

**Topic P11: Basics of clinical parasitology**

To study: Protozoa, Nematoda, Cestoda, Trematoda, Arthropoda

From spring term: Microscopy, CFT, ELISA

**Task 1: Sampling in medical parasitology**

**a) Sampling for intestinal parasites**

Observe and draw the container for intestinal parasites. Remember, that it is not possible to use rectal swabs for parasitological examination.

	Stool sample is not very suitable for detection of (name of a worm):
	In this case, it is recommended to use rather (name of a method):

**b) Sampling for blood parasites**

Look at the videoclips and describe in one or two sentences, how to prepare a thick and a thin blood smear. In thin smear, draw the position of both slides at preparing.

Thick smear:	Thin smear – description	Thin smear – picture

**c) Other sampling methods**

Connect with lines methods from the left column and sampling approaches in the right column.

- |                                       |  |
|---------------------------------------|--|
| diagnostics of toxoplasmosis          | sending used compact lenses                        |
| diagnostics of trichomonosis          | sending gastric juice (+ stool)                    |
| diagnostics of urinary schistosomosis | histological examination of urinary bladder tissue |
| diagnostics of giardiasis             | sending C. A. T. swab + smear                      |
| diagnostics of acanthamoebiasis       | sending blood for serology                         |

**Task 2: Microscopy of intestinal parasites**

**a) Kató preparation (stool of a healthy person)**

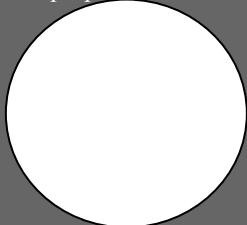
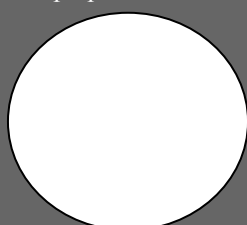
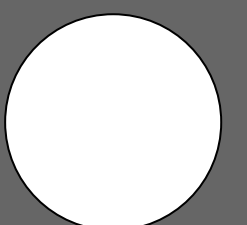
The preparation was made by Kato method, which is thick smear of faeces covered with a cellophane sheet saturated with glycerine containing malachite green order to improve the visualization of certain structures. Examine the preparation, which was made by this method **under the microscope at a magnification of objective 20× (no oil immersion)**. Note the fat globules and granules that resemble the ova of parasites. Learn these structures and draw your result.

**b) Faust concentration method (stool of a healthy person)**

Examine the demonstrated materials and draw and describe the principle of the Faust concentration method. Examine the preparation, which was made by this method **under the microscope at a magnification of objective 20× (no oil immersion)**. Draw your result.

**c) Graham method (with presence of pinworm eggs)**

Presence of the pinworm eggs is examined by Graham’s method – tape is impressed on unwashed peri-anal skin and stick on slide. Examine the eggs of pinworm, **under the microscope at a magnification of objective 20× (no oil immersion)**. Draw the result of observation.

Kató preparation	Faust preparation	Faust – principle	Graham method
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**Task 3: Demonstration of parasites, their ova and life cycles**

