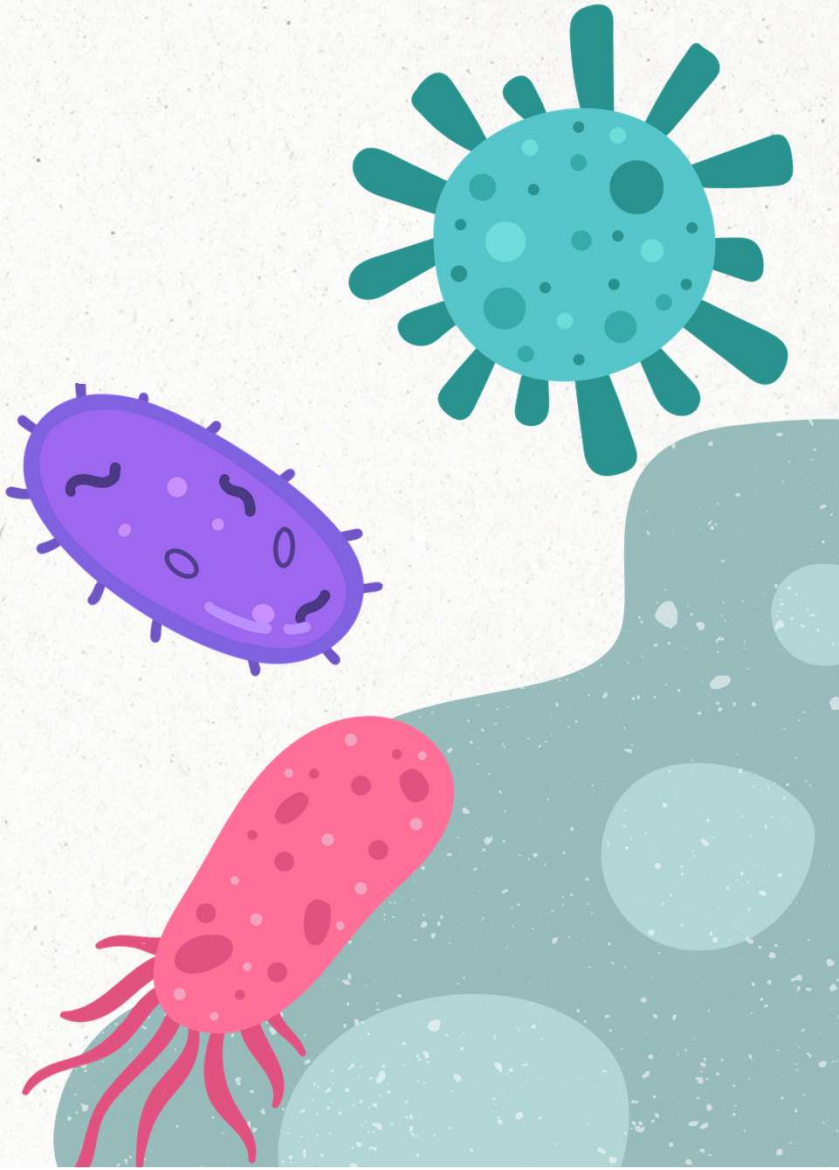
GIEMSA STAIN



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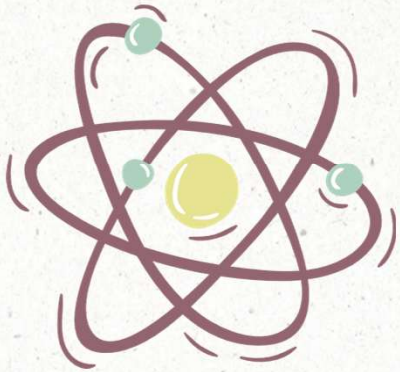
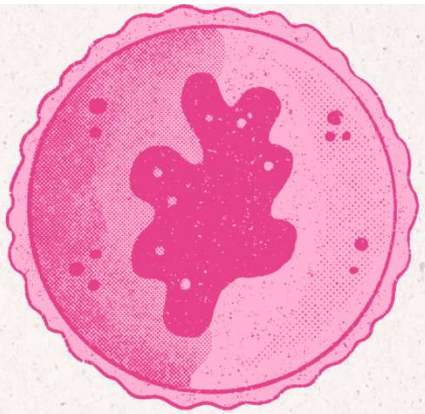
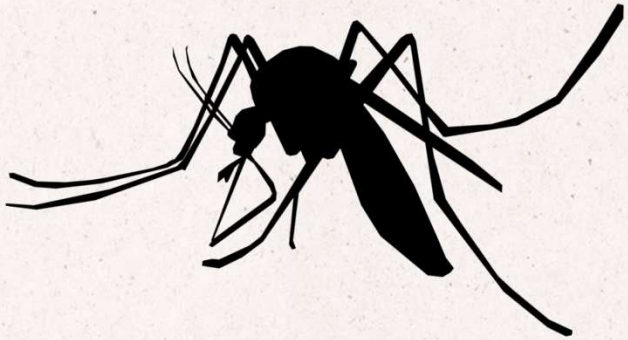
LEARNING OBJECTIVES

- Understand the staining procedure of Giemsa stain
- Recognize cellular components and common pathogens on Giemsa
- Identify causes of under- and over-differentiation





