.5.01, 2019.01.15. | Rev001

RUMINANT DIAGNOSTIC SUBMISSION GUIDE

Pathogen/Disease suspected	Specimen	Sample Preparation	Diagnostic Method
Mycoplasma ovipneumoniae	lungs, BALF, nasal/tracheal swabs, FTA-cards* (PCR only)	refrigerated **DO NOT FREEZE! Culture: swabs with specific Mycoplasma medium!**	specific culture (sensitivity testing on request)
		refrigerated/frozen	PCR
Pasteurella multocida	lungs, BALF, nasal/tracheal swabs, bronchial/mediastinal lymph nodes, FTA-cards* (PCR only)	refrigerated	culture, sensitivity testing
		refrigerated/frozen	PCR (screening, typing based on capsule genes (A, B, D, E, F)
Salmonellosis (Salmonella spp.)	fecal samples/swabs, intestine (small and large intestine), mesenteric lymph nodes, spleen, liver, lungs, swipe samples, dust	refrigerated	specific culture, sensitivity testing, serotyping via agglutination
		refrigerated	PCR (screening, differentiation SE/ST)
	serum	refrigerated	serology

Pathogen/Disease suspected	Specimen	Sample Preparation	Diagnostic Method
PARASITOLOGICAL PATHOGEN / DISEASE			
Coccidiosis (Eimeria spp.)	fecal samples, intestine (small intestine)	refrigerated	flotation, microscopic investigations
Cryptosporidiosis (C. parvum)	fecal samples/swabs, intestine, FTA-cards* (PCR only)	refrigerated/frozen	PCR
Liver Fluke (Fasciola hepatica)	fecal samples	refrigerated	sedimentation
	serum	refrigerated	serology
Lung worms	fecal samples	refrigerated	larvae differentiation by Baermann technique
Neospora caninum	brain, muscle tissue, aborted fetuses	refrigerated/frozen	PCR
	serum	refrigerated	serology
Parasitological investigation	fecal samples, intestine	refrigerated	flotation/sedimentation, microscopic investigation
Toxoplasma gondii	brain, muscle tissue, aborted fetuses	refrigerated/frozen	PCR
	serum	refrigerated	serology
OTHERS			
Trace element deficiencies (i.e. selenium, copper, cobalt)	liver, serum	refrigerated	atomic absorption spectrometry (AAS)
Polioencephalomalacia / Cerebrocorticalnecosis (PEM/CNN)	brain (cerebral cortex, brainstem)	refrigerated/fixed in formalin **DO NOT FREEZE!**	histopathology
Pregnancy testing (> day 28)	serum, milk samples	refrigerated	PAG (pregnancy associated glycoprotein) test

If no animal pikto is added the pathogen is relevant for all ruminants.
*no special storing or shipment requirements

R.5.01, 2019.01.15. | Rev001

RUMINANT DIAGNOSTIC SUBMISSION GUIDE

Pathogen/Disease suspected	Specimen	Sample Preparation	Diagnostic Method
VIRAL PATHOGEN / DISEASE			
Bovine Virus Diarrhea Virus (BVDV)	lungs, intestine, mesenteric lymph nodes, spleen, whole blood samples, FTA-cards* (PCR-only)	refrigerated/frozen	PCR
	serum	refrigerated	serology
Bovine Coronavirus (Respiratory and Enteric variants)	fecal samples/swabs, intestine, nasal/tracheal swabs, BALF, lungs, FTA-cards* (PCR-only)	refrigerated/frozen	PCR
Bovine Herpesvirus 1 (BHV-1/IBRV)	lungs, trachea, BALF, nasal/tracheal swabs, FTA-cards* (PCR-only)	refrigerated/frozen	PCR
	serum	refrigerated	serology
Bovine Respiratory Syncytial Virus (BRSV)	lungs, BALF, nasal/tracheal swabs, FTA-cards* (PCR and squencing only)	refrigerated/frozen	PCR sequencing
Influenza D	lungs, BALF, nasal/tracheal swabs, FTA-cards* (PCR only)	refrigerated/ frozen	PCR
		refrigerated **Culture: swabs with specific viral medium!**	virus isolation
Ovine Pulmonary Adenomatosis (OPA)	lungs, BALF	refrigerated/frozen	PCR
Parainfluenza-3 (PI-3)	lungs, BALF, nasal/tracheal swabs, FTA-cards* (PCR-only)	refrigerated/frozen	PCR
Rotavirus infection (Rotavirus A and C)	fecal samples/swabs, intestine, FTA-cards* (PCR and squencing only)	refrigerated/frozen	PCR (A and C) sequencing of Rotavirus A based on VP4 and VP7
		refrigerated	virus isolation (Rotavirus A only)
		fixed in formalin **DO NOT FREEZE!**	immunohistochemistry (Rotavirus A only)
Schmallenberg Virus (SBV)	aborted fetuses, brain, liver, spleen, blood samples	refrigerated/frozen	PCR
	serum	refrigerated	serology
Small Ruminant Lentiviruses (CAE, Maedi/Visna)	lungs, BALF	refrigerated/frozen	PCR
	serum	refrigerated	serology

PCR/Sequencing: All organs listed may be sampled as tissue samples or alternatively as dry swabs that carry sufficient load of suitable tissue material. Moreover, FTA-cards are suitable for PCR investigations and sequencing. A special submission guide for FTA-cards can be found here (https://www.anicon.eu/templates/images/documents/AniCon_SubmissionGuidelineFTACardsCATTLE_Rev10012017.pdf). Sequencing includes phylogenetic analysis visualized in a phylogenetic tree and a comparison to vaccine strains, if data of commercial live attenuated vaccines are available.
Bacterial Culture: We recommend swabs with transport media to prevent desiccation and/or bacterial overgrouth. Specific media might be required (e.g. for Mycoplasma spp., Actinomyces spp. or Dichelobacter nodosus).
Viral Culture: We recommend organ/tissue samples. Swabs for viral culture should carry sufficient load of tissue material and should be placed into viral transport media.
Milk Samples: Milk samples should be gained aseptically for bacteriology and PCR investigations. Milk samples can be sent in refrigerated or frozen for bacterial culture, PCR or serology.
Serology: If not stated differently ELISA will be applied by default. Serum samples can be sent frozen for ELISA, KBR or MAT, if centrifuged before (pure serum).
Histopathology/Immunohistopathology: Do not freeze the samples! This will destroy the tissue and lead to artefacts. Best results will be achieved, if samples are placed in formalin prompt after sampling.
Autogenous Vaccines: For the production of bacterial autogenous vaccines we prefer invasive isolates (e.g. isolated from brain, lungs, joints, pericardium). For production of viral autogenous vaccines, please sample affected organs related to clinical signs (e.g. small intestine for Rotavirus A, lungs for Influenza D).
Please note that the sample material may vary depending on state of the infection or type of manifestation of the disease.
For selection of suitable sample material clinical symptoms, course of disease and gross pathological lesions should be taken into consideration.
Information on how to correctly wrap samples for sending them in and which accompanying documents are needed can be provided by AniCon Labor GmbH, if desired.
For further information please don´t hesitate to contact us!
E-mail: info@anicon.eu · Phone: +49 4473 943830

If no animal pikto is added the pathogen is relevant for all ruminants.
*no special storing or shipment requirements

R.5.01, 2019.01.15. | Rev001