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## Microscopy

### Papanicolaou's solution 3a polychromatic solution EA 31

for cytological cancer and cycle diagnosis

### Papanicolaou's solution 3b polychromatic solution EA 50

for cytological cancer and cycle diagnosis

IVD

In Vitro Diagnostic Medical Device



Staining solutions for cytological cancer and cycle diagnosis

These "Papanicolaou's solution 3a polychromatic solution EA 31 - for cytological cancer and cycle diagnosis" and "Papanicolaou's solution 3b polychromatic solution EA 50 - for cytological cancer and cycle diagnosis" are used for human-medical cell diagnosis and serve the purpose of the cytological investigation of sample material of human origin. They are ready-to-use staining solutions these when used together with other in vitro diagnostic products from our portfolio make cytological target structures (by fixing, staining, counterstaining, mounting) in human gynecological and clinico-cytological specimen materials, for example cervical smears, evaluable for diagnostic purposes.

#### Principle

Most used staining procedure for cytological specimen is Papanicolaou's technique. It enables an adequate statement about dignity, hormone status, and vaginal flora. In addition, it can also be used for staining specimens for carcinoma diagnosis.

In the first staining step are stained the cell nuclei by a hematoxylin solution. Nuclei are stained blue to dark violet.

Two methods can be distinguished. With the progressive method staining is carried out to the desired intensity, followed by the bluing step in tap water to make color permanent.

With the regressive method the material is over-stained and the excess of staining solution is removed by acid rinsing steps, followed by the bluing step to make color permanent.

The structures of nuclei are more differentiated and better visible by the regressive method.

The second staining step is cytoplasmic staining by orange staining solution, especially for demonstration of mature and keratinized cells. The target structures are stained orange in different intensities.

In the third staining step is used the so-called polychrome solution, a mixture of eosin, light green SF and Bismarck brown. The polychrome solution is used for demonstration of differentiation of squamous cells.

Papanicolaou's solution 3a polychromatic solution EA 31 gives a blue-green to green staining result with clinical material.

Papanicolaou's solution 3b polychromatic solution EA 50 gives a blue-green-pinkish staining result in clinical specimen material.

#### Sample material

Gynaecological and non-gynaecological specimen as sputum, urine, smears from fine needle aspiration biopsies (FNAB), effusions, rinses

#### Reagents

Cat. No. 109271  
Papanicolaou's solution 3a polychromatic solution EA 31 500 ml, 2.5 l  
for cytological cancer and cycle diagnosis

Cat No. 109272  
Papanicolaou's solution 3b polychromatic solution EA 50 500 ml, 1 l, 2.5 l,  
for cytological cancer and cycle diagnosis 25 l

#### Also required:

##### for nucleus staining:

Cat. No. 105175 Hematoxylin solution modified acc. to Gill II 500 ml, 2.5 l  
for microscopy

or

Cat. No. 109253 Papanicolaou's solution 1a 500 ml, 1 l, 2.5 l  
Harris hematoxylin solution  
for cytological cancer and cycle diagnosis

or

Cat. No. 109254 Papanicolaou's solution 1b 500 ml, 2.5 l  
Hematoxylin solution S  
for cytological cancer and cycle diagnosis

##### for cytoplasm staining:

Cat. No. 106887 Papanicolaou's solution 2b 500 ml, 2.5 l  
Orange II solution  
for cytological cancer and cycle diagnosis

or

Cat. No. 106888 Papanicolaou's solution 2a 500 ml, 1 l, 2.5 l  
Orange G solution (OG6)  
for cytological cancer and cycle diagnosis

##### required for regressive staining (see "Procedure"):

Cat. No. 106329 Sodium hydrogen carbonate 500 g, 1 kg, 5 kg  
for analysis EMSURE® ACS, Reag. Ph Eur

Cat. No. 100316 Hydrochloric acid 25% 1 l, 2.5 l  
for analysis EMSURE®

#### Sample preparation

The sampling must be performed by qualified personnel.

#### Fixation

Wet fixation immediately with spray fixative M-FIX™ for min. 10 min or wet fixation immediately in ethanol 96 % for min. 30 min.

When the smears are fixed with M-FIX™, rinsing steps 1 - 4 in the ascending ethanol sequence prior to staining can be omitted.