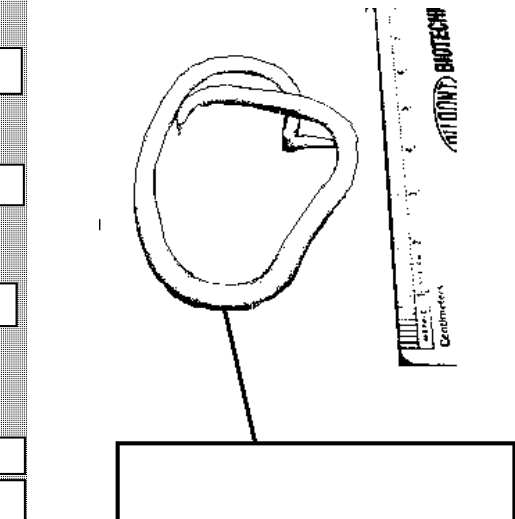
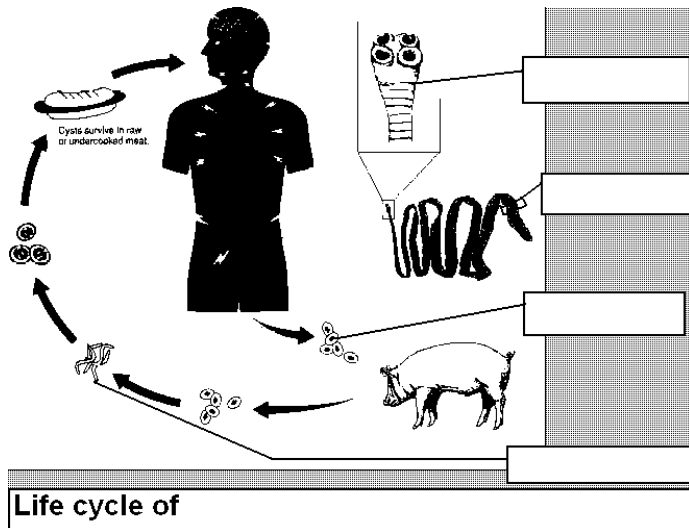
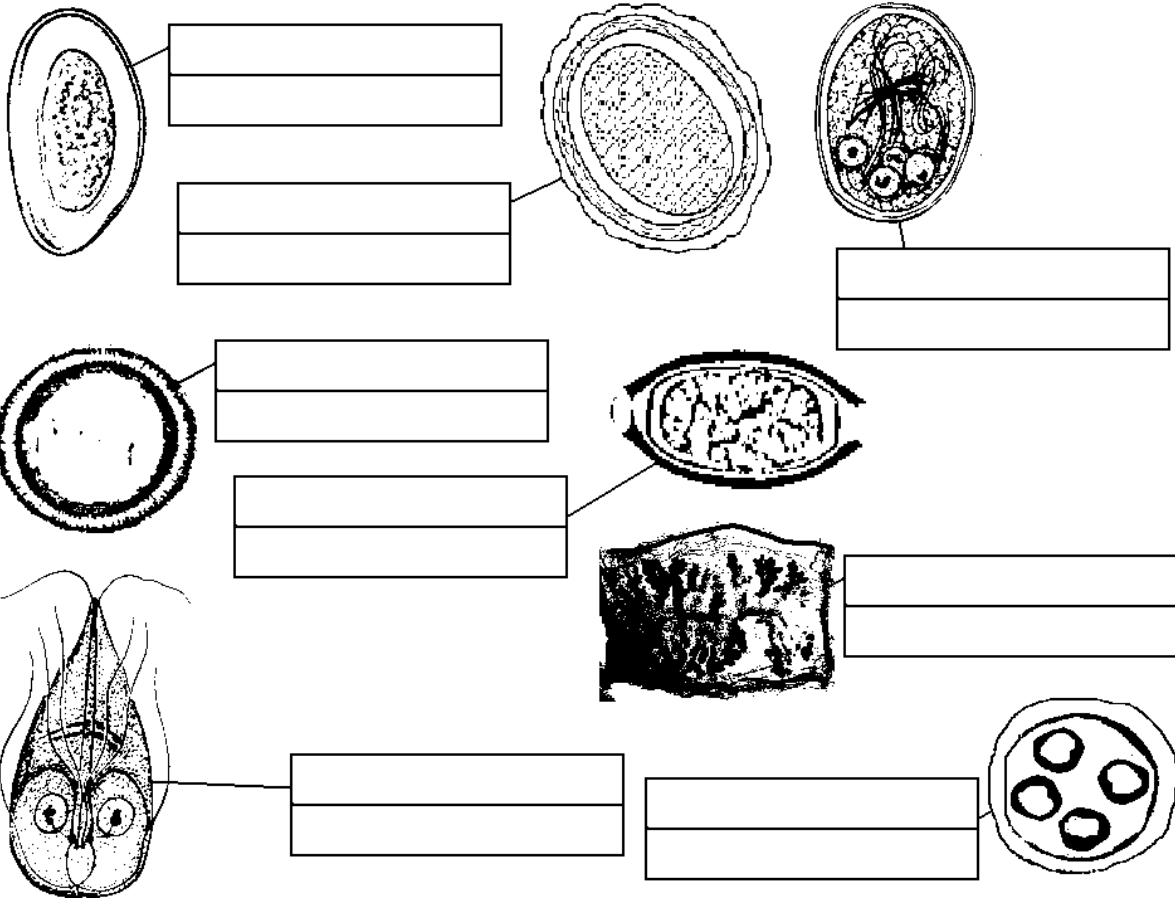
**a) Demonstraion of parasital preparations**

