
Which Parasites Are Important for Humans?

2

2.1 Groups of Parasites

The selected parasites here belong mainly to a few groups inside the animal kingdom:

(a) **Protists/protozoa**

Unicellular organism and reduced specimens of different origins

(b) **Helminths**

Worms, which belong to the animal phyla: **Platyhelminthes** (flatworms), **Nemathelminthes**, **Aschelminthes** (roundworms), **Acanthocephala** (thorny-headed worms), **Annelida** (e.g. leeches) or **Pentastomida** (tongue worms). The members of these different worms range in a size from a few millimetres up to 30 m.

(c) **Arthropoda**

The name comes from a Greek term and means “feet with segments”. This worldwide distributed group includes subgroups such as Chelicerata (=Greek: horny claws, e.g. spiders), insects (=Latin: animals with a clearly segmented body, e.g. beetles, mosquitoes, bugs, etc.) and Crustacea (=Latin: animals with a hard body cover, e.g. shrimps, etc.). All members of these groups are characterized by a rather thick body cover containing chitin and often in addition lime components. All this together forms a stiff exoskeleton, the segments of which are interconnected by smooth ligaments thus guaranteeing flexibility. The specimens of this group harm their hosts either directly, e.g. by their sucking activity or by transmission of agents of diseases (viruses, bacteria, fungi and/or other parasites).

The exact definition of the systematic position of parasites is very difficult, since the members of the different groups have developed often very sophisticated adaptations, so that even members of the same group may appear and behave completely different. Thus this book considers and presents each group of parasites not in a systematically sense, but just under their morphological

appearance as protozoa, helminths or arthropods and describes their parasitological effects as agents of diseases.

Thus the below-listed simplified system gives just a short overview on the distribution of parasites among different groups of animals and humans and does not reflect the recent sophisticated systematic discussion on interrelations.

Kingdom: Animalia (animals)

Subkingdom: Protozoa/Protista (unicellular stages)

Phylum: Sarcomastigophora – some parasitic species

Phylum: Opalozoa – commensals/parasitic

Phylum: Apicomplexa – many parasitic species

Phylum: Microspora – parasitic

Phylum: Myxozoa – multicellular stages, but looking like protozoa, parasitic

Phylum: Ascetosporea – parasitic

Phylum: Ciliophora – some parasitic species

One of the modern systematics classifies the groups of Apicomplexa (Sporozoa), Dinoflagellata and Ciliophora into the new phylum Alveolata.

Intermediate group: Mesozoa – parasitic, e.g. reduced helminths

Subkingdom: Metazoa (multicellular organisms).

Phylum: Platyhelminthes (flatworms)

Class: Turbellaria – free living

Class: Trematodes – parasitic

Class: Cestodes – parasitic

Phylum: Nematelminthes/Aschelminthes (roundworms)

