



# Sternheimer-Malbin

## Staining concentrate for urine sediments

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### Principle

Sternheimer-Malbin concentrate is a dyeing agent for urine sediments. It is also used for the detection of so-called Sternheimer-Malbin cells.

### Reagent

Unfavorable conditions (cold, long storage of already opened bottles) may result in dye precipitation. These can be removed by centrifugation with the highest possible speed or filtration.

### Risks and Safety

Please observe the necessary precautions for use of laboratory reagents and body fluids. Applications should be performed by expert personnel only. Follow the national and laboratory internal guidelines for work safety and infection control. Wear suitable protective clothing and disposable gloves while handling.

It is important to ensure effective protection against infection according to laboratory guidelines.



For additional safety information please refer to the information on the label and the corresponding Safety Data Sheet (SDS).

Download by QR-Code or link: [www.sds-id.com/100106-5](http://www.sds-id.com/100106-5)

### Contents/Main Components

003503-0010	<b>Sternheimer-Malbin, ready for use.</b> <small>Cont.</small> 100 mL contains: 100 mg Gentiana violett C.I. 52535, 250 mg Safranin-O C.I. 50240, 25 mg Ammonium oxalate, Stabilizer, non-reactive components, Aqua p.a.
003503-0010	1× 10 mL Sternheimer-Malbin, ready for use. Brown glass bottle with pipette dropper
003503-0100	1× 100 mL Sternheimer-Malbin, ready for use. Brown glass bottle

The ready for use solutions are stabilized and have a shelf life of at least 3 month after opening.

### Equipment

Microscope, centrifuge, standard laboratory equipment.

### Specimen

For detection of Sternheimer-Malbin cells use exclusively fresh urine (not older than 2 hours). After that, Sternheimer-Malbin cells are no longer recognizable.

### Procedure

Transfer 10 mL of the fresh (midstream) urine sample into a conical centrifugation tube. Use within 2 hours. Centrifuge at ~1000...1500 rpm (~400...500 ×g) for 5 minutes.

Drain off the supernatant up to a residual of 0.5 mL. Alternatively remove the supernatant using a water-jet pump with a glass capillary or a disposable transfer-pipette. Add 2 drops of Sternheimer-Malbin concentrate to the 0.5 mL sediment (ca. 50 µL to 60 µL max.). Mix the sample manually. Incubate the sample at room temperature for at least 1 minute to ensure complete staining.

Put a drop of slightly shaken up sediment onto a microscope slide and cover with a cover glass. Microscopic examination is carried out immediately and usually at a magnification of 400×.

### Morphology

The morphological structures of sediment components correspond to those of an unstained sediment. For this purpose, please compare the images of the literature available for urine sediments.

### Interpretation

The staining of the cells depends on temperature, exposure time and urine pH value. Therefore, the intensity of color and hue may vary.

#### Erythrocytes (RBC):

- Pale pink to strong pink.
- Some uncolored, but easy to spot.

#### Leukocytes (WBC):

- Nucleus dark purple to blue.
- Cytoplasm pink, a little blue.
- Dyeing occurs very slowly, the color intensity changes accordingly with the duration of the dyeing time.

#### Red colored leukocytes:

- Cells translucent with light to dark red color [4].

#### Blue colored leukocytes:

- Cells translucent, nucleus indistinct defined from plasma and always static (non-moving) granules. Smaller than "vital" leukocytes [4].

#### Blue colored "vital" leukocytes:

- (Synonyms: Sternheimer-Malbin cells, glitter cells)
- Pale blue to blue colored, slightly vesicular enlarged, irregularly shaped. Nucleus visible. The granules appear with vivid vibrant movement [4].

The color of the cells changes slowly from initially blue over purple (mixed color) to red [4].

The speed of the process is dependent on various factors:

- Dye concentration
- Temperature (heat source: microscope lamp)
- Time of exposure
- Osmolality of the stained sample
- Condition of the leukocytes (vitality, age)
- pH value of urine

The color change is often associated with a decline of granules agility, which suddenly can start again. A burst of cells with (spherical) leakage of the cytoplasm is then frequently observed [4].

After hours, only red cells can be detected.

#### Plate-epithelial cells:

- Nucleus deep purple-purple to blue.
- Cytoplasm pink to purple.

#### Renal tubular epithelial cells:

- Nucleus violet to blue
- Cytoplasm purple.

