Special Stains
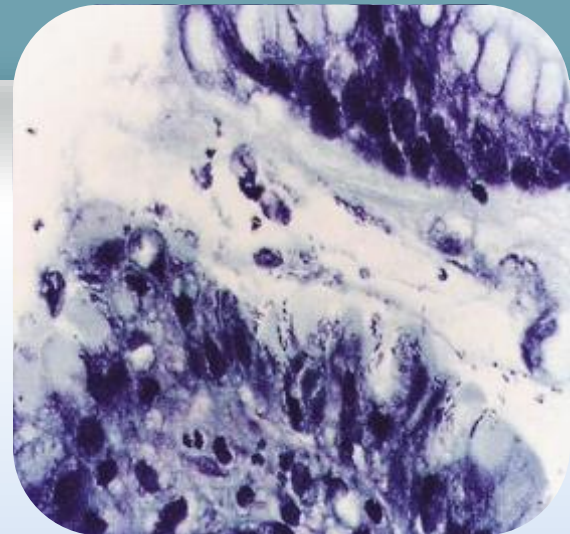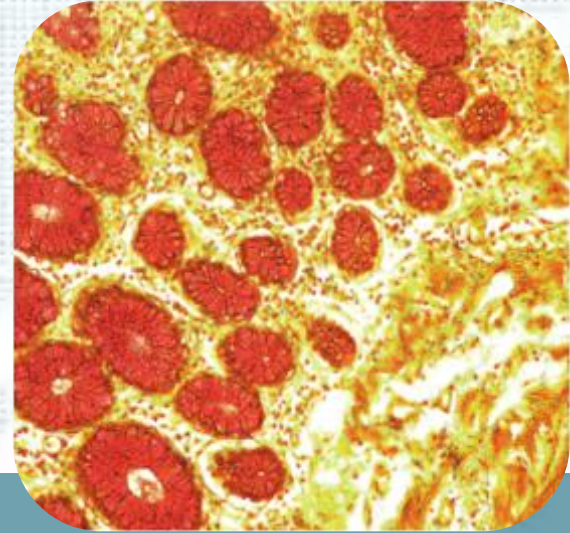
Presented for:

Presented by:
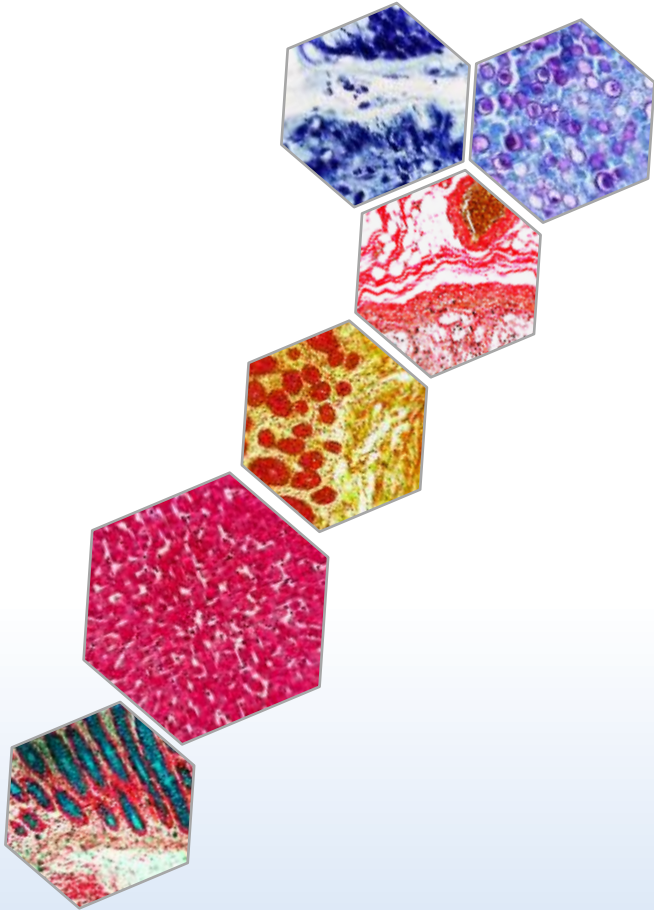
Date:

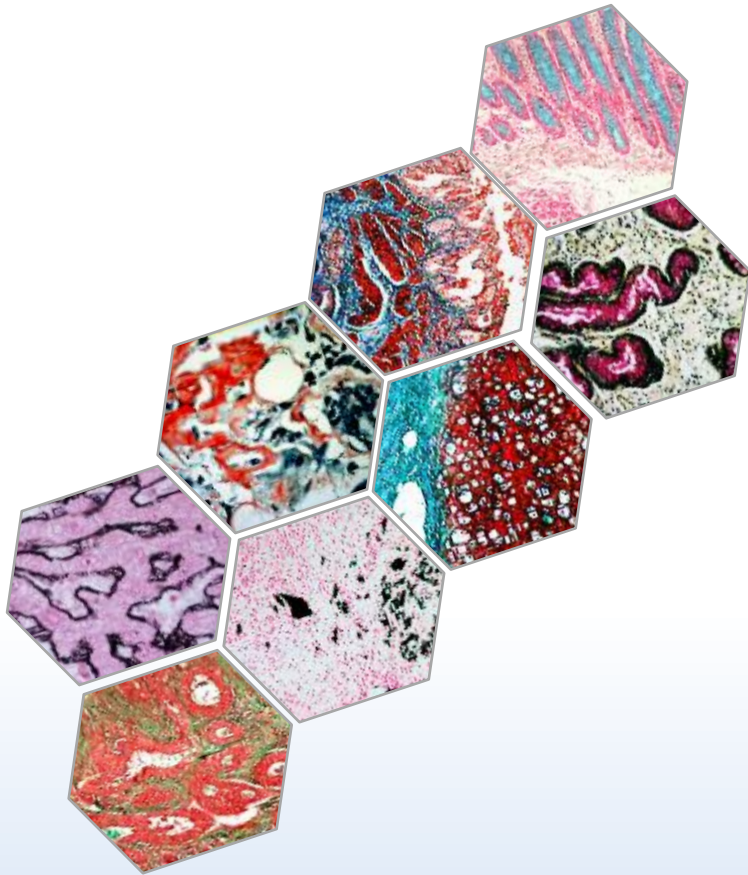**BioGenex**

Special Stains

**𝗫 BioGenex**

Special Stains

- Used in addition to H & E staining to selectively stain cells and cellular components

- Used when needed

- **Gives information on:**

  - Presence of certain class of molecules

  - Their localization

  - Number of molecules present

✗ BioGenex

Classification

- **Can be grouped into:**

  - Stains for detection of microorganisms

  - Connective tissues and lipids

  - Carbohydrates

  - Amyloid

  - Minerals, pigments and miscellaneous

# Stains for the detection of Microorganisms
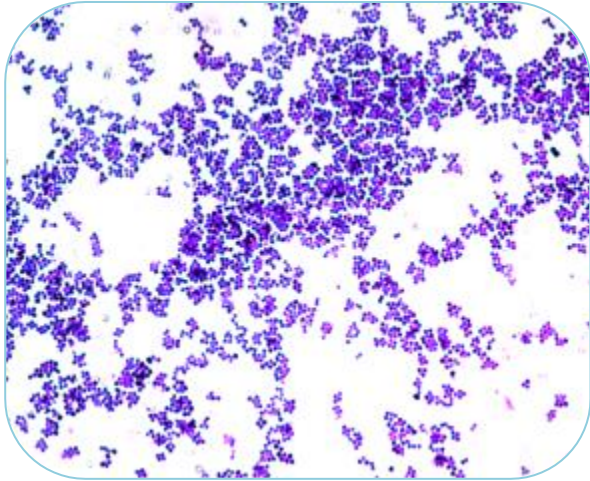
- **Gram Staining :**

  - Used to stain both bacilli and cocci

  - Basic classification of bacteria are based on this staining

    - Bacteria with large deposits of peptidoglycan in their cell walls retain methyl violet and are termed Gram positive