Subphylum: Nematodes (thread worms) – some parasitic species

Phylum: Acanthocephala (thorny-headed worms) – parasitic

Phylum: Pentastomida (tongue worms) – parasitic

Phylum: Annelida

Class: Polychaeta – free living

Class: Clitellata (leeches) – parasitic

Phylum: Arthropoda – several parasitic species

Subphylum: Chelicerata (ticks, mites) – parasitic

Subphylum: Branchiata (Crustacea) – some parasitic species

Subphylum: Tracheata (insects) – many parasitic species

2.2 Organs of Humans and Their Typical (Common) Parasites

Localization	Parasitic stages
Lumen of intestine and feces	Cysts of amoebae
	<i>Giardia</i>
	<i>Isospora</i> oocysts
	<i>Caryospora</i> oocysts
	<i>Sarcocystis</i> oocysts
	<i>Cryptosporidium</i> oocysts
	<i>Balantidium</i> cysts
	Microsporidian cysts
	<i>Blastocystis</i> cysts
	Worm eggs
	Larvae of worms
	Adult worms
	<i>Entamoeba</i> , magna forms
Wall of the intestine	<i>Giardia</i> trophozoites
	<i>Isospora</i> stages
	<i>Cryptosporidium</i> stages
	<i>Sarcocystis</i> stages
	<i>Caryospora</i> stages
	<i>Balantidium</i> trophozoites
	Microsporidian stages
	Adult trematodes
	Adult cestodes
	Hookworms
	<i>Anisakis</i> worms
	<i>Trichuris</i> worms
	<i>Gnathostoma</i> worms
Lungs	Acanthocephalan stages
	Pentastomid stages
	<i>Pneumocystis carinii</i> stages
	<i>Paragonimus</i> worms
	<i>Schistosoma</i> granulomes, adult worms
Saliva	<i>Capillaria</i> stages
	<i>Pneumocystis jirovecii</i> stages
	Eggs of lung trematodes
	<i>Echinococcus</i> hooks
	Nematode larvae
	<i>Trichomonas</i> mouth species
Brain	<i>Entamoeba</i> species
	Facultative amoebae
	Cysts of amoebae
	<i>Toxoplasma gondii</i>
	<i>Encephalitozoon</i> stages

(continued)

Localization	Parasitic stages
	Cysticercus of tapeworms
	Larvae of nematodes
Fluid	<i>Trypanosoma</i> species
	Amoebae
	<i>Toxoplasma gondii</i> zoites
	<i>Angiostrongylus cantonensis</i>
Lymph, lymph nodes	<i>Leishmania</i> stages
	<i>Toxoplasma gondii</i> zoites
	Filarial larvae
Blood	<i>Trypanosoma</i> stages
	<i>Leishmania</i> stages
	<i>Plasmodium</i> stages
	<i>Babesia</i> stages
	<i>Schistosoma</i> larvae, adults
	<i>Dirofilaria</i> stages
	Filarial larvae
	<i>Angiostrongylus</i> stages
Subcutaneous tissues	<i>Loa loa</i> stages
	<i>Onchocerca volvulus</i> stages
	<i>Dracunculus medinensis</i> stages
	<i>Mansonella</i> stages
Inside skin	<i>Leishmania</i> stages
	<i>Onchocerca</i> stages
	Mites
	Sand fleas (<i>Tunga</i>)
On the skin surface	Mosquitoes
	Flies
	Midges
	Simuliids
	Tabanids
	Fleas
	Lice
	Bugs
	Mites
	Ticks
	Leeches
	Vampire bats
Eye	<i>Acanthamoeba</i> stages
	<i>Loa loa</i> worms
	<i>Onchocerca volvulus</i> larvae
	<i>Philophthalmus</i> species
	<i>Thelazia</i> species
	Microsporidian stages

(continued)

Localization	Parasitic stages
	Larvae of tapeworms and trematodes
	Pentastomids
Nose	<i>Leishmania</i> species
	Amoebae
	<i>Microsporidia</i>
	Fly larvae
	Pentastomid worms
Spleen	<i>Leishmania</i> species
	<i>Toxoplasma gondii</i>
	Filarial larvae
Bone marrow	<i>Leishmania donovani</i>
	<i>Trypanosoma cruzi</i>
	<i>Toxoplasma gondii</i>
	<i>Microsporidia</i>
Genital- and excretion organs	<i>Trichomonas vaginalis</i>
	<i>Microsporidia</i>
	<i>Schistosoma</i> eggs
	Microfilariae
	<i>Diectophyme renale</i> stages
	<i>Enterobius vermicularis</i>
	Fly maggots
	Vampire fish
Muscles	<i>Toxoplasma gondii</i>
	<i>Trypanosoma cruzi</i>
	<i>Sarcocystis</i> species
	Cysticerci of tapeworms
	<i>Trichinella</i> species
Liver	<i>Plasmodium</i> stages
	Abscesses of <i>Entamoeba histolytica</i>
	<i>Fasciola hepatica</i>
	<i>Dicrocoelium dendriticum</i>
	<i>Clonorchis sinensis</i>
	<i>Opisthorchis</i> species
	<i>Schistosoma</i> granulomas
	<i>Echinococcus</i> cysts and abscesses
	Larvae of nematodes
	Pentastomids

Attention: Many other parasites may be found accidentally in any through-blooded organ!

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Diagnosis, Treatment, Prevention

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