All samples must be treated using state-of-the-art technology.

All samples must be clearly labeled.

Suitable instruments must be used for taking samples and their preparation. Follow the manufacturer's instructions for application / use.

#### Reagent preparation

The Papanicolaou's solution 3a polychromatic solution EA 31 and the Papanicolaou's solution 3b polychromatic solution EA 50 used for staining are ready-to-use, dilution of the solutions is not necessary and merely produces a deterioration of the staining result and their stability.

**It is recommended to filter the solutions prior to their use.**

#### Hydrochloric acid 0.1 %, aqueous

For preparation of approx. 100 ml solution mix:

Hydrochloric acid 25 %	0.4 ml
Distilled water	100 ml

#### Sodium hydrogen carbonate solution 1.5 %

For preparation of approx. 1000 ml of solution, add and dissolve:

Sodium hydrogen carbonate	15 g
Distilled water	1000 ml

## Procedure

### Progressive staining

#### Staining in the staining cell

The slides must be immersed and moved briefly in the solutions, simple immersion alone yields inadequate staining results.

The slides should be allowed to drip off well after the individual staining steps, as a measure to avoid any unnecessary cross-contamination of solutions.

The stated times should be adhered to to guarantee an optimal staining result.

Slide with fixed smear	
Ethanol 96 %*	10 sec
Ethanol 80 %*	10 sec
Ethanol 70 %*	10 sec
Ethanol 50 %*	10 sec
Distilled water	20 sec
Hematoxylin solution modified acc. to Gill II or Papanicolaou's solution 1a Harris hematoxylin solution or Papanicolaou's solution 1b Hematoxylin solution S	3 min
Running tap water	3 min
Ethanol 70 %	30 sec
Ethanol 80 %	30 sec
Ethanol 96 %	30 sec
Papanicolaou's solution 2a Orange G solution or Papanicolaou's solution 2b Orange II solution	3 min
Ethanol 96 %	30 sec
Ethanol 96 %	30 sec
Papanicolaou's solution 3a polychromatic solution EA 31 or Papanicolaou's solution 3b polychromatic solution EA 50	3 min
Ethanol 96 %	30 sec
Ethanol 96 %	30 sec
Ethanol 100 %	5 min
Mixture consisting of: Ethanol 100 % + Neo-Clear® or xylene (1 + 1)	2 min
Clarify with Neo-Clear® or xylene.	5 min
Clarify with Neo-Clear® or xylene.	5 min
Mount the Neo-Clear®-wet slides with Neo-Mount® or the xylene-wet slides with e.g. Entellan® new and cover glass.	

\* These steps can be omitted when smears are fixed with M-FIX™.

After dehydration (ascending alcohol series) and clarification with xylene or Neo-Clear®, cytological samples can be mounted with water-free mounting agents (e.g. Entellan® new, DPX new, or Neo-Mount®) and a cover glass and can then be stored.

The use of immersion oil is recommended for the analysis of stained slides with a microscopic magnification >40x.

## Regressive staining

#### Staining in the staining cell

The slides must be immersed and moved briefly in the solutions, simple immersion alone yields inadequate staining results.

The slides should be allowed to drip off well after the individual staining steps, as a measure to avoid any unnecessary cross-contamination of solutions.

The stated times should be adhered to to guarantee an optimal staining result.

Slide with fixed smear	
Ethanol 96 %*	10 sec
Ethanol 80 %*	10 sec
Ethanol 70 %*	10 sec
Ethanol 50 %*	10 sec
Distilled water	10 sec
Hematoxylin solution modified acc. to Gill II or Papanicolaou's solution 1a Harris hematoxylin solution or Papanicolaou's solution 1b Hematoxylin solution S	5 min 6 min 5 min
Distilled water	10 sec
Hydrochloric acid 0.1%, aqueous	10 sec
Distilled water	10 sec
Sodium hydrogen carbonate solution 1.5 %	1 min
Running tap water	3 min
Ethanol 70 %	30 sec
Ethanol 80 %	30 sec
Ethanol 96 %	30 sec
Papanicolaou's solution 2a Orange G solution or Papanicolaou's solution 2b Orange II solution	3 min
Ethanol 96 %	30 sec
Ethanol 96 %	30 sec
Papanicolaou's solution 3a polychromatic solution EA 31 or Papanicolaou's solution 3b polychromatic solution EA 50	3 min
Ethanol 96 %	30 sec
Ethanol 96 %	30 sec
Ethanol 100 %	5 min
Mixture consisting of: Ethanol 100 % + Neo-Clear® or xylene (1 + 1)	2 min
Clarify with Neo-Clear® or xylene.	5 min
Clarify with Neo-Clear® or xylene.	5 min
Mount the Neo-Clear®-wet slides with Neo-Mount® or the xylene-wet slides with e.g. Entellan® new and cover glass.	

