

Table 6: bacterial infections

Disease	Pathogenic agent	Infectious for / observed in: lorisiae	other prosimians	simians, humans; primates in general; other species	Symptoms	Detection / identification	Treatment	Source of infection / Prevention
	<i>Bordetella</i> sp., <i>B. bronchiseptica</i>		In <i>Galago senegalensis</i> ¹⁴	In <i>Callicebus</i> , African green monkeys ² . Seldom in humans ⁵	In <i>Galago</i> : pneumonia, meningitis; epileptiform seizures. Two animals found dead without previous signs of illness ¹⁴	Identification of the bacterium by culture	Test of efficient antibiotics by an antibiogram	In rodents, dogs and other mammals, in the respiratory tract ⁵
	<i>Campylobacter jejuni</i> . ⁶¹	In <i>Nycticebus coucang</i> : isolated in a geriatric animal prior to death from renal failure ⁶¹		<i>Campylobacter</i> : 5 species, usually in animals; three of them, including <i>C. jejuni</i> , can be pathogenous for humans ⁵	In humans: enteritis, colitis, proctitis. In nonhuman primates enteritis (in combination with immunodepressing agents like SIV).	Identification of the bacterium by culture	Test of efficient antibiotics by an antibiogram	Infection by contact, over water or food ⁵
	<i>Klebsiella</i> sp.; <i>K. pneumoniae</i>		In lemurs ¹	In many monkey species ² . In humans ⁵	In lemurs: an epidemic disease in a colony of captive lemurs by <i>K. pneumoniae</i> ¹ . In humans: a variety of different diseases, mainly of respiratory tract and urinary passage by <i>K. pneumoniae</i> ⁵ . In nonhuman primate-babies septicemia with death.	Detection of infectious agents ²	Resistant to <i>Penicillin</i> ⁵	Common; in soil, water, grain; in the intestine of humans and animals ⁵ .
Listeriosis	<i>Listeria monocytogenes</i>	In <i>Loris</i> (n=1), <i>Nycticebus</i> (n=1), <i>Perodicticus</i> (n=1) (Schweigert, pers. comm)		In domestic mammals fed with infected silage, hens, rats, mice, rabbits and many other mammal and bird species; in humans (Schweigert, pers. comm.; ⁵)	In humans: without symptoms or with symptoms of an influenza with mild meningoencephalitis (inflammation of meninges and brain), inflammation of the liver, bladder and kidney or of the uterus muscles. Infection of the foetus during pregnancy may lead to abortion, stillbirth or severe illness of the infant ⁵	In faeces, urine, anal mucus	Test of efficient antibiotics by an antibiogram	Bacteria with worldwide distribution, in soil, waste water, faeces of infected animals, on plants. Infection by exposition to increased quantities of bacteria: by feeding of domestic animals with silage of low acidity in which high concentration of bacteria may develop, direct contact with sick animals, infectious smears, inhalation of dust from stables, dirty food, milk from infected animals. Cases observed in <i>Nycticebus</i> , <i>Perodicticus</i> probably caused by salad grown with polluted water (Schweigert, pers. comm., ⁵)