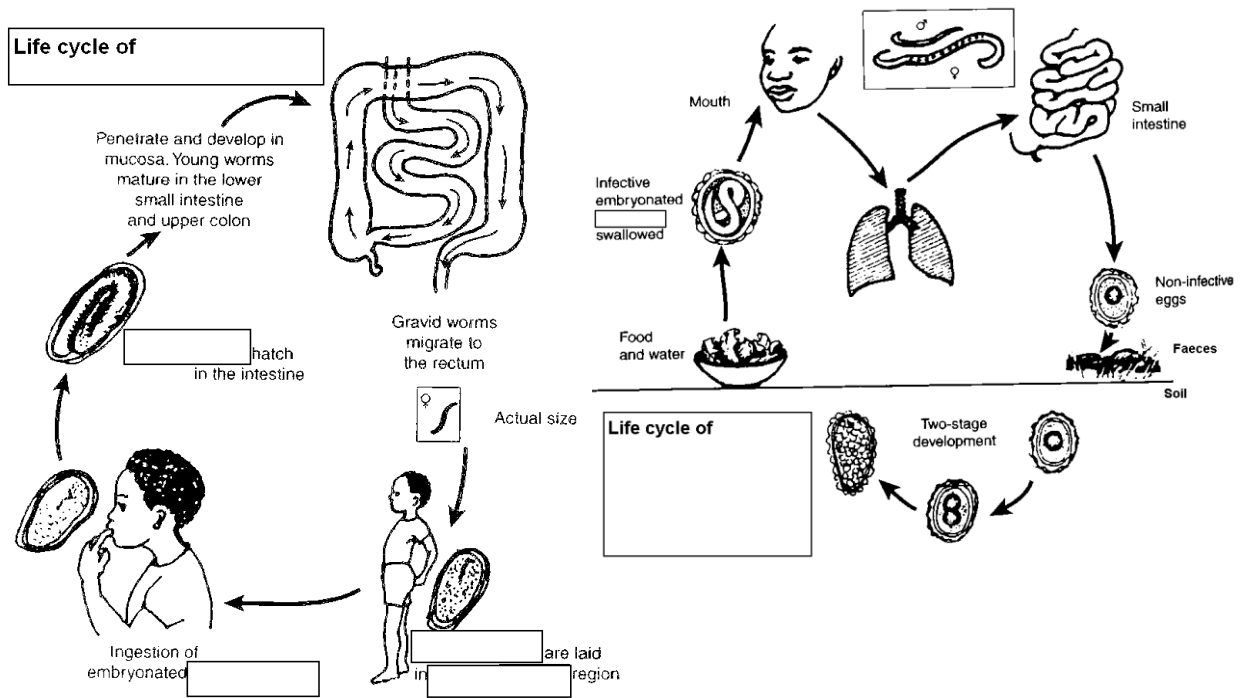
Look at preparations of parasites conserved by ethanol and draw and describe two of them.