    - Bacteria with large deposits of lipids and lipopolysacharrides are termed Gram negative
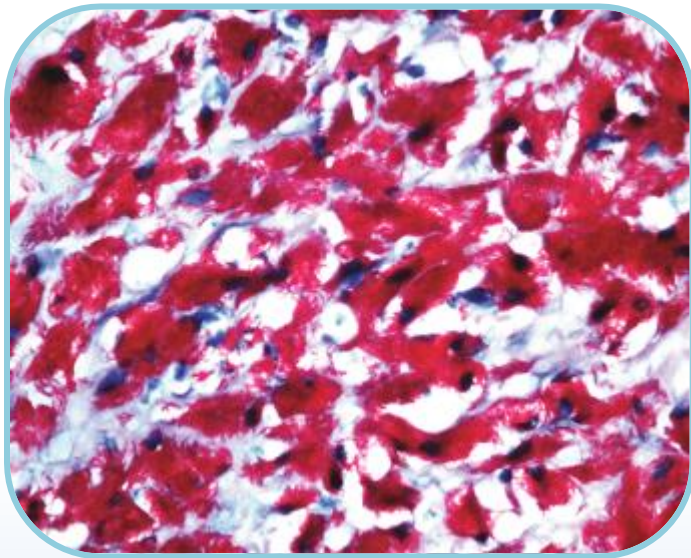
X BioGenex
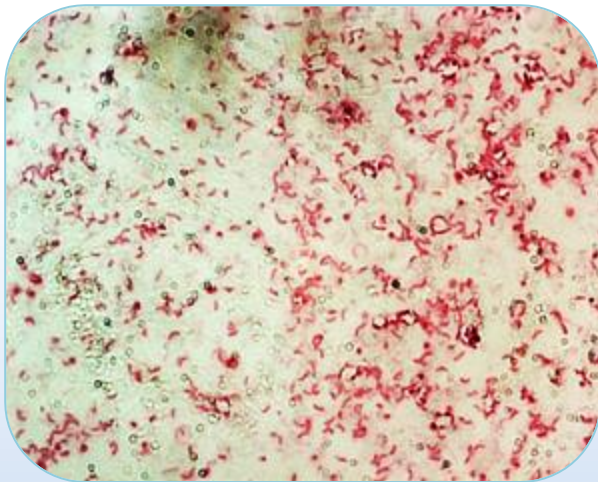
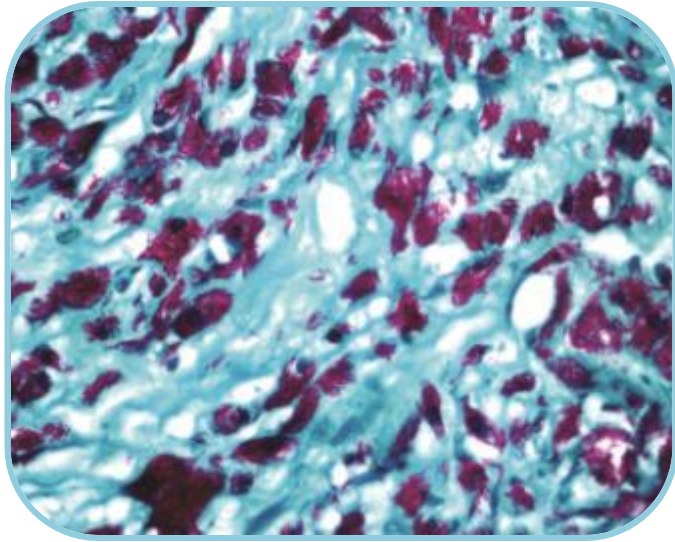# Stains for the detection of Microorganisms
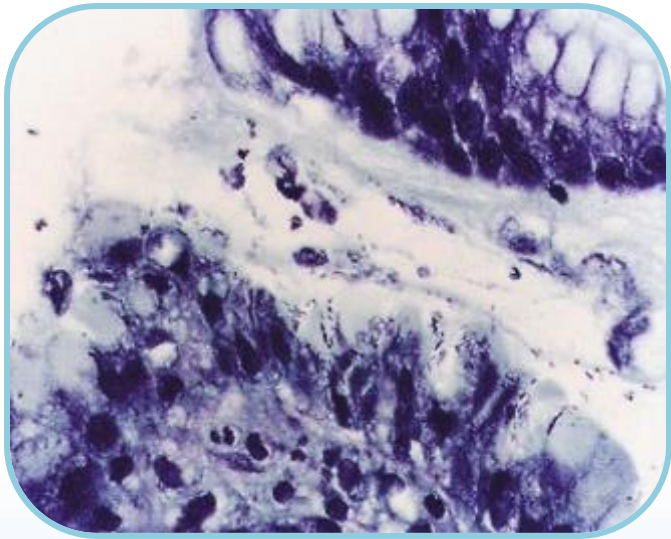
- **Giemsa Stain :**

  - Used to stain bacteria and protozoa, H. pylori, rickettsia and chlamydiae

- **Type of staining:**

  - Bacteria stains blue

  - cytoplasm stains from pink to rose and nuclei blue

  - Eisonophils are also easily detected

Stains for the detection of Microorganisms


- **Acid Fast Blue**

    - Acid fast refers to cell walls containing high lipid content (mycolic acid and long chain fatty acids)

    - These bind to Carbol-fuchsin dye after decolorization

    - Used to stain Mycobacteria, oocysts of Cryptosporidium parvum, Cyclospora, Isospora; also hooklets of cysticerci

