Table 9: infections by protozoans (single-celled animals)

Disease	Pathogenic agent	Infectious for / observed in: lorisinae	other prosimians	Simians, humans; primates in general; other species	Symptoms	Detection / identification	Treatment	Source of infection / Prevention
Amebiasis	*Entamoeba histolytica* (*Entamoeba coli*: nicht pathogen)	"All primates [3]"	Lemurs[1], "all primates" [2, 3]	"All primates" [3], may be fatal for humans [2]; less infectious for monkeys and apes. Latent infection possible [3]	Without clinical symptoms or dysentery [1], flatulence (inflation of the intestine), exsiccosis (loss of water), thirst [4], severe depression [2], gut ulceration [3], enlarged liver [2], hepatic abscesses [3], death within 4 weeks [2]	in faeces (may be present without being pathogenous) 1 microscopically on warm! material or in histology of gut-content.	*Metronidazol;* 10 mg/kg *Carnidazol** for three days [1]; *Diiodohydroxyquin*, 20 mg / kg twice per day for for three weeks [3], *Clont*	Usually in faeces [1, 3]; water, salad and fruits should be washed [1]
Balantidiasis	*Balantidium coli*	"All primates" [2]	"all primates" [2]	Common in chimpanzees, present in many species [3], dangerous for humans [2]	Ulcerative enteritis (inflammation of the intestine), colitis with abundant mucus, but seldom bloody [2]; severe dysentery in humans, usually has little effect on nonhuman primates [3]	In faeces (may be present without being pathogenous) [2]; microscopically on warm! material or in histology of gut-content should be distinguished from *Entamoeba coli*	*Diiodohydroxyquin*, 20 mg / kg twice per day for for three weeks [3], *Clont*	
Toxoplasmosis	*Toxoplasma gondii*	In slow-loris	In ring-tailed lemur, ruffed lemur. "In prosimians" [1], dangerous for lemurs, especially for *L catta* [1]	In many species of new world monkeys [3]; some old world monkeys ,less infectious for simians than for lemurs [1]	Symptoms mostly unspecific or abortion or pulmonal / neurological symptoms possible. In lemurs: reduced food consumption, sometimes diarrhoea, lethargy, hypothermia, lack of coordination, abnormal movements, ascites, liquid in thorax or pericard, liver degeneration, necroses in liver, kidney, spleen, death after 2-12 days [1]	Serological examination in intervals of 10-14 days (increasing antibody titer) [2] Histologically on post-mortem material	Treatment difficult; usually fatal in spite of use of antibiotics; success in two cases with *Maderan*[R] for children (*Sulfadiazin*, *Pyromethamine*) for 16 days plus vitamins (*Protovit* ®) [1]	ZOONOSIS! Transmission diaplacental or oral. From faeces of cats.
Trichomoniasis	*Trichomonas* sp. [61] (for example *Tritichomonas gastritis*)	In *Nycticebus coucang* (n=2) [61]		In non-human primates like rhesus macaques, humans, birds	*N. coucang:* one of two infected animals had bloody stool and diarrhea. It is not known whether trichomonads were the cause of the bloody stool, but the condition improved with treatment [61] In non-human primates either gastritis, vaginitis (*T. vaginalis*); in humans pneumonia (*T. tenax*, *T. hominis*)	Microscopically or in necropsy. *N. coucang:* found in faeces (n=2) [61].	In humans: *Metronidazol*	Common in birds
	Giardia sp.	In *Nycticebus pygmaeus* (n=3), *N. coucang* (n=3) [61]	Occasionally in lemurs (*L. catta, E. mongoz*) [1]		Bloody diarrhoe, sometimes vomiting [1]	In faeces [1, 61]	*Metronidazol;* 10 mg/kg *Carnidazol* for three days [1] (*Carnidazol*: very bad taste for primates; 10 % of substance mixed with calcium carbonate, added to the food. [2])	Direct infection; no other host necessary [1]

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	Blastocystis hominis	In *Loris* ([15]; Mehlhorn, pers. comm.)		In a variety of hosts [7]	Regarded as not pathogenous for a long time; but can, for unknown reasons, suddenly become pathogenous, then multiplies considerably and penetrate the intestinal villi. Symptoms: severe diarrhoea, severe exsiccosis (loss of water)t [7]. In *Loris*: wet fur all over the body (especially in juveniles) or only slightly clotted hair in the surroundings of the anal region; behaviour vivid, normal. In some animals thirst [15].	In faeces: size of stages 5-30 µm, containing a large nucleus which cannot be stained with iodine; crescent-shaped chromatin at the rim. Between intestinal villi:size of stages 50-150 µm, food vacuoles included [7]	*Metronidazol* (Mehl-horn, pers. comm.). In *Loris*: *Metronidazol*, dissolved in water and added to the daily milk pap, was readily eaten; symptoms vanished within 5 days [15].	Apparently oral infection from faeces (dirty food) [7]
Cryptosporidiosis	*Cryptospo-ridium sp*. (*C. parvum*?)	In *Loris*, n=1, one fatal opportunistic infection in an old animal (Mehlhorn, pers. comm.); primary cause of death was renal failure [15]. In captive *Nycticebus coucang* [61]		*C. parvum* in a variety of hosts [4]. Deaths in humans, especially in cases of immunodeficiencies such as AIDS ([4, 5, 16], Mehlhorn, pers. comm.) In experimentally SIV infected rhesus monkeys.	Infections most frequent in juveniles and in cases of immunodeficiency (see HIV, SIV); secondary infection due to disease from other pathogenic agents which influence the immune system. Symptoms: gastroenteritis, diarrhoea, severe exsiccosis, indigestion, loss of weight, sometimes colic, disturbance of motility. [4]. Abdominal seizures [16]. In *Loris*: symptoms of excitement, reduced food consumption, increasing weakness, death. No increase of thirst observed (n=1, old specimen) [15]. Severe inflammation of liver and gall bladder [63]	Detection of *oocysts* in faeces [4]; histologically: pathogenic agents visible (dark spots), fixed to the intestinal epithelium [16] or the epithelium of the gall bladder	In humans: no chemotherapy known; typical medicine against Coccidiosis and amoeba ineffective (Mehlhorn, pers. comm., [16]). For domestic animals: *Lasalocid* (for calves 15 mg/kg, for lambs 5 mg/kg for 3 days), in addition electrolyte solution for replacing the water; *Buscopan* against colic, if necessary [4]	Common; mainly oral infection from faeces of infected calves. Sick animals emit larger quantities of *ooczysts*, especially in the middle of the 14-day-period of disease; in sufficient humidity these remain infectious for 6 months. Prevention by removal of faeces, cleaning with hot steam, disinfection for instance with Lysococ [4, 16]