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Salmonellosis, Shigellosis Bacillary dysentery	<i>Salmonella</i> sp., <i>Shigella</i> sp., often both combined ¹			In <i>Varecia</i> ¹	Subclinical infection very common, may become fatal in periods of stress. Usually harmless in adult humans, but may be fatal for children ³	Severe watery diarrhoea, mucous to bloody, often anal prolaps; vomiting, loss of water, inanition, depression. Ulcers and necroses of mucosa ² . Sometimes fever ³	From the feces. Identification in culture	Antibiotics (oral, if possible), therapeutic diet; replacing of lost liquid for instance by Oralpädon ^R (electrolytes, glucose) or Coca-Cola; vitamins B and C; Nutri-Cal ^R may help the animal to regain strength; spasmolytics, if necessary ²	Source of infection: often contaminated food. May be caused by transport stress, unfamiliar food ²
Tuberculosis	Especially <i>Mycobacterium tuberculosis</i> , <i>M. bovis</i> , <i>M. avium</i> ³	In <i>Loris</i> , <i>Nycticebus</i> , <i>Arctocebus</i> ; especially in <i>Perodicticus</i> ¹⁰ .		In several <i>Galago</i> species ¹⁰ , in <i>L. catta</i> , <i>Varecia</i> , <i>E. mongoz</i> ¹	In most primate species, especially in rhesus monkeys ³	In lorises, galagos almost invariably abdominal tuberculosis; death ¹⁰ . In lemurs: loss of weight, arched back, coughing ² ; partly no symptoms before sudden death; one case with symptoms of pneumonia before death was most probably due to tuberculosis ¹ . Symptoms usually recognizable in an advanced stage of disease; first signs may be behavioural changes (animals slower, running about on the floor instead of climbing, refusal to eat, crouching in a corner, lethargy), or sudden death of an animal which made a healthy appearance. Less common signs: diarrhoea, skin ulceration, suppuration of lymph nodes, enlargement of liver and spleen ³	Bacterial cultures from faeces; direct detection in bronchial mucus, serologically ² . Tuberculin skin test: injection usually into the upper eyelid, then check at intervals (24, 48, 72 hours): swelling of the eyelid is a positive reaction ^{2,3} . <i>Nycticebus pygmaeus</i> (n=1), <i>N. coucang</i> (N=1): positive response to tuberculin testing (intradermal eyelid). Each animal underwent additional testing that included thoracic radiographs, comparative TB testing, samples from tracheal washes, gastric washes and rectal swabs for mycobacterial cultures. Results of all diagnostics were normal, and cultures were negative ⁶¹	Difficult; usually animals are euthanized. Treatment: a combination of <i>Neoteben</i> ^R , (<i>Isonicotinsäurehydracid</i> , 5 mg/kg), <i>Myambutol</i> ^R (<i>Ethambutol</i> ^R , 25 mg/kg) and <i>Rimactan</i> ^R (<i>Rifampicin</i> , 12 mg/kg) for 3 months, then <i>Neoteben</i> ^R and <i>Rimactan</i> ^R for 3 months, finally <i>Neoteben</i> ^R only for 6 months ²	Infection usually not in the wild, but after import ² . Dangerous for humans, but in animals treated against tuberculosis, sputum for instance is no longer infectious after 4 days of treatment ² .
	<i>Pseudomonas aeruginosa</i> ¹			In one <i>E. macaco</i> ¹		Sepsis with symptoms as described for Yersinioses; death ¹	Identification in culture	Test of efficient antibiotics by an antibiogram	

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	<i>Staphylococcus albus</i>	In <i>Loris</i> , captive, 1 case. ¹⁵		In many species ²	In <i>Loris</i> : detected postmortem in all organs, regarded as the cause of death; symptoms before death unknown ¹⁵	Identification in culture	Dependant on antibiotic sensitivity patterns ²	
	<i>Staphylococcus epidermidis</i>	In <i>Loris</i> , captive, 1 case. ⁶¹		In many species	In <i>Loris</i> : stifle abscess ⁶¹	In <i>Loris</i> : <i>S. epidermidis</i> was cultured from the abscess ⁶¹	"Was treated, healed without complications". ⁶¹	
Dysbacteriosis (unusual amounts of intestinal bacteria and fungi)	<i>Escherichia coli</i> ²	In <i>Loris</i> ¹⁵			See table 4, organ problems, lesions, under "dysbacteriosis"			
Yersiniosis; pseudotuberculosis	<i>Yersinia enterocolitica</i> , <i>Y. pseudotuberculosis</i> (former <i>Pasteurella pseudotuberculosis</i>), <i>Y. sp.</i> ^{1, 5, 11}	Two deaths: in a <i>Loris</i> in a zoo ³² , in a captive potto ¹³ .	In <i>Galago senegalensis</i> ¹³ , <i>G. crassicaudatus</i> ¹¹ , <i>Galago sp.</i> ¹² , <i>Varecia</i> , <i>E. macaco</i> ¹	In many species, especially in <i>Cercopithecus</i> ² ; in marmosets, woolly monkeys, a spider monkey and a macaque ¹³ , in <i>Saimiri sciureus</i> ⁶³ .	In a potto: death after one day of lethargy; necroses in the enlarged liver and spleen, perihepatitis, hemorrhage in the mucosa of the stomach ¹³ . In galagos: gastroenteritis (inflammation of the mucosa of stomach and guts usually caused by food poisoning); diarrhoea, listlessness, death within few hours after onset of symptoms ¹¹ ; in one case fever ¹² ; in lemurs: rejecting of food, lethargy, pain in the abdominal region, in some cases diarrhoea, loss of water, fever; deaths ¹ . Sometimes no visible symptoms before death; sometimes seizures. Tuberculosis-like white necrotic foci especially on liver, spleen ² . In some cases pulmonary edema, emphysema ¹³ . Often chronic disease, usually only some animals become sick ² .	From faeces ¹	In galagos: success with <i>Ampicillin</i> , oral ¹¹ . In lemurs: antibiotics: <i>Neomycin</i> (25 mg/kg, oral, 2 days) and <i>Tetracyclin</i> (100 mg/kg, 10 days, in the drinking water), additional vitamins and electrolytes ¹	Not occurring in wild lemurs ¹ . Vaccination against pseudotuberculosis with killed vaccine seemed to be successful in prosimians and simians ¹ , Zwart-killed vaccine, 0,5-3ml, twice (interval 3-4 weeks) repeated every year ²