Beaumont HEALTH

Beaumont Laboratory
Royal Oak

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Related Documents:
RC.HM.FRM.051 Stat Lab Function Checks

QUICK SLIDE PLUS II STAINER

RC.HM.PR.019.r06

Introduction

The Quick Slide Stainer is an automated instrument that utilizes a Wright Giemsa process for staining blood smears. It may also be used for staining bone marrow slides and other biological samples. The new version of this stainer, Quick Slide Plus II Stainer, has an added soft agitation feature before the buffer is drained, resulting in a cleaner slide.

Principle

Slides stained by the Quick Slide Plus II Stainer are used for differentiation and morphologic evaluation of cellular elements of whole blood. Wright stain is a Romanowsky neutral dye stain based upon combination of methylene blue azures as the basic dye component and eosin as the acid dye component. Romanowsky modified Ehrich's earlier finding of a neutral dye which offered the ability to identify acidophilic, basophilic, and neutrophils granules of leukocytes.

Specimen Collection and Handling

Type:	Whole blood collected in a 4 mL Hemogard vacutainer. This is the preferred sample. OR Capillary blood collected in an EDTA microtainer.	
Anticoagulant:	K_2EDTA	
Amount:	Whole blood	- Minimum sample size is 2.0 mL - Optimum sample size is 4.0 mL
	Capillary blood	- Minimum sample size is 300 mcL - Optimum sample size is 500 mcL
Special Handling:	Specimen must be well mixed for minimum of two minutes before being analyzed. Samples containing gross hemolysis, lipemia, icteria, cold agglutinins or cryoglobulins may affect smear quality.	
Timing:	Specimen is stable for 8 hours at room temperature; 72 hours at 4^{o}C.	

Criteria for Unacceptable Specimens: Specimens containing clots, hemolysis or inappropriate volume are unacceptable and must be redrawn.

Supplies

Reagents

Quick Slide Stain Pack (3 x 500 mL)

Stain	Buffer	Rinse
Wright Stain 6g/L	Sodium Phosphate Dibasic 1g/L	Methanol 20%
Giemsa Stain 2g/L	Distilled Water	Distilled Water
Eosin Y Stain	Wetting Agent	
Methanol		

Storage:
Store products at room temperature (25-30^{o}C). Protect from exposure to water vapor, chemical fumes and direct sunlight.

Stability:
Unopened reagents may be used until the expiration date on the label.
Opened reagents are stable for 60 days. Reagents displaying any signs of instability should not be used.

WARNING: Stain flammable and poisonous. Potential human carcinogen. May be fatal if ingested. Vapor harmful. Cannot be made non-poisonous. Avoid prolonged breathing of vapor. Use only with adequate ventilation. Causes irritation to eyes, skin and respiratory tract.
Recommended: Wear gloves, lab coat, and safety glasses for protection.

Equipment

Quick Slide Plus II Stainer
Glass microscope slides

Maintenance

Refer to Attachment A.

Procedure

Setup

1. Before plugging the wall transformer into an AC outlet, connect the round barrel receptacle to the instrument. The connector is located on the left-hand side of the instrument directly under the ON/OFF switch.

2. Plug the wall transformer in and turn the ON/OFF switch to the OFF position.

Initial Start-Up

1. Place the Reagent Pack on the shelf behind the instrument and connect the Reagent Pack phone type connector to the receptacle on the right-hand side of the instrument. If the Reagent Pack is not plugged in when the unit is turned on, the message "SELF-TEST FAILURE: Pack not connected" will appear. Turn unit off, connect Reagent Pack and turn unit on to continue.

2. Remove the caps from the Reagent Pack and insert the color-coded tubing cannulas in the appropriate bottles. Do not remove the heat seals on the bottles. Push the tubing cannulas through the heat seals at an angle being careful not to damage the silicone tubing.

3. Place the RED waste tube into the waste container.

4. Turn the instrument on and the instrument will go through self-test and then display "PRIME" or "CONTINUE".

5. The unit needs to be primed at least twice before staining slides.

Stain Procedure

1. Press F4. Then choose the type of stain you want to do and press F1 = Blood or F4 = Marrow.

2. Press F4 and the cuvette will be prepared.

3. Load the slide and press STAIN.

4. When done, remove slide and press F4 to continue.

5. Allow slide to dry thoroughly before viewing

   CAUTION: When loading and unloading the slides, be sure you pull it all of the way out STRAIGHT up. Otherwise, the slides can break inside the slide holder resulting in unit malfunction. It will also produce sharp objects that could injure operators.

