

TUBERCULOSIS (primates)

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

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Susceptible animal groups Pongidae and Cercopithecidae, rarely Cebidae (Mostly squirrel monkeys) only exceptionally Prosimiae.	
Causative organism <i>Mycobacterium tuberculosis</i> , <i>M.bovis</i> .	
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 < 3weeks 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 <ol style="list-style-type: none"> 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 <i>M.tuberculosis</i> 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.

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Relevant diagnostic laboratories

1. Local medical laboratories.
2. Nationales veterinärmedizinisches Referenzlabor für Tuberkulose,
Naumburger Str. 96 a, 07743 Jena, Germany
3. Nationales Referenzzentrum für Mykobakterien am Forschungs-zentrum Borstel,
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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. Rüscher-Gerdes NRZ Borstel
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