GIEMSA

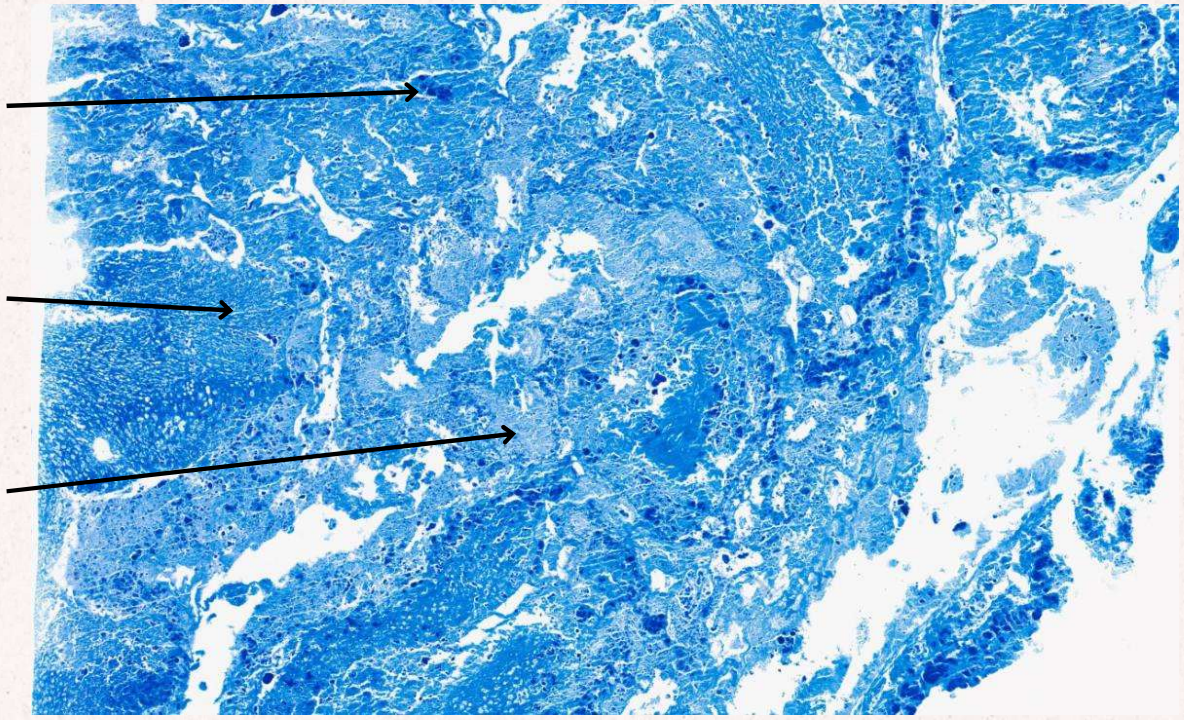


Giemsa stain is a differential Romanowsky stain (consisting of methylene blue, azure, and eosin) that allows for the differentiation of cellular components based on pH affinity. By binding specifically to the phosphate groups of DNA, it produces multiple shades of blue ranging from dark blue to pale blue.

Besides being used to visualise pathogens (eg. blood parasites) and cell nuclei. Giemsa stain is used for the detection of *Helicobacter pylori* in stomach biopsies, chlamydia inclusion bodies, and mast cells.