Reagent Replacement

1. Turn the instrument OFF.

2. Remove the cannulas from the empty Reagent Pack.

3. Unplug the phone connector from the instrument and remove the empty Reagent Pack. Don't forget to empty the waste container at this time.

4. Place the new Reagent Pack on the instrument, connect the phone connector, and place the color-coded cannulas in the new reagent bottles.

5. Turn the instrument ON and the Self-Test menu will be displayed. The cuvette is automatically drained and the Main Menu is displayed.

6. It is best to prime the unit twice before staining.

NOTICE: When changing reagent kits, it is important to regularly check the waste bottle. It is used repeatedly and requires being emptied. If not emptied, it could result in an overflow of reagent that could potentially lead to possible damage to the unit's surroundings.

Quality Control

Daily, examine a stained smear from the routine workload for smear and stain quality. **Document results on the appropriate log.**

A. Review the blood smears macroscopically for acceptability:
   1. Smears are sufficient length (greater than half the length of the unfrosted portion of the slide.
   2. The feathered edge becomes gradually thinner without streaks, holes, or tails.
   3. Even, consistent staining of blood smear.

B. Review the blood smears microscopically for acceptability:
   1. Relatively even distribution of cellular elements.
   2. Acceptable morphology within the working area of the slide.
   3. None or very little artifact of the cell morphology, (e. g., "punched-out" RBCs, smashed WBCs.)
   4. None, or very little stain precipitate or debris.
   5. The staining is consistent and imparts the characteristic cytoplasmic color differences and distinct nuclear chromatic patterns of the whole spectrum of blood cells. Acceptable stains will display the following characteristics.
      a. RBCs should be pink to orange. There should be good differentiation between normochromic, hypochromic, and polychromatic cells.
      b. Lymphocytes will display dark purple nuclei with varying shades of blue cytoplasm.
      c. Neutrophils will display dark purple nuclei, with light pink cytoplasm and lilac granules.
      d. Monocytes will show lighter purple nuclei. The cytoplasm of the monocytes will be gray-blue with reddish granules.
      e. Eosinophils show bright orange granules in the cytoplasm.
      f. Basophils display dark blue granules in the cytoplasm.
      g. Platelets will be violet to purple.

Limitations

1. Improper technique used for obtaining specimen or making blood smear can alter results.
2. Very high humidity can alter results or result in producing the appearance of artifacts.

Notes

1. Concentration of stain pack was obtained from personal communication with ENG Scientific, Inc., 2/27/06.

2. PRIME the stain on MONDAYS as it is not being used for two days.

3. Take the slide out of the stainer right away. Do not let it sit in the stainer.
4. When the stainer is ready (the compartment is filled), put the slide in right away.
5. Remember to clean the chamber when you get precipitate.
6. Document all Quick Slide Plus stain pack reagent changes and maintenance on the appropriate log.

References

1. GG&B Company, 3411 McNeil, Suite 302 Wichita Falls, TX 76308; 1998.
2. Quick Slide Stain Pack product insert.
3. Wintrobe, Maxwell M., Clinical Hematology, Lea and Febiger, 1961.

Authorized Reviewers

Medical Director, Hematology

Attachments

Attachment A – Maintenance

The orange pump tubes and color coded lines should be replaced every 6 to 12 months, depending on use.

To perform this procedure, do the following:

1. Remove the lines from the stain bottles and prime the unit twice to remove fluid from the old tubes.

2. Shut the unit off.

3. Unscrew the two thumbscrews holding the pump cover on.

4. Remove the lines, one at a time and replace starting from left to right. The longest lines are to be positioned on the left side of the orange pump tubes and the shorter lines should be on the right side of the pump tubes. The longer lines are to go into the reagent bottles and the shorter lines will go to the slide holder.

   Pump #1, furthest to the left, is the rinse (white labeled line).
   Pump #2 is the buffer (green labeled line).
   Pump #3 is the waste (red labeled line).
   Pump #4 is the stain (blue labeled line).

5. After installation, 2 primes are required to fill the buffer and rinse lines.

6. Any problems, please call service technicians at GG&B Company 800-295-9588.

Attachment B – Set Fill Levels

The fill levels are factory set for a standard 3x1 slide. The fill levels can be custom set to the operator's preference if desired.