#### Oval fat bodies:

- Nucleus violet to blue,
- Cytoplasm reddish violet.
- The fat remains unstained but shows a very clear contrast to the stained cells due to the different refractive index to water.

#### Fat:

- Uncolored, shows a very clear contrast to colored components.

#### Mucus:

- Almost uncolored or light blue to light pink.

#### Urinary crystals:

- Uncolored, retain their normal morphological appearance and color.

Produktinformation  
Sternheimer-Malbin- Färbekonzentrat

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#### Yeast cells:

- Pale purple to purple; slow coloring.

#### Bacteria:

- Staining and degree of staining depending on the type of bacteria. Some turn, some don't.
- Living bacteria colorless to red
- Dead bacteria strongly red to dark violet (coloring increases with time).

#### Fungus, Mycelia and Spores

- Different, mostly light purple

#### Trichomonas

- Colorless or light blue

#### Hyaline cylinders:

- Pink to red.

#### Wax cylinder:

- Purple to purple red.

#### Epithelial cylinder:

- Base substance light blue to petroleum blue.
- deep purple seeds
- Inclusions ⇔ Renal tubular epithelial cells.

#### Granulated cylinders:

- Base substance light blue to petroleum blue.
- Inclusions ⇔ pink to violet.

#### Erythrocyte cylinder:

- Base substance light blue to petroleum blue.
- Inclusions ⇔ Erythrocytes (RBC).

#### Hemoglobin cylinder:

- Base substance light blue to light red.
- Inclusions purple.

#### Leukocyte cylinder:

- Base substance light blue to light red.
- Inclusions ⇔ leukocytes (WBC).

#### Mixed cellular cylinders:

- Base substance light blue to light red.
- Inclusions ⇔ cells.

#### Fat cylinder:

- Base substance light blue to light red.
- Inclusions ⇔ Fat unstained, shows a very clear contrast to the stained cells.

## Diagnosis

According to Sternheimer and Malbin, the so-called Sternheimer-Malbin-cells are characteristic for pyelonephritis <sup>[1]</sup>.

This was confirmed in several subsequent studies <sup>[5] [6]</sup>.

The assumption is often referred to a cell ratio of > 10 %.

The information is given without warranty. Data from our own studies are not available. For diagnosis, please refer to the literature.

### **Interfering lines**

Small air bubbles under the cover glass can be confused with fat droplets or erythrocytes.

Bacteria can also be the cause of unclean collection containers or non-sterile conditions of the patient (e.g. no middle jet urine).

Examine samples immediately or stabilize against bacterial growth. Do not use stabilized samples for Sternheimer Malbin cell testing.

## Notes

### **Classifications**

Not for human diagnostics.

### **Support / Information service**

For methodological and technical support, please contact us by E-Mail at [support@bioanalytic.de](mailto:support@bioanalytic.de).

Periodically check for updates of this product information on our website.

### **Feedback**

Information from users can be reported to [support@bioanalytic.de](mailto:support@bioanalytic.de).

Suggestions for further developments will be considered.

### **Waste Management**

Please observe your national laws and regulations.

Used and expired solutions must be disposed of in accordance with your local regulations.

Inside the EU, national regulations apply that are based on the current, amended version of Council Directive 67/548/EEG on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances. Decontaminated packaging can be disposed of as household waste or recycled, unless otherwise specified.

## Literature & Footnotes

Legends for the graphic symbols and tags used follow relevant norms or are available on our internet pages.

- [1] Sternheimer R and Malbin B. Clinical recognition of pyelonephritis with a new stain for urinary sediments. American Journal of Medicine 1951;11;312.
- [2] Sternheimer R. A supravital cytodagnostic stain for urinary sediments. JAMA 1975;231;8.
- [4] Schmutzinger P.: Die Bedeutung der Sternheimer-Malbin-Zellen ("Granula Motility cells") für die Diagnose der Pyelonephritis.
- [5] Goodgold, A. L., and F. Reubi: Appraisal of the Sternheimer-Malbin urinary sediment stain in the diagnosis of pyelonephritis. Urol. int. (Basel)4, 225 (1955).
- [6] Reubi, F., A. Goodgold et A. Schmid: La présence de cellules de Sternheimer-Malbin dans le sédiment urinaire est-elle liée à l'existence d'une pyélonéphrite? Helv. med. Acta20, 392 (1953).
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