THREE PRIMARY SHADES OF BLUE

- **Dark Blue:** Observed in acidic cellular components, particularly the chromatin within the nuclei of leukocytes and the nucleoli.
- **Light Blue**: Seen in the cytoplasm of active cells, such as lymphocytes, and in the background cytoplasm of many bacterial pathogens.
- **Pale Blue**: Can appear in the cytoplasm of other leukocytes, where cytoplasm appears darker than normal.



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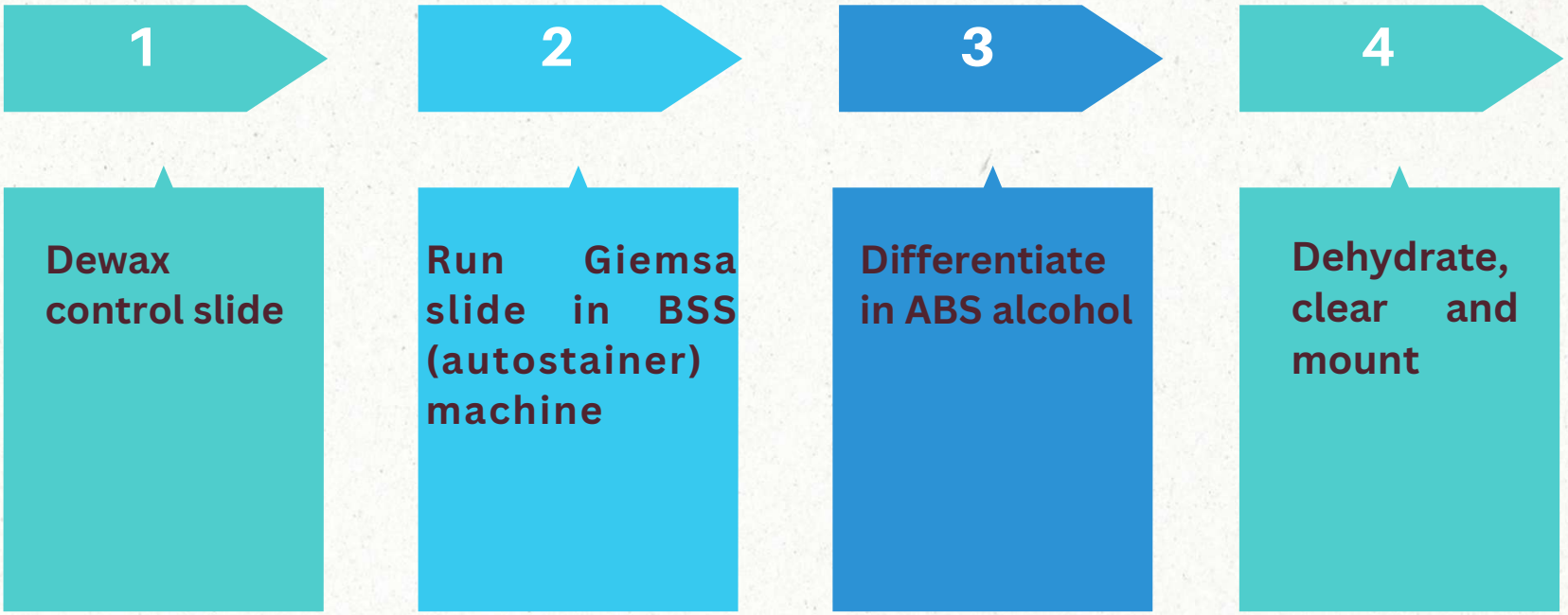
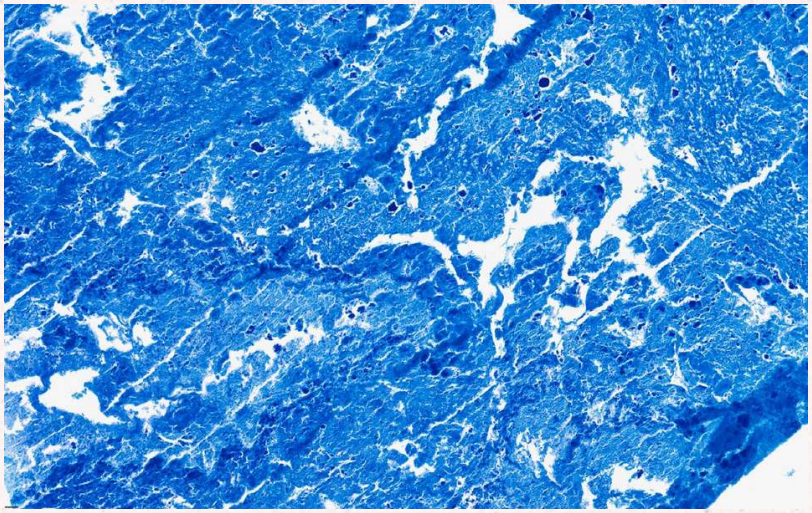
PROCEDURE

