

CHAPTER 2.9.11.

ZOONoses TRANSMISSIBLE FROM NON-HUMAN PRIMATES

SUMMARY

The Terrestrial Animal Health Code (chapter 6.11) requires tests for certain diseases in non-human primates imported for research, educational or breeding purposes. This chapter indicates where to find further information on such tests. It is important to recognise that primate species represent a significant risk of pathogen transmission to humans in contact, including the collection of samples for laboratory testing, and the handling of those samples in the laboratory. Veterinary laboratories should seek advice from medical authorities on the appropriate health protocols that should be followed by staff handling such materials. All laboratory manipulations with live cultures or potentially infected or contaminated material must be performed at an appropriate biosafety and containment level determined by biorisk analysis (Chapter 1.1.4 Biosafety and biosecurity: Standard for managing biological risk in the veterinary laboratory and animal facilities).

In addition to the specific tests required by the OIE Terrestrial Code as detailed below, additional information on the health monitoring of non-human primate colonies, including a list of potential zoonotic diseases and the types of tests used for diagnosis, is provided by FELASA (1998).

1. Tuberculosis

The test procedures and preparation of reagents are described in chapter 2.4.6 *Bovine tuberculosis*. The delayed hypersensitivity skin test in non-human primates is usually carried out by intradermal injection of 0.1 ml “mammalian old tuberculin”¹ into the edge of the upper eyelid using a sterile 25–27 gauge needle. Purified protein derivatives (PPD) as described in Chapter 2.4.6 *Bovine tuberculosis* may also be used, but are generally considered less sensitive for non-human primates. The animal must be suitably restrained or drug-immobilised. For smaller species such as marmosets, tamarins or small prosimians the test should be carried out in the abdominal skin. A repeat test by this route may be used in other cases where the palpebral reaction is difficult to interpret. False positive and false negative reactions can occur with the tuberculin skin test and clarification can be obtained by use of additional tests including radiography for tuberculous lesions; detection of the organism in samples of gastric or bronchial lavage, faeces or tissue biopsies by culture or polymerase chain reaction (PCR) assay; the detection of cellular immunity by the gamma-interferon assay; or antibody detection by enzyme-linked immunosorbent assay (ELISA).

2. Enteric bacteria (*Salmonella*, *Shigella*, *Yersinia*)

These organisms can be detected by standard bacteriological culture methods on samples of fresh faeces or rectal swabs. Culture techniques for *Salmonella* are described in chapter 2.9.8 *Salmonellosis*. Methods for *Shigella* are described by WHO (2003).

Enteric species of *Yersinia* include *Y. enterocolitica* and *Y. pseudotuberculosis*. Culture and enrichment are more effective if carried out at lower temperatures (4°C rather than 25°C). Details of culture methods including suitable enrichment media are described by Laukanen *et al.* (2010) and Arrausi-Subiza *et al.* (2014). The latter also describe real-time polymerase chain reaction (PCR) methods for the identification of culture isolates. A general overview of *Y. enterocolitica* and *Y. pseudotuberculosis* is given by Fredriksson-Ahomaa *et al.* (2007), including biochemical methods for the identification of culture isolates.

¹ Mammalian old tuberculin is available from the Colorado Serum Company, 4950 York St, P.O. Box 16428, Denver, Colorado 80216-0428, United States of America.

3. Hepatitis B

Hepatitis B virus (HBV) is classified in the family *Hepadnaviridae*. It occurs as seven distinct genotypes, designated A to G, and has a double-stranded DNA genome of approximately 3200 base pairs organized into four partially overlapping open reading frames, which encode the envelope, core, polymerase and X proteins. The surface glycoproteins of the envelope are collectively designated as hepatitis B surface antigen. Infection is widespread in the human population, despite the availability of effective vaccines, and a significant proportion of infected people progress to serious or fatal liver diseases.

Non-human primates should be tested for evidence of infection by serological methods for antibodies to hepatitis-B core antigen and surface antigen. The test methods are described by Kraiden *et al.* (2005).

4. Endo- and ectoparasites

Non-human primates should be screened during quarantine for the presence of parasites by standard parasitological techniques, according to the parasite under investigation. Methods for these tests may be found in standard parasitological textbooks (Cogswell, 2007; Smith *et al.*, 2007) or, for specific parasites, the relevant chapter in this *Terrestrial Manual*, such as 2.9.4 *Cryptosporidiosis* and 2.9.9 *Toxoplasmosis*.

5. Other zoonotic pathogens

As well as those infections and infestations referred to above, there is a long list of zoonotic agents that may be carried by different species of non-human primate. Further details including the likely host species, and a suitable regimen for health monitoring in primate colonies, are given in FELASA (1998, currently under review). The following table is derived from that publication.

Table 1. Microorganisms and parasites of current concern in non-human primates (from FELASA [1998])

(1) Viruses	
B virus, <i>Herpesvirus simiae</i> , Cercopithecine herpesvirus 1	Marburg virus
<i>Herpesvirus cercopithecus</i> , (SA 8), <i>Cercopithecine herpesvirus 2</i>	Ebola-Reston virus
<i>Herpesvirus papio 2</i> (HVP/2), <i>Cercopithecine herpesvirus 12</i>	Simian immunodeficiency virus (SIV)
<i>Herpes T</i> , <i>Herpesvirus platyrrhinae</i> , <i>Saimiriine herpesvirus 1</i>	Simian T-cell lymphotropic virus-1 (STLV-1)
<i>Herpesvirus saimiri</i> , <i>Saimiriine herpesvirus 2</i>	Simian retrovirus, type D (SRV/D)
Hepatitis A virus	Foamy virus
Hepatitis B virus	Monkeypox virus
SV 40	Lyssa virus (rabies)
Simian haemorrhagic, fever virus	Yellow fever virus
(2) Bacteria	
<i>Campylobacter jejuni</i>	<i>Salmonella typhimurium</i>
<i>Campylobacter fetus</i>	<i>Salmonella enteritidis</i>
<i>Leptospira interrogans</i> (various serovars)	<i>Shigella flexneri</i>
<i>Mycobacterium africanum</i>	<i>Yersinia pseudotuberculosis</i>
<i>Mycobacterium bovis</i>	<i>Pseudomonas pseudomallei</i> (<i>Burkholderia pseudomallei</i>)
<i>Mycobacterium tuberculosis</i>	
(3) Parasites	
<i>Entamoeba histolytica</i>	<i>Plasmodia malariae</i> , <i>vivax</i>
<i>Toxoplasma gondii</i>	<i>Strongyloides stercoralis</i>

Table 1 (cont.). Microorganisms and parasites of current concern in non-human primates (from FELASA [1998])

(3) Parasites (cont.)	
<i>Giardia</i> spp.	<i>Trichuris</i>
<i>Plasmodia</i> species	<i>Prosthenorchis elegans</i>
<i>Plasmodia cynomolgi</i>	<i>Pneumonyssus simicola</i>
<i>Plasmodia brasiliensis</i>	Ectoparasites: • Mites • Lice
(4) Dermatophytosis	
<i>Trichophyton</i>	

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