_____ _____ _____ _____	_____ _____ _____ _____
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**b) Demonstraion of parasital pictures, pictures of their ova and life cycles**

Add missing descriptions to your pictures (in the first part, write allways parasite name + stage of development)





**Task 4: Microscopy of *Trichomonas vaginalis***

Examine a Giemsa stained vaginal smear. Find the protozoon *T. vaginalis* in the specimen. This protozoon is of ovoid shape, about 10 times larger than bacteria, light blue in colour with red elongated and pointed nucleus. It is necessary to differentiate 1) epithelial cells (different in colour); 2) leukocytes (less cytoplasm, usually wrinkled nucleus). Describe also all other observed objects (yeasts, bacteria, epithelial cells, white blood cells). In bacteria remark morphology.

*T. vaginalis*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Task 5: Diagnostics of malaria**

**a) Microscopy of a malaric thin smear**

Observe a given preparation. Try to draw observed objects. Avoid getting confused by artifacts, platelets and other objects appearing similarly like malaric plasmodia.

red blood cells

malaric plasmodium

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**b) Evaluation of stages of parasite**

Fill in the description fields to individual pictures. Use words: schizont, early trophozoite, gametocyte, merozoites, late trophozoite.


**Task 6: Diagnostic of *Toxoplasma gondii* by serological tests**

We work with following sera, coming for serological examination:

P: screening of a 29-years old healthy pregnant woman, no clinical problems, two cats at home

Q: screening of another, 24-years old healthy pregnant woman, no clinical problems, no cats

R: young lady, student, 21-years old, spending her free time by trekking in forests, no cats, two weeks ago started to be tired, enlarged lymphonodes

S: retired man, 65-years old, living in a vilage his hobby is working in garden, cats often walk through his garden; symptomatology of chorioretinitis, other causative agents than *Toxoplasma* excluded already

**a) Complement-fixing test**

Read CFT titres in sera of clients P, Q, R, S tested for antibodies against by *Toxoplasma gondii*. The first dilution is 1:5 an then the dilution continues in geometric series. Carefully evaluate controls of anticomplementarity. Draw a result and write titer.

**b) ELISA test for demonstration IgA antibodies**

The results of the ELISA for IgA antibodies against *T. gondii* in patient sera are demonstrated on a serological plate. The measured results of optical density are on enclosed paper. According to learners directions. Well A1 is a blank. Calculate the cut off (average of both c. o. values, i. e. wells C1 and D1) and determine optical density of negative (B1) and positive (E1) controls.

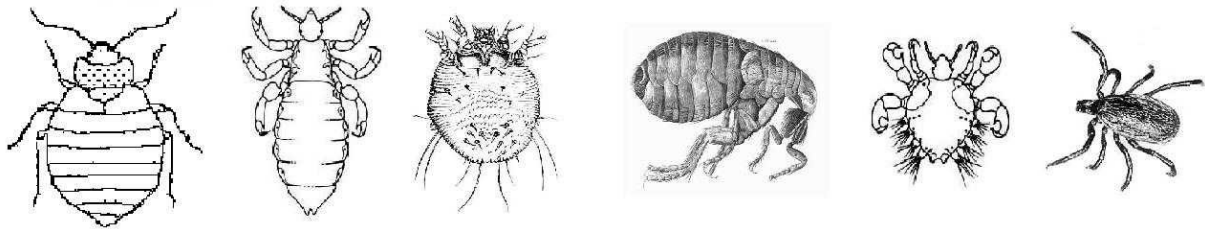
Write down the interpretation for both parts of the task (a + b)

