

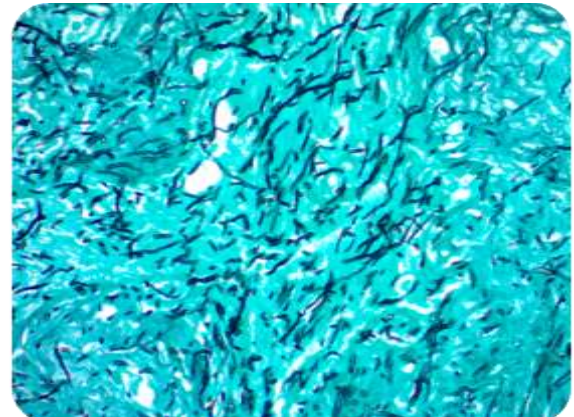
## GMS Stain Kit

(Modified Gomori Methenamine-Silver Nitrate Stain for Fungus and *Pneumocystis carinii*)

**Description:**

The Modified Gomori Methenamine-Silver Nitrate Stain (GMS Stain Kit) is intended for use in the histologic visualization of fungi, basement membrane and some opportunistic organisms such as *Pneumocystis carinii*. *Pneumocystis carinii* is an opportunistic pathogen that causes severe pulmonary disease in humans, dogs, rats, mice and other vertebrate species with acquired, induced, or inherited immune deficiency syndromes. In addition, this procedure will demonstrate *Actinomyces* and related species, *Nocardia* asteroids, and certain encapsulated bacteria.

Fungi: Black  
*P. Carinii*: Black  
 Mucin: Gray  
 Mycelia (inner): Grey to Black  
 Hyphae (inner): Grey to Black  
 Background: Light Green



**Uses/Limitations:**

Not to be taken internally.  
 For In-Vitro Diagnostic use only.  
 Histological applications.  
 Do not use if reagents become cloudy.  
 Do not use past expiration date.  
 Use caution when handling reagents.  
 Non-Sterile.


**Control Tissue:**

Any Fungus infected tissue.

**Ordering information regarding individual components on back page!**


**Kit Contents:**

<u>Item #</u>	<u>Kit Contents</u>	<u>Volume</u>	<u>Storage</u>
SNS125	Silver Nitrate Solution (0.2%)	125 ml	2-8° C.
MET125	Methenamine Solution	125 ml	2-8° C.
GCB125	Gold Chloride Solution (0.2%)	125 ml	2-8° C.
BOR015	Borax Solution	15 ml	18-25°C.
SBC125	Sodium Bisulfite Solution	125 ml	18-25°C.
CHR125	Chromic Acid Solution	125 ml	18-25°C.
STB125	Sodium Thiosulfate Solution (5%)	125 ml	18-25°C.
LGA125	Light Green Solution	125 ml	18-25°C.


Storage: 2° C  25° C

**Mixed Storage Conditions.  
 Separate Contents.**

Doc: IFU-TemplateMixedStorageev2

 ScyTek Laboratories, Inc.  
 205 South 600 West  
 Logan, UT 84321  
 U.S.A.

 EmergoEurope (31)(0) 70 345-8570  
 Molsnstraat 15  
 2513 BH Hague, The Netherlands

**Precautions:** *Chromic Acid is a strong oxidizer. Contact with other material may cause fire. Contact with skin and eyes can cause burns. Harmful if swallowed. Harmful to respiratory and gastrointestinal system. Can cause cancer and birth defects.*

*Borax solution is irritating to skin, eyes, and respiratory system. Target organs are central nervous system and kidneys. Harmful if swallowed. Possible risk to unborn child.*

*Handle all components with care, wearing gloves and eye protection.*

*ScyTek Laboratories may not be held liable for injury due to mishandling.*

*Follow all Federal, State, and local regulations regarding disposal.*

*Use in chemical fume hood whenever possible.*

### Important Notes:


1. *All glassware used in this procedure should be chemically cleaned and rinsed thoroughly in distilled water.*
2. *Failure to adequately remove the alcohol used in deparaffination will result in reduction of the chromic acid solution. Reduction of the chromic acid solution will result in a change in color from orange to brown. Discard the reagent if color change is noted.*
3. *Do not use metal forceps to remove slides from reagents. Use plastic forceps only.*
4. *Prewarm all reagents to room temperature prior to use.*

### Procedure (Standard):

1. *Deparaffinize sections if necessary and hydrate to distilled water.*
2. *Incubate slide in Chromic Acid Solution for 10 minutes.*
3. *Rinse in tap water followed by 2 changes of distilled water.*
4. *Incubate slide in Sodium Bisulfite Solution for 1 minute (to remove any residual chromic acid).*
5. *Rinse in tap water followed by 2 changes of distilled water.*
6. *Combine the following for a working GMS solution:*
  - 25 ml Silver Nitrate Solution (0.2%)
  - 25 ml Methenamine Solution
  - 2 ml Borax Solution


*Note: Mixed solution may not be stored for reuse later.*

7. *Place working GMS solution in 60° centigrade water bath and allow temperature to equilibrate.*
8. *Incubate slide in working GMS solution for 10-15 minutes. Using plastic forceps, dip slide in distilled water and check under a microscope for evaluation of silver impregnation. Fungi should be dark brown. If color is not sufficient, return the slide to working GMS solution for 2-3 minutes and check again.*
9. *Rinse in 4 changes of distilled water.*
10. *Incubate slide in Gold Chloride Solution for 15-30 seconds.*
11. *Rinse in 4 changes of distilled water.*
12. *Incubate slide in Sodium Thiosulfate Solution (5%) for 2 minutes.*
13. *Rinse in tap water followed by 2 changes of distilled water.*
14. *Incubate slide in Light Green Solution for 2 minutes.*

Storage: 2° C  25° C

**Mixed Storage Conditions.  
Separate Contents.**

Doc: IFU-TemplateMixedStorageev2



ScyTek Laboratories, Inc.  
205 South 600 West  
Logan, UT 84321  
U.S.A.

