The cellular membrane of animal cells

Biology	Microscopy / Cell Biology	Basics of Microscopy & Work Technology
Biology	Microscopy / Cell Biology	Plants & Fungi
Biology	Microscopy / Cell Biology	Cell structure
Nature & technology	From the very small & the very big	
Nature & technology	Plants & animals	

Difficulty level	Group size	Preparation time	Execution time
easy	1	10 minutes	30 minutes

Robert-Bosch-Breite 10
37079 Göttingen
Tel.: 0551 604 - 0
Fax: 0551 604 - 107
info@phywe.de
www.phywe.de

PHYWE excellence in science

Teacher information

Application

PHYWE excellence in science

Cells from the oral mucosa

The oral mucosa can be very easily obtained when working according to the instructions. Revulsions or feelings of disgust occur less often if one approaches and involves the students with an attitude of research (Which animal cells could be appropriate? Where can we get our own body cells without difficulty?). After initial reluctance, the students will ultimately be enthusiastic about looking at their own cells under the microscope.

PHYWE excellence in science

Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de

Other teacher information (1/3)

Prior knowledge

The cells of the oral mucosa form a continuous squamous epithelium which is similar to the epidermis of plants. The cells undergo cell division within a rather short time and are easily detached from their surface. In the test sample of the specimen we will therefore find single cells and not gain an overall impression of a tissue as has been the case in the plant experiment. Epithelial tissues not only line out the entire oral cavity, the gastrointestinal tract, and the blood vessels, but all organs of the body. The shapes of animal cells is highly diverse (compare muscle fibers, nerve cells, cartilage cells, sensory cells).

Scientific principle

Animal cells should be compared with plant cells in order to recognize the differences between the individual cell types.

Other teacher information (2/3)

Learning objective

The students learn wo make a micropreparation of their own oral mucosa. The should pay special attention to the structure of the cell and the difference to plant cells.

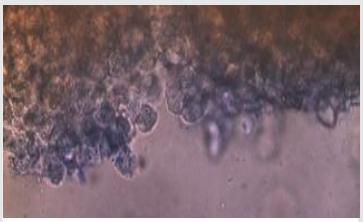
Tasks

1. Slide preparation
2. Microscopy
3. Staining and microscopy

Robert-Bosch-Breite 10
37079 Göttingen
Tel.: 0551 604 - 0
Fax: 0551 604 - 107
info@phywe.de
www.phywe.de

Other teacher information (3/3)

Oral epithelum without stain (100x)



Hepatic tissue border (400x)

The students should only use clean instruments in this experiment. Spatulas which are otherwise used for chemicals must not be used. Disposable wooden spatulas (from medical practices) are safe from the hygienic point of view and must be discarded after use. Another possibility is that every student brings a spoon of her/his own from home. The specimen must be diluted with a little bit of water because otherwise the slide would not become transparent due to the great number of epithelium cells and mucus.

Alternatively, the use of liver is recommended as tissue material when studying the animal cell in general.

Safety instructions

- The students may only use clean instruments in this experiment. Spatulas which are otherwise used for chemicals must not be used.
- The disgust treshold is different for each student. Consideration is required.
- Unexperienced students tend to get tired, headaches or nausea while working with microscopes. Take breaks!
- Microscopes and magnifying glasses are sensitive. Be careful while transporting and handling them.
- The general instructions for safe experimentation in science teaching apply to this experiment.

Robert-Bosch-Breite 10
37079 Göttingen
Tel.: 0551 604 - 0
Fax: 0551 604 - 107
info@phywe.de
www.phywe.de

PHYWE excellence in science

Student information

Motivation

PHYWE excellence in science

Obtaining animal cells

In this experiment you will learn how you can easily get an animal specimen. You can treat this so-called scraping specimen with a staining technique after the first microscoping the unstained specimen to increase the contrast. You should notice the differences between an animal and a plant cell.

PHYWE excellence in science

Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de

Tasks

PHYWE excellence in science

1. Slide preparation
2. Microscopy
3. Staining and microscopy

PHYWE excellence in science

Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

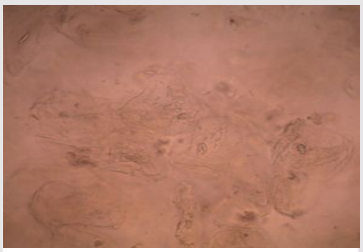
info@phywe.de
www.phywe.de

Equipment

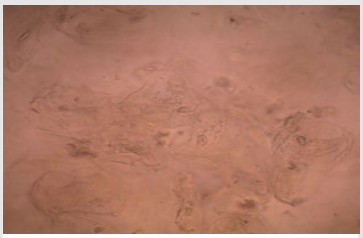
Position	Material	Item No.	Quantity
1	PHYWE Binocular student microscope, 1000x, mechanical stage	MIC-129A	1
2	Microscopic slides, 50 pcs	64691-00	1
3	Cover glasses 18x18 mm, 50 pcs	64685-00	1
4	Beaker, 100 ml, plastic (PP)	36011-01	1
5	Dropping pipette with bulb, 10pcs	47131-01	1