\* These steps can be omitted when smears are fixed with M-FIX™.

After dehydration (ascending alcohol series) and clarification with xylene or Neo-Clear®, cytological samples can be mounted with water-free mounting agents (e.g. Entellan® new, DPX new, or Neo-Mount®) and a cover glass and can then be stored.

The use of immersion oil is recommended for the analysis of stained slides with a microscopic magnification >40x.

## Result

Staining with	3a / EA 31	3b / EA 50
Cytoplasm cyanophilic (basophilic) eosinophilic (acidophilic) keratinized	blue-green to green pink pink-orange	blue-green pink pink-orange
Erythrocytes	red	
Cell nuclei	blue to dark violet	
Microorganisms	grey-blue	
Trichomonas	grey-green	

## Technical notes

The microscope used should meet the requirements of a medical diagnostic laboratory.

When using automatic staining systems, please follow the instructions for use supplied by the supplier of the system and software.

Remove surplus immersion oil before filling.

## Diagnostics

Diagnoses are to be made only by authorized and trained personnel.

Valid nomenclatures must be used.

Further tests must be selected and implemented according to recognized methods.

Suitable controls should be conducted with each application in order to avoid an incorrect result.

## Storage

Store the Papanicolaou's solution 3a polychromatic solution EA 31 - for cytological cancer and cycle diagnosis and the Papanicolaou's solution 3b polychromatic solution EA 50 - for cytological cancer and cycle diagnosis at +15 °C to +25 °C.

## Shelf-life

The Papanicolaou's solution 3a polychromatic solution EA 31 - for cytological cancer and cycle diagnosis and the Papanicolaou's solution 3b polychromatic solution EA 50 - for cytological cancer and cycle diagnosis can be used until the stated expiry date.

After first opening of the bottle, the contents can be used up to the stated expiry date when stored at +15 °C to +25 °C.

The bottles must be kept tightly closed at all times.

Avoid exposure to heat.

## Capacity

109253 Papanicolaou's solution 1a Harris hematoxylin solution  
1500 - 2500 stainings / 500 ml

109254 Papanicolaou's solution 1b Hematoxylin solution S  
1500 - 2500 stainings / 500 ml

105175 Hematoxylin solution modified acc. to Gill II  
1000 - 1500 stainings / 500 ml

106888 Papanicolaou's solution 2a Orange G solution)  
1500 - 2000 stainings / 500 ml

106887 Papanicolaou's solution 2b Orange II solution  
1500 - 2000 stainings / 500 ml

109271 Papanicolaou's solution 3a polychromatic solution EA 31  
1500 - 2000 stainings / 500 ml

109272 Papanicolaou's solution 3b polychromatic solution EA 50  
1500 - 2000 stainings / 500 ml

## Additional instructions

### For professional use only.

In order to avoid errors, the application must be carried out by qualified personnel only.

National guidelines for work safety and quality assurance must be followed.

Microscopes equipped according to the standard must be used.

If necessary use a standard centrifuge suitable for medical diagnostic laboratory.

## Protection against infection

Effective measures must be taken to protect against infection in line with laboratory guidelines.

## Instructions for disposal

The package must be disposed of in accordance with the current disposal guidelines.

Used solutions and solutions that are past their shelf-life must be disposed of as special waste in accordance with local guidelines. Information on disposal can be obtained under the Quick Link "Hints for Disposal of Microscopy Products" at [www.microscopy-products.com](http://www.microscopy-products.com). Within the EU the currently applicable REGULATION (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 applies.