CE IVD

EC REP EmergoEurope (31)(0) 70 345-8570  
Molsnstraat 15  
2513 BH Hague, The Netherlands

15. Rinse slide using absolute alcohol.
16. Dehydrate in 2 changes of absolute alcohol, clear, and mount in synthetic resin.


## Procedure (Microwave):

Note: These instructions were developed using a standard 500 watt microwave oven. Heating times should be modified as needed depending on the microwave oven used.

1. Deparaffinize sections if necessary and hydrate to distilled water.
2. Place slide in plastic coplin jar filled with Chromic Acid solution. Cap jar loosely!
3. Place jar in microwave oven and heat on high power for 10 seconds. Allow slide to remain in warm solution for 3 minutes.
4. Rinse in tap water followed by 2 changes of distilled water.
5. Incubate slide in Sodium Bisulfite solution for 1 minute (to remove any residual chromic acid).
6. Rinse in tap water followed by 2 changes of distilled water.
7. Combine the following for a working GMS solution:
  - 25 ml Silver Nitrate
  - 25 ml Methenamine
  - 2 ml Borax Solution


Note: Mixed solution may not be stored for reuse later.

8. Place working GMS solution (loosely capped) in microwave oven for 40 seconds. Remove and pour several times between coplin jar and a clear graduated cylinder to mix thoroughly (use protective glove to avoid burning hand). Mixed solution remains in coplin jar.
9. Incubate slide in working GMS solution (heated) for 2-6 minutes until the tissue is medium brown in color. Using plastic forceps, dip slide in distilled water and check under a microscope for evaluation of silver impregnation. Fungi should be dark brown. If color is not sufficient, return the slide to working GMS solution for 1-2 minutes and check again. Reheat solution if needed.
10. Rinse in 4 changes of distilled water.
11. Incubate slide in Gold Chloride solution for 15-30 seconds.
12. Rinse in 4 changes of distilled water.
13. Incubate slide in Sodium Thiosulfate for 2 minutes.
14. Rinse in tap water followed by 2 changes of distilled water.
15. Incubate slide in Light Green Solution for 2 minutes.
16. Rinse slide using absolute alcohol.
17. Dehydrate in 2 changes of absolute alcohol, clear, and mount in synthetic resin.

Storage: 2° C  25° C


**Mixed Storage Conditions.  
Separate Contents.**

Doc: IFU-TemplateMixedStorageev2



ScyTek Laboratories, Inc.  
205 South 600 West  
Logan, UT 84321  
U.S.A.

CE 


 EmergoEurope (31)(0) 70 345-8570  
Molsnstraat 15  
2513 BH Hague, The Netherlands

**References:**

1. McManus, J.F.A. and Mowry, R. 1955. *Staining Methods and Histologic and Histochemical. Grocott*, pp 194-197.
2. Sale, G.E. 1978. *Rapid Methenamine Silver Stain. Arch Path Lab Med*, 1978, 102, pp 351-352.
3. Sheehan, D.C., Hrapchak, B.B. 1980. *Theory and Practice of Histotechnology, 2<sup>nd</sup> edition*, CV Mosby Company, St. Louis, MO.
4. Koski, J.P. 1981. *Silver methenamine-borate (SMB); Cost reduction with technical improvement in silver nitrate-gold chloride impregnation's. Journal of Histotechnology* 4:115.
5. Raab, S.S. et al. 1994. *Utility of Gomori methenamine silver stains in bronchoalveolar lavage specimens. Modern Pathology*, June 1994, Vol. 7, No. 5, pp 599-604.
6. Procop, G.W. et al. 2004. *Detection of Pneumocystis jiroveci in Respiratory Specimens by Four Staining Methods. Journal of Clinical Microbiology*. July 2004, Vol. 42, No. 7, pp 3333-3335.
7. Bryan, R.A., Jiang, Z., Howell, R.C., Morgenstern, A., Bruchertseifer, F., Casadevall, A., Dadachova, E. *Radioimmunotherapy is More Effective than Antifungal Treatment in Experimental Cryptococcal Infection. Journal of Infectious Disease*, August 15, 2010. Vol. 202(4): pages 633-637.


 Bulk Reagent Ordering Information and Current Pricing at [www.scytek.com](http://www.scytek.com)

Description:	Catalog #	Volume
Silver Nitrate Solution (0.2%)	SNS125	125 ml
	SNS500	500 ml
Methenamine Solution	MET125	125 ml
	MET500	500 ml
	MET999	1000 ml
Gold Chloride Solution (0.2%)	GCB125	125 ml
	GCB500	500 ml
	GCB999	1000 ml
Borax Solution	BOR125	125 ml
	BOR500	500 ml
	BOR999	1000 ml
Sodium Bisulfite Solution	SBC125	125 ml
	SBC500	500 ml
	SBC999	1000 ml
Chromic Acid Solution	CHR125	125 ml
	CHR500	500 ml
	CHR999	1000 ml
Sodium Thiosulfate Solution (5%)	STB125	125 ml
	STB500	500 ml
	STB999	1000 ml
Light Green Solution	LGA125	125 ml
	LGA500	500 ml
	LGA999	1000 ml

 Storage: 2° C  25° C


**Mixed Storage Conditions.**  
**Separate Contents.**

Doc: IFU-TemplateMixedStorageev2



ScyTek Laboratories, Inc.  
 205 South 600 West  
 Logan, UT 84321  
 U.S.A.



 EmergoEurope (31)(0) 70 345-8570  
 Molsnstraat 15  
 2513 BH Hague, The Netherlands