1. Unit must be primed before setting fill levels.
2. Turn the unit OFF and then back ON and wait for the main menu. Now turn unit OFF again.
3. Turn the instrument ON while holding down F4.
4. Select F4.
5. If the cuvette has any fluid in it, press and hold F1 until it is all gone.
6. If it is empty, press F4.
7. Now load a slide in the cuvette before setting fill levels.
8. To set the stain level, press and hold F2 until desired level is reached. Then release the key.
9. Drain the cuvette until it is completely empty and press F4 again.
10. Then use the F4 key to set the rinse and buffer. They are set simultaneously. Drain the cuvette again. To save fill levels, press the MENU key. The unit will save the fill levels and cycle back to the Main Menu to prepare for the next slide.

    NOTICE: Fill levels not set with a 3x1 slide inserted in the slide chamber will be incorrect and lead to overflow of reagents onto operating area. This can lead to possible damage of the unit's surroundings.

Attachment C – To Change Timing

The MENU key allows customization of stain and buffer times for both blood and bone marrow stains separately. The stain and buffer times are changed in 5 second intervals. If times are changed, be sure to press F4 to save your selected time. Factory settings are 30 seconds stain and 30 second s buffer.

To change the timing on the Quick Slide Plus II Stainer:

1. Press MENU until you see Alter Stain Time or alter Buffer Time.

2. If the stain is too dark, decrease the stain time.

3. If neutrophil cytoplasm is not pink, increase the buffer time.

Attachment D – Extended Methanol Cleaning

This maintenance is to be performed monthly and documented on the designated maintenance log.

1. Turn the instrument off.

2. Remove lines from the staining solution bottles (i.e. Stain, Buffer, Rinse) and place all 3 lines in a beaker with methanol.

3. Make sure that there is adequate room in the waste container or replace with new bottle if necessary.

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4. Place a blank slide into the staining compartment.

5. Hold down F1 while turning the instrument back on. This puts the stainer into a continuous prime/ deprime cycle to prime the lines with methanol and then drain them again in order to clean the staining compartment, fittings, and tubings.

6. To stop the prime/deprime cycle once the process is complete, turn the instrument off.

7. Wipe the reagent container lines off with gauze and place back into the appropriate staining containers.

8. Prime the instrument twice and test the stainer with a test slide to verify that it is staining properly.

QUICK SLIDE PLUS II STAINER

Document Control

Location of Master: Hematology Procedure Manual
Master electronic file stored on the Beaumont Laboratory server:
S:\HEMACOAG\Document Control\Hematology\Procedure\Master Documents\Quick Slide Plus II Stainer.doc
Number of Controlled Copies posted for educational purposes: 1
Number of circulating Controlled Copies: 1
Location of circulating Controlled Copies: STAT Lab

Document History

Signature	Date	Revision #		Related Documents Reviewed/ Updated
Prepared by: Noelle Procopio MT(ASCP)SH	09/16/2009			
Approved by: Ann Marie Blenc, MD	09/16/2009			
Reviewed by: (Signature)	**Date**	**Revision #**	**Modification**	**Related Documents Reviewed/ Updated**
Ann Marie Blenc, MD	09/16/2009	00	New procedure.	
Ann Marie Blenc, MD	04/27/2010	01	Updated µL to mcL; added directive to document opening of new stain pack on maintenance log.	
Ann Marie Blenc, MD	03/10/2011	02	Added extended methanol cleaning procedure.	NA
Ann Marie Blenc, MD	04/26/2013	03	Added Notes 2-5.	NA
Ann Marie Blenc, MD	07/27/2013	04	Changed procedure name and references to stainer in procedure, consistent with upgrade to Quick Slide Plusstainer. Added instructions for reagent replacement. Added caution when loading/unloading slides. Added Notice to check waste bottle. Revised Attachment A-Maintenance with tubing replacement instructions. Revised Attachment B-Set Fill Levels instructions. Revised Attachment C-To Change Timing explaining function of MENU key.	NA
Ann Marie Blenc, MD	04/16/2015		No change	NA

Ann Marie Blenc, MD	03/20/2017	05	Added statement that methanol cleaning is to be performed monthly; added STAT Lab Function Checks log as related document.	OK
Elizabeth Sykes, MD	02/02/2018			
Peter Millward, MD	01/30/2019		New Medical Director	
Ann Marie Blenc, MD	11/14/2019	**06**	Added 60-day stability to opened reagent stain packs.	OK