TUBERCULOSIS (primates)

<table>
<thead>
<tr>
<th>ANIMAL GROUP AFFECTED</th>
<th>TRANSMISSION</th>
<th>CLINICAL SIGNS</th>
<th>FATAL DISEASE?</th>
<th>TREATMENT &amp; CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pongidae, Cercopithecidae, rarely Cebidae or Prosimiae</td>
<td>Mainly aerogenously, less commonly perorally.</td>
<td>In final stages coughing, lymphadenopathy, wasting, apathy, in enteric infections diarrhoea</td>
<td>In rhesus monkeys yes</td>
<td>Ethambutol, Rifampicin, INH</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>In houses in zoos</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Strict quarantine and testing programs</td>
</tr>
</tbody>
</table>

Fact sheet compiled by Manfred Brack, formerly German Primate Center, Göttingen / Germany.

Last update November 2003

Fact sheet reviewed by
W. Rietschel, Wilhelma Zoologischer-Botanischer Garten, Stuttgart, Germany
C. Furley, Howletts Zoo, Bekesbourne, United Kingdom

Susceptible animal groups
Pongidae and Cercopithecidae, rarely Cebidae (Mostly squirrel monkeys) only exceptionally Prosimiae.

Causative organism
Mycobacterium tuberculosis, M.bovis.

Zoonotic potential
Yes (So far, only tuberculin-conversions occurred after contact to tuberculous monkeys).

Distribution
World-wide.

Transmission
Primarily aerogenously, rarely perorally, occasionally nosocomial: cutaneously.

Incubation period
< 3 weeks for tuberculin conversion.

Clinical symptoms
Depending on the primate species involved: rapidly progressive in rhesus monkeys and baboons, slowly progressive in cynomolgus monkeys, more chronic course in great apes and the occasional New World monkeys. In many cases no symptoms other than tuberculin-conversion are observed, more severely affected monkeys show dry, soft, chronic coughing, lymphadenopathy, wasting, hepato- or splenomegaly, apathy or depression. The main symptom of enteric infection is diarrhea, skin infections result in cutaneous ulcerations.

Post mortem findings
Yellowish-white, caseous, sometimes confluent granulomas in affected organs, in the lungs also tuberculous, giant cellular pneumonia. In tuberculous granulomas of nonhuman primates comparatively scarcity of Langhans's giant cells and almost complete lack of calcification.

Diagnosis
1. Clinical observations,
2. X-rays (less radiologic contrasts than in other animals due to the lack of calcifications!),
3. Tuberculinization : 0.04 – 0.1 ml (= 1500 – 3000 units) mammalian Old Tuberculin intracutaneous (usually upper eye lid, alternatively abdominal skin), reading after 24, 48, and 72 hs. During quarantine and after appearance of positive reactors repeating of the entire procedure at least once after 6 weeks. A practical problem in the evaluation is the occurrence of false positive or false negative reactions, false positives particularly common in orang-utans.
4. Cultivation of mycobacteria from clinical or pathological materials using Löwenstein- Jensen- agar or other suitable cultivation media,
5. PCR (false positive and false negative reactions reported!)
6. ELISA (limited usefulness in man due to false positives). The 38 kDa proteins (most seroreactive protein antigen in man) provokes only weak antibody responses in nonhuman primates. Better results are obtained using antibodies against purified M.tuberculosis proteins.
7. Primagam interferon- Gamma-test (false positives or false negative tuberculin reactors not detected). The primagram test, which detects interferon gamma, works well with sera from gorillas, chimpanzees, orang-
utans, gibbons, colobids, baboons, mandrills, vervets, guenons, squirrel monkeys, langurs, and marmosets, but fails with sera from *Macaca* spp.

**Material required for laboratory analysis**
Clinical materials: lavage fluid, exudates, discharges, Necropsy materials: granulomas, lymph nodes.

**EU Reference Laboratory**
VISAVET
Laboratorio de vigilancia veterinaria, Facultad de Veterinaria, Universidad Complutense de Madrid
Avda. Puerta de Hierro, s/n. Ciudad Universitaria
28040. Madrid
Spain

**OIE Reference Laboratories**

- **Dr Bernardo Alonso**
  Gerencia de Laboratorios (GELAB) del Servicio Nacional de Sanidad y Calidad, Agroalimentaria (SENASA)
  Av. Alexander Fleming 1653, 1640 Martinez - Pcia de Buenos Aires
  ARGENTINA
  Tel: (54.11) 48.36.00.36 Fax: (54.11) 48.36.00.36
  Email: balonso@senasa.gov.ar
  Email: dlilab@inea.com.ar

- **Mme María Laura Boschiroli-Cara**
  AFSSA Alfort, Unité Zoonoses Bactériennes, Laboratoire d'études et de recherches en pathologie animale et zoonoses
  23 avenue du Général de Gaulle, 94706 Maisons-Alfort Cedex
  FRANCE
  Tel: (33 (0)1) 49.77.13.00 Fax: (33 (0)1) 49.77.13.44
  Email: ml.boschiroli@afssa.fr

- **Dr Debby V. Cousins**
  Australian Reference Laboratory for Bovine Tuberculosis, Agriculture Western Australia
  Locked Bag N° 4, Bentley Delivery Centre, Bentley WA 6983
  AUSTRALIA
  Tel: (61.8) 93.68.34.51 Fax: (61.8) 94.74.18.81
  Email: dcousins@agric.wa.gov.au

- **Prof. Glyn Hewinson**
  VLA Weybridge
  New Haw, Addlestone, Surrey KT15 3NB
  UNITED KINGDOM
  Tel: (44.1932) 34.11.11 Fax: (44.1932) 34.70.46
  Email: r.g.hewinson@vla.defra.gsi.gov.uk

**Relevant diagnostic laboratories**
1. Local medical laboratories.
2. Nationales veterinärmedizinisches Referenzlabor für Tuberkulse, Naumburer Str. 96 a, 07743 Jena, Germany
3. Nationales Referenzszentrum für Mykobakterien am Forschungszentrum Borstel, D 23 845 BORSTEL, Germany
  Tel.: 04537 188 213
  " " 211
  Fax: " " 311
  e-mail: srueschg@fz-borstel.de

**Treatment**
In most cases euthanasia of tuberculous animals is recommended, treatment can be considered only in very valuable animals: INH (22.5 mg/kg), Ethambutol (20 mg/kg), Rifampicin (22.5 mg/kg).
### Prevention and control in zoos
Strict quarantine and testing programs with removal of all positively reacting animals. Reactors should be euthanized if at all possible, in exceptional cases: treated of very valuable animals: strict separation is mandatory.

### Suggested disinfectant for housing facilities

### Notification

### Guarantees required under EU Legislation

### Guarantees required by EAZA Zoos

### Measures required under the Animal Disease Surveillance Plan

### Measures required for introducing animals from non-approved sources

### Measures to be taken in case of disease outbreak or positive laboratory findings

### Conditions for restoring disease-free status after an outbreak

### Experts who may be consulted
Frau Dr. S. Rüschi-Gerdes
NRZ Borstel

### References


