Fact sheet: Tuberculosis

Causative agent:
M*ycobacterium tuberculosis, Mycobacterium bovis, Mycobacterium africanum*

Susceptible animal groups:
Pongidea, Cercopithecidae, rarely *Cebidae* (mostly squirrel monkeys) and *prosimiae*

Zoonotic potential: Yes

Distribution: world-wide

Transmission: primarily aerogenously, rarely perorally, cutaneously

Incubation period:
< 3 weeks for tuberculin conversion

Clinical symptoms:
Especially in rhesus monkeys and baboons rapidly progressive disease, which seldom becomes arrested as in humans, slowly progressive in cynomolgus monkeys, more chronic course in great apes and New World monkeys. Often there are no clinical signs; severely affected monkeys may show cuffing, wasting, enlarged lymph nodes, hepato- or splenomegaly, apathy and depression. The main symptom of enteric infection is diarrhea, skin infections are characterized by cutaneous ulceration.

Pathology:
The classic lesions are tuberculoid granulomas of varying size containing a caseous center consisting of acellular necrotic debris. In contrast to other animal species, a fibrous capsule is usually not found in non human primates. The same applies for calcification, which is usually rare or lacking. The lesions may affect all major organs, but the lung is the organ system most commonly affected.

Diagnosis:
1. Clinical observation
2. X-rays
3. Tuberculinization: 0,05 – 0,1 ml (1500 – 3000 units) mammalian Old Tuberculin intracutaneous, application side upper eyelid, alternatively abdominal skin, reading after 7, 24, 28, 72 hs. Cave: false positive and false negative reactions, false positive reactions are particularly common in orang-utans.
4. Cultivation of mycobacteria from clinical materials, Löwenstein-Jensen Agar or other suitable cultivation media.
5. PCR
6. ELISA
7. Primagam Interferon-Gamma test: tested for gorillas, chimpanzees, orang-utans, gibbons, colobids, baboons, mandrills, vervets, guenons, squirrel monkeys, langurs, marmosets, problems with sera from Macaca spp.. (at the moment not available)

Grading system for intradermal tuberculin test

grade	diameter	weight of induration	erytheme	valuation
0	-	-	none	negative
1	< 5 mm	< 2 mm	none	negative
2	5 - 8 mm	2 - 3 mm	minimal	negative
3	8 - 11 mm	3 - 5 mm	moderate	questionable
4	11 - 15 mm	5 - 7 mm	severe	positive
5	> 15 mm	> 7 mm	severe	positive

Material required for laboratory analysis:

Clinical materials: tracheobronchial lavage fluid, exsudate, sputum, discharges, biopsies from altered tissue.
Necropsy material: granulomas, lymph nodes.
blood for Primagam-Test: 4 ml Li-Heparin

Diagnostic material, UN-Nr. 3373 packed in compliance with IATA packing instruction P650
(see guidelines).
The receiving laboratory should be contacted before sample collection to ascertain preferred collection method, transport media and transport conditions.

National reference laboratories:

Germany: ***Nationales Referenzzentrum für Mykobakterien***
am Forschungszentrum Borstel
D-23845 Borstel
Tel.: 0049 4537 188 2110
e-mail: srueschg@fz-borstel.de

Treatment:
Euthanasia is recommended, treatment can be considered only in valuable animals.

Prevention:
Strict quarantine and testing programs with removal of all positive reacting animals, strict separation of negative and positive reactors.

Guideline: Packing Diagnostic Specimens For Transport: Summary Instructions
(Diagnostic Specimens, Category B, assigned to UN identification number 3373)

Triple packaging system

Primary Packing

- Primary receptacle(s) must be water tight, e. g., screw cap seal with parafilm or adhesive tape or similar.
- Multiple primary receptacles must be wrapped individually to prevent breakage.
- When determining the volume of diagnostic specimens being shipped, include the viral transport media.
- Primary receptacle(s) must not contain more than 500 ml or 500 g.
  ***The entire content of the primary receptacle is the diagnostic specimen*.**

Secondary Packing

- Use enough absorbent material in the secondary container to absorb the entire contents of all primary receptacles in case of leakage or damage.
- Secondary packaging must meet the IATA packaging requirements for diagnostic specimens including 1.2 meter (3.9 feet) drop test procedure. Since infectious substance packaging surpasses the requirements for diagnostic specimen packaging stated in the IATA Packing Instruction 602, it can be used.
- Infectious substance packaging must have the required specification markings on packaging.

Secondary packaging must be watertight. Follow the packaging manufacturer or other authorized party's packing instructions included with the secondary packaging. Secondary packaging must be at least 100 mm (4 inches) in the smallest overall external dimension, must be large enough for shipping documents, e. g., air waybill.

Outer Packing

- The outer packaging must not contain more than 4 L or 4 kg.
- Both dry ice and wet ice must be placed outside the secondary packaging.
- Dry ice: packaging must permit the release of carbon dioxide gas and not allow a
  build-up of pressure that could rupture the packaging.
- Wet ice: the packaging must be leak-proof.
- Each package and the air waybill must be marked with the following exact wording:

  UN 3373 DIAGNOSTIC SPECIMEN
  PACKED IN COMPLIANCE WITH
  IATA PACKING INSTRUCTION 650

- An itemized list of contents must be enclosed between the secondary packaging and the outer packaging.
- Place in a sealed plastic bag to protect from moisture.
- A sShippers declaration for dangerous goods is **NOT** required.

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For more information, visit www.cdc.gov/ncidod/sars or call the CDC public response hotline
at (888) 246-2675 (English), (888) 246-2857 (Español), or (866) 874-2646 (TTY)