PHYWE excellence in science
Robert-Bosch-Breite 10
37079 Göttingen
Tel.: 0551 604 - 0
Fax: 0551 604 - 107
info@phywe.de
www.phywe.de

Procedure (1/3)



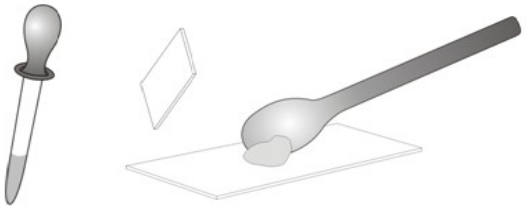
Oral epithelium (100x)



Oral epithelium (400x)

(1) Slide preparation

- Cells growing on the surface of mucous membranes detach easily. This makes it possible for you to study your own cells. Scrape some mucosa from your buccal cavity (cheek pouch) with a spoon.
- Place the scraped specimen on a slide and dilute it with water.



Production of the scraping specimen

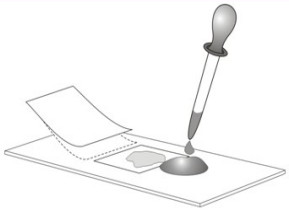
Procedure (2/3)

(2) Microscopy

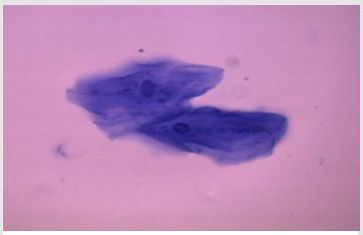
- Study the specimen with the lowest magnification. If you spot a nice cell, move the site of interest into the center of the visual field.
- Then switch to an intermediate power by turning the revolving nosepiece. Describe the shape of the cells in the report.

Robert-Bosch-Breite 10
37079 Göttingen
Tel.: 0551 604 - 0
Fax: 0551 604 - 107
info@phywe.de
www.phywe.de

Procedure (3/3)



Staining with Methylene Blue



Oral epithelium (400x)

(3) Staining and microscopy

- One drop of the staining solution is placed next to the specimen and drawn under the cover slip from the opposite edge with a strip of absorbent paper. Ink contains the dye Methylene Blue and it is suited for this stain when applied in a high dilution!
- Study the specimen under the microscope a second time and draw one cell in the report.

PHYWE excellence in science

Protokoll

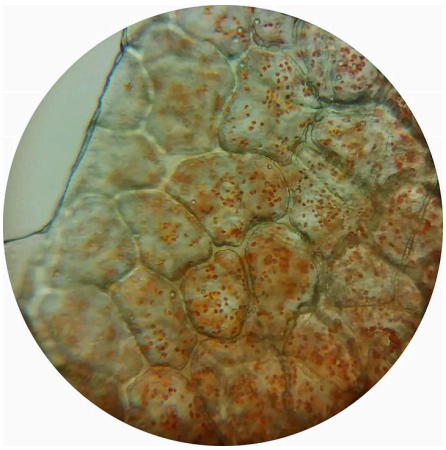
PHYWE excellence in science
Robert-Bosch-Breite 10
37079 Göttingen
Tel.: 0551 604 - 0
Fax: 0551 604 - 107
info@phywe.de
www.phywe.de

Task 1

PHYWE excellence in science

What is the difference between an animal cell and an plant cell?

- There is no difference. Both have a cell wall.
- There is no difference. Neither has a cell wall.
- A animal cell has a cell wall, the plant cell does not.
- A plant cell has a cell wall, the animal cell does not.



Plant cell

Task 2

PHYWE excellence in science

What do the cells in your specimen look like?

- [ ] Non-uniform
- [ ] Disordered
- [ ] Ordered
- [ ] Firm and stable

Überprüfen

PHYWE excellence in science

Robert-Bosch-Breite 10
37079 Göttingen

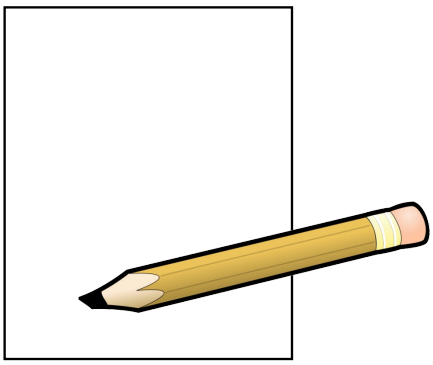
Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de

Aufgabe 3

PHYWE excellence in science

Draw one cell and label the cell membrane and the nucleus.



Folie	Punktzahl/Summe
Folie 15: Untitled Single Choice Set	0/1
Folie 16: Cells in the preparation	0/2

Gesamtsumme 0/3

Lösungen Wiederholen

PHYWE excellence in science

Robert-Bosch-Breite 10
37079 Göttingen

Tel.: 0551 604 - 0
Fax: 0551 604 - 107

info@phywe.de
www.phywe.de