May-Grünwald-Giemsa staining

This is the commonly used staining of blood smears. Similarly, to other methods in histology it is based on the electrostatic interaction between dye and target molecules. The staining solutions contain methylene blue (a basic dye), related azures (also basic dyes) and eosin (an acid dye). The basic dyes carry net positive charges, consequently they stain nuclei (because of the negative charges of phosphate groups of DNA and RNA molecules), granules of basophil granulocytes and RNA molecules of the cytoplasm of white blood cells. The eosin carries net negative charge and stains red blood cells and granules of eosinophil granulocytes. It was originally thought that the granules of neutrophil granulocytes were stained by a „neutral dye" that formed when the above-mentioned dyes were combined, but the correct mechanism is not clear.

The nuclei of white blood cells and the granules of basophil granulocytes appear in blue (staining with basic dyes), while red blood cells and eosinophil granules in red (because of red color of eosin). The cytoplasm of white blood cells are light blue, because of the low concentration of RNA molecules.

Solutions:

1. May-Grünwald stain diluted with an equal volume of distilled water
2. Giemsa stain diluted with 9 volume of distilled water

Procedure of staining:

1. Stain the fixed smears for 5 minutes in May-Grünwald stain diluted with an equal volume of distilled water!
2. Put the smears without washing for 30 minutes into Giemsa stain diluted with 9 volume of distilled water!
3. Wash the smears in distilled water and let them dry!
4. Observe the stained blood cells in light microscope!

Results of the staining:

The nuclei of white blood cells appear in blue, whereas the cytoplasm in light blue color. The cytoplasm of granulocytes contain some granules staining according to the type of the cell. The red blood cells appear in red. Look for different types of leucocytes! Draw them into the lab book!