

PART 3: Periodic Acid-Schiff (PAS) Staining Clinical, diagnostic and technical aspects

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Due Date

The Periodic Acid-Schiff (PAS) Staining method is used in the therapeutic setting.

It is common practice in histopathology to employ the Periodic Acid-Schiff (PAS) Stain to show the presence of carbohydrates or carbohydrate-rich compounds in tissues. Polysaccharides, mucin, glycogen, specific glycoproteins and glycolipids, the basement membrane, and fungus may all be seen in PAS stained tissues, as well as some of their constituent parts.

When and why would this technique be used for histopathological diagnosis?

Periodic Acid-Schiff (PAS) Stain's Importance and Applications PAS aids in the identification of glycogen, cellulose, and starch (Rustamadji et al.,2020). When glycogen storage disorder is suspected, this may be used to identify glycogen deposits in the liver.

The PAS stain may also be used to view the basement membrane of different tissues. When assessing renal illness, the PAS is most frequently used to show the thickness of the glomerular basement membrane.

Because of the high carbohydrate content in their cell walls/capsules, PAS stain may be used to detect *Cryptococcus neoformans*.

PAS aids in the identification of cerebroside and ganglioside. It aids in diagnosing illnesses such as Gaucher's disease.

Periodic Acid-Schiff (PAS) stain reveals pigments such as lipofuscin and pigments associated with Dubin-Johnson syndrome.

Periodic Acid-Schiff (PAS) Stain is used to stain the Russell bodies of plasma cells.

Periodic Acid-Schiff (PAS) Spectroscopy and Its Diagnostic Uses

When glycogen storage disorder is suspected, this staining technique is the most frequently employed in the histology laboratory to identify glycogen deposits in the liver. The

presence of glycogen granules in malignancies of the bladder, kidney, ovary, pancreas, and lungs is also a possible finding (Williamson & Snyder, 2015).

Due to the high carbohydrate content of the organism's cell walls, the PAS staining technique is also employed to show hyphae and yeast forms of fungus in tissue samples.

What technical (laboratory processes) need to be considered when using this method? (Safety implications? Specific temperature/pH/timing/etc.?)

The PAS technique, which includes periodic acid exposure, may cure cancer. A free hydroxyl (-OH) group or an amino/alkylamine group may be oxidized by periodic acid to dialdehydes. It oxidizes substances with hydroxyl (-OH) or amino/alkylamine groups. Periodic acid is a halogenated halogen. When subjected to Schiff's reagent, these dialdehydes produce an insoluble magenta-colored complex. An excellent primary stain is required to make a good counterstain (Cana et al., 2017).

The Working Principle of the Periodic Acid-Schiff (PAS) Stain

Using periodic acid, the glycol group of carbohydrates is oxidized, resulting in the release of dialdehydes. Upon reaction of these dialdehydes with Schiff's reagent, a magenta-colored complex is produced, concentrated explicitly at the site of aldehyde synthesis.

What advantage does this method have over other techniques for carbohydrates or mucosubstance staining/labelling procedures,

Periodic acid has an advantage in that its oxidation is quite selective. It produces aldehydes within the polysaccharide molecule but does not allow the polymers to oxidize to low molecular weight water soluble forms.

Is this method conclusive or inductive for a final diagnosis when ordered by the pathologist?

Periodic acid-Schiff (PAS) is an indictive method since it is mostly ordered by the pathologist to indicate the type of cancer or tumor in the patient. PAS staining can also be used to differentiate between different kinds of glycogen storage disease, as well as indicating the presence of some cancers, such as Paget's disorder.

REFERENCES

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