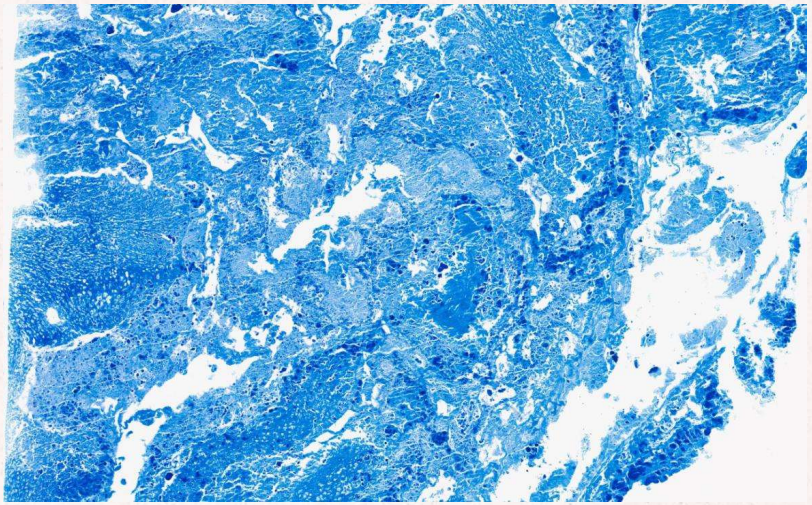

1
Dewax control slide
2
Run Giemsa slide in BSS (autostainer) machine
3
Differentiate in ABS alcohol
4
Dehydrate, clear and mount

