Histopathological Diagnosis

PREPARATION OF HISTOLOGICAL SPECIMENS

Periodic acid-Schiff reaction (PAS)

- The Schiff reagent is a bleached basic fuschin that reacts with aldehyde groups. This reaction results in a deep red colour in the section. It is the basis of the PAS stain.
- PAS stains carbohydrates and carbohydrate rich macromolecules a deep red colour (magenta).

Periodic acid-Schiff reaction (PAS)

- **PAS will therefore stain up:**
- glycogen the intracellular storage form of carbohydrate in cells
- Mucus in cells and tissues, Basement membranes, and Brush borders of kidney tubules and small and large intestines Reticular fibres (i.e. collagen) in connective tissue and Cartilage.
- In the example shown above, The mucin produced by goblet cells is stained a purple colour by this stain.

Masson's trichrome

- This is often used to stain connective tissue.
- Tri-chrome - means the technique produces three colours.
- Nuclei and other basophilic (basic-liking) structures are stained blue, cytoplasm, muscle, erythrocytes and keratin are stained bright-red.
- Collagen is stained green or blue, depending on which variant of the technique is used.

Alcian blue

- Alcian blue is a mucin stain that stains certain types of mucin blue.
- Cartilage is also stained blue. It can be used with H&E, and with van Gieson stains.

VAN GIESON

- This stains collagen red, nuclei blue, and erythrocytes and cytoplasm yellow.
- It can be combined with an elastic stain that stins elastin blue/black.
- It is often used for blood vessels and skin.

Reticulin Stain

- Stains reticulin fibres blue/black. Used with H&E

Azan

- Nuclei are stained bright red, collagen, basement membrane and mucin are stained blue, muscle and red blood cells are stained orange to red.
- Good for staining connective tissue and epithelium.

TOLUIDINE BLUE

- A basic stain that stains acidic components various shades of blue.
- It is usually used for thin acrylic or epoxy sections.
- MAST CELLSSSS!!!

Silver and gold methods

- Sometimes used to demonstrate fine structures such as cell processes in neurones.
- Produces a black, brown or golden stain.

Sudan Black and osmIum

- These dyes stain lipid-containing structures such as myelin a brownish-black colour.

Oil red o

- Oil Red O is one of the dyes used for Sudan staining. Similar dyes include Sudan III, Sudan IV, and Sudan Black B. **The staining has to be performed on fresh samples,** as alcohol fixation removes most lipids.
- Oil Red O largely replaced Sudan III and Sudan IV, as it provides much deeper red color and the stains are therefore much easier to see.

Nissl and methylene blue

- A basic dye used to stain the rough ER in neurones.

Giemsa

- Usually used for staining blood and bone-marrow smears.
- Nuclei are stained dark-blue to violet, cytoplasm pale blue, erythrocytes pale pink.

Congo red

- Congo red is used for staining in amyloidosis, and for the cell walls of plants and fungi, and for the outer membrane of Gram-negative bacteria.

Ziehl–Neelsen stain

- The Ziehl–Neelsen stain, also known as the acid-fast stain.
- It is a special bacteriological stain used to identify acid-fast organisms, mainly Mycobacteria. Mycobacterium tuberculosis is the most important of this group because it is responsible for tuberculosis (TB).
- Acid-fast organisms like Mycobacterium contain large amounts of lipid substances within their cell walls called mycolic acids. These acids resist staining by ordinary methods such as a Gram stain.

Ziehl–Neelsen stain

- It can also be used to stain a few other bacteria, such as Nocardia. The reagents used for Ziehl–Neelsen staining are – carbol fuchsin, acid alcohol, and methylene blue. Acid-fast bacilli are bright red after staining.
- It is also useful in the identification of some protozoa, namely Cryptosporidium and Isospora.
- Acid-fast bacteria retain carbol fuchsin so they appear red.