<p><b>a)</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;"></td> <td style="width: 10%; text-align: center;">1:5</td> <td style="width: 10%; text-align: center;">1:10</td> <td style="width: 10%; text-align: center;">1:20</td> <td style="width: 10%; text-align: center;">1:40</td> <td style="width: 10%; text-align: center;">1:80</td> <td style="width: 10%; text-align: center;">1:160</td> <td style="width: 10%; text-align: center;">1:320</td> <td style="width: 10%;"></td> </tr> <tr> <td style="text-align: center;">K+</td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td style="text-align: center;">TITRE</td> </tr> <tr> <td style="text-align: center;">P</td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td></td> </tr> <tr> <td style="text-align: center;">Q</td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td></td> </tr> <tr> <td style="text-align: center;">R</td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td></td> </tr> <tr> <td style="text-align: center;">S</td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td></td> </tr> </table>		1:5	1:10	1:20	1:40	1:80	1:160	1:320		K+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TITRE	P	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Q	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<p><b>b)</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">C. O. =</td> <td style="width: 50%;">C. O. =</td> </tr> <tr> <td>K+ OK? K- OK?</td> <td>K+ OK? K- OK?</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;"><b>IgA</b></td> <td style="width: 50%; text-align: center;"><b>IgG</b></td> </tr> <tr> <td style="text-align: center;">ABSORBANCE</td> <td style="text-align: center;">ABSORBANCE</td> </tr> <tr> <td style="text-align: center;">+</td> <td style="text-align: center;">+</td> </tr> <tr> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> </tr> <tr> <td style="text-align: center;">P</td> <td style="text-align: center;">P</td> </tr> <tr> <td style="text-align: center;">Q</td> <td style="text-align: center;">Q</td> </tr> <tr> <td style="text-align: center;">R</td> <td style="text-align: center;">R</td> </tr> <tr> <td style="text-align: center;">S</td> <td style="text-align: center;">S</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;"><b>Conclusion</b></td> </tr> <tr> <td> </td> </tr> <tr> <td> </td> </tr> <tr> <td> </td> </tr> <tr> <td> </td> </tr> </table>	C. O. =	C. O. =	K+ OK? K- OK?	K+ OK? K- OK?	<b>IgA</b>	<b>IgG</b>	ABSORBANCE	ABSORBANCE	+	+	-	-	P	P	Q	Q	R	R	S	S	<b>Conclusion</b>				
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**Task 7: Diagnostics of ectoparasites**

**a) Survey of ectoparasites**

Connect the pictures with corresponding names of ectoparasites in latin and in English (or encircle them by the same colour, label with the same nubers etc.)



Hard tick                      Flea                      Itch mite                      Head louse                      Bed bug                      Crab louse

*Phthirus pubis*                      *Ixodes ricinus*                      *Cimex lectularius*                      *Pediculus capitis*                      *Pullex irritans*                      *Sarcoptes scabiei*

**b) A note to myiases**

Look at the videoclip showing a case of a myiase. Write down a definition, what a myiase is.

## Topic P11

### Check-up questions:

1. What diseases are caused by protozoa of genus *Leishmania*?
2. Do you know some more bloodstream parasites besides malaric plasmodia?
3. Find in textbook, www etc. at least two staining methods for intestinal protozoa
4. What is the importance of *Cyclospora cayetanensis* and *Cryptosporidium parvum*? What staining method can be used for diagnostics of these organisms?
5. Write names of at least three non pathogenic intestinal amoebae (may be confused with *E. histolytica*)
6. Name at least one disease transmitted by each of following vectors:
  - a) *Glossina* fly
  - b) *Anopheles* mosquito
  - c) *Aedes* mosquito
  - d) *Ixodes ricinus* tick
  - e) *Phlebotomus* gnat
7. Do you know an example of artificial (iatrogenous) myiasis used for treatment?

Picture concerning biofilm: Veronika Holá

Pictures concerning parasites were created by O. Z. with use of pictures from following websites:

<http://creatures.ifas.ufl.edu>

<http://www.apartmenttherapy.com>

<http://www.bed-bug.org>

<http://www.dkimages.com>

<http://www.aaainsectpestcontrol.com>

<http://encyklopedie.divoch.info>

<http://www.wikieducator.org>

<http://pedagogie.ac-montpellier.fr>

<http://www.humanillnesses.com>

<http://upload.wikimedia.org>

<http://www.wadsworth.org>

<http://teaching.path.cam.ac.uk>

<http://www.wikieducator.org>

<http://www.cmpt.ca>

<http://pathmicro.med.sc.edu>

<http://www.bushwalking.org.au>

<http://picasaweb.google.com>