TROUBLESHOOTING

UNDER-DIFFERENTIATION



Under-differentiated

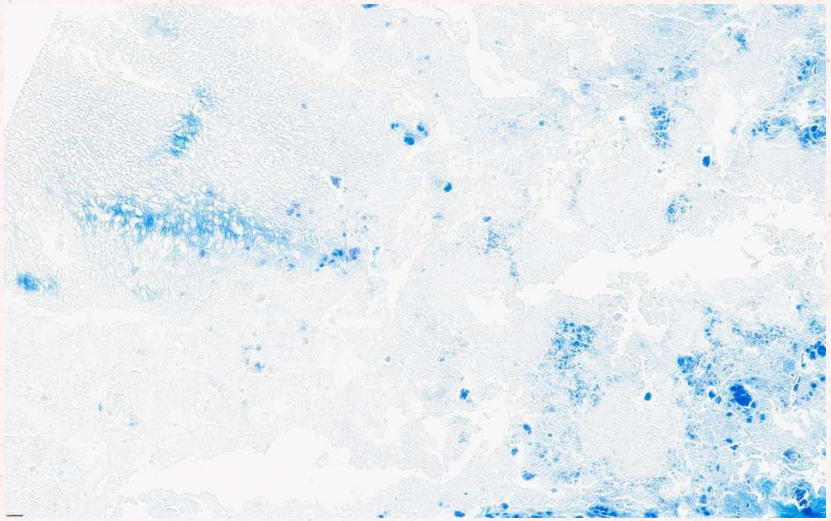


Normal

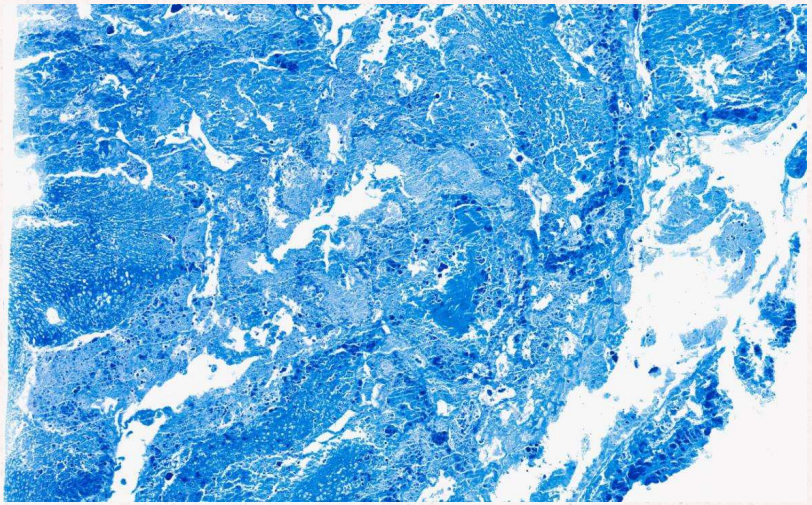
- Insufficient contrast observed
- Unable to differentiate between cells and microorganisms
- Differentiate further into ABS alcohol to achieve better staining

TROUBLESHOOTING

OVER-DIFFERENTIATION

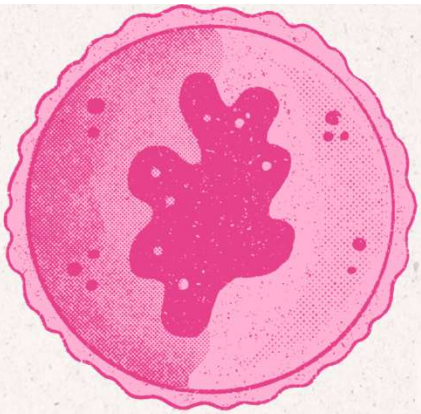


Over-differentiated



Normal

- Near complete loss of primary stain
- Unable to differentiate between cells and microorganisms
- Repeat staining



TAKE HOME MESSAGES

- Giemsa is a Romanowsky stain that differentiates cells and microorganisms based on pH affinity
- Binds strongly to DNA and nuclear material, producing characteristic blue shades
- Useful for identifying blood parasites, Helicobacter pylori, chlamydial inclusions, and mast cells
- Correct differentiation is essential—under- or over-differentiation reduces contrast and diagnostic accuracy

REFERENCES

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