## Auxiliary reagents

Cat. No.	100316	Hydrochloric acid 25% for analysis EMSURE®	1 l, 2.5 l
Cat. No.	100579	DPX new non-aqueous mounting medium for microscopy	500 ml
Cat. No.	100974	Ethanol denatured with about 1 % methyl ethyl ketone for analysis EMSURE®	1 l, 2.5 l
Cat. No.	103981	M-FIX™ spray fixative for cytodiagnosis	100 ml, 1 l
Cat. No.	104699	Immersion oil for microscopy	100-ml dropping bottle, 100 ml, 500 ml
Cat. No.	105175	Hematoxylin solution modified acc. to Gill II for microscopy	500 ml, 2.5 l
Cat. No.	106329	Sodium hydrogen carbonate for analysis EMSURE® ACS, Reag. Ph Eur	500 g, 1 kg, 5 kg
Cat. No.	106887	Papanicolaou's solution 2b Orange II solution for cytological cancer and cycle diagnosis	500 ml, 2.5 l
Cat. No.	106888	Papanicolaou's solution 2a Orange G solution (OG6)	500 ml, 1 l, 2.5 l
Cat. No.	107961	Entellan® new rapid mounting medium for microscopy	100 ml, 500 ml, 1 l
Cat. No.	108298	Xylene (isomeric mixture) for histology	4 l
Cat. No.	109016	Neo-Mount® anhydrous mounting medium for microscopy	100-ml dropping bottle, 500 ml
Cat. No.	109253	Papanicolaou's solution 1a Harris hematoxylin solution for cytological cancer and cycle diagnosis	500 ml, 1 l, 2.5 l
Cat. No.	109254	Papanicolaou's solution 1b Hematoxylin solution S for cytological cancer and cycle diagnosis	500 ml, 2.5 l
Cat. No.	109843	Neo-Clear® (xylene substitute) for microscopy	5 l

## Hazard classification

Cat. No. 109271

Cat. No. 109272

Please observe the hazard classification printed on the label and the information given in the safety data sheet.

The safety data sheet is available on the website and on request.

## Main components of the products

Cat. No. 109271

C.I. 42095	1.4 g/l
C.I. 21010	0.04g/l
C.I. 45380	2.0 g/l
H <sub>3</sub> [P(W <sub>32</sub> O <sub>10</sub> ) <sub>4</sub> ]	1.7 g/l
CH <sub>3</sub> COOH	1 g/l
C <sub>2</sub> H <sub>6</sub> O <sub>2</sub>	22 g/l
1 l = 0.82 kg	

Cat. No. 109272

C.I. 42095	0.6 g/l
C.I. 21010	0.04g/l
C.I. 45380	2.6 g/l
H <sub>3</sub> [P(W <sub>32</sub> O <sub>10</sub> ) <sub>4</sub> ]	1.7 g/l
CH <sub>3</sub> COOH	1 g/l
1 l = 0.82 kg	

## Other IVD products

Cat. No.	105174	Hematoxylin solution modified acc. to Gill III for microscopy	500 ml, 1 l, 2.5 l
Cat. No.	109204	Giemsa's azur eosin methylene blue solution for microscopy	100 ml, 500 ml, 1 l, 2.5 l
Cat. No.	109269	Papanicolaou's solution 3d polychromatic solution EA 65 for cytological cancer and cycle diagnosis	100 ml, 2.5 l
Cat. No.	109270	Papanicolaou's solution 3c polychromatic solution EA 65 for cytological cancer and cycle diagnosis	100 ml
Cat. No.	109275	Shorr staining solution for hormonal cytodiagnosis	500 ml
Cat. No.	115355	CYTOCOLOR® Cytological standard stain acc. to Szczepanik for microscopy	6x 500 ml

## Literature

1. Routine Cytological Staining Techniques: Theoretical Background and Practice, Mathilde E. Boon, Johanna S. Drijver, 1986, Elsevier Science Publishing Company
2. Conn's Biological Stains: A Handbook of Dyes, Stains and Fluorochromes for Use in Biology and Medicine, 10th Edition, (ed. Horobin, R.W. and Kiernan, J.A). Bios, 2002



Consult instructions for use



Manufacturer



Catalog number



Batch code



Caution, consult accompanying documents



Use by YYYY-MM-DD



Temperature limitation

Status: 2017-09-08

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