    - Acid fast cells stain Red and non acid fast cells stain Blue

Stains for the detection of Microorganisms

- **Acid Fast Green**

  - Used for the detection of Mycobacterium spp

 - Stains Acid fast bacteria red while the background Stains green

# Stains for the detection of Microorganisms
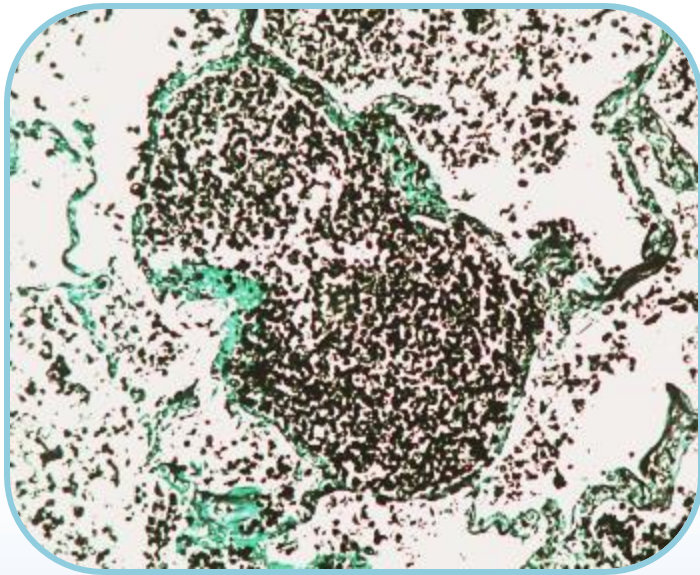
- **GMS Staining**

  - Used for the detection of fungi in tissue sections

  - Argentaffin reaction forms the basis for the identification of fungi

  - Stains fungi, Pneumocystis carnii, histoplasma spp Black, inner parts of mycelia and hyphae old rose, leishmania spp, toxoplasma spp negative, mucin dark grey, background pale green

✗ BioGenex

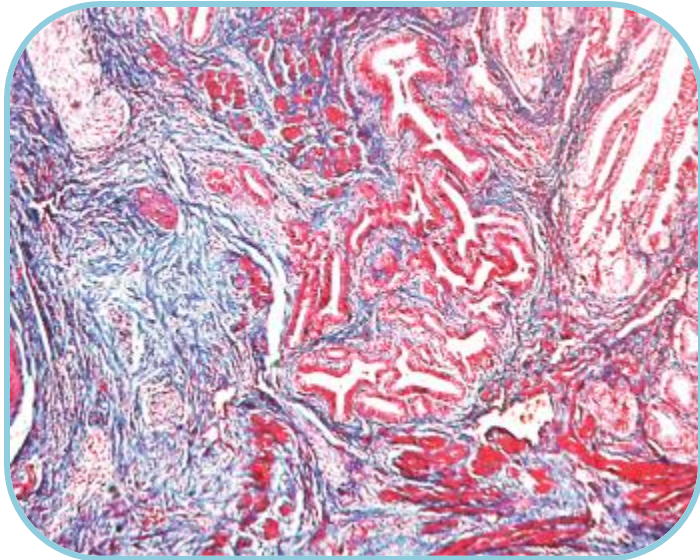# Stains for the detection of Connective Tissue
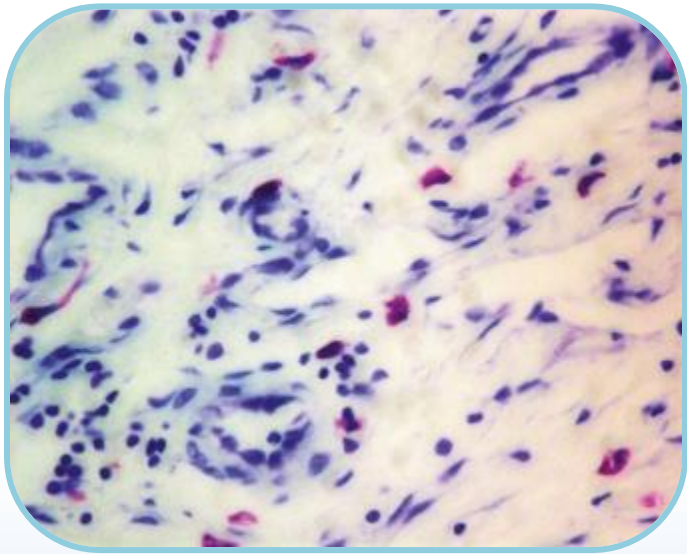
- **Toluidine Blue**

  - Used to stain mast cells

  - These cells are widely distributed in connective tissue

  - Mast cells stain Red-purple (Metachromatic staining) and the background stain blue (orthochromatic staining)

BioGenex

# Stains for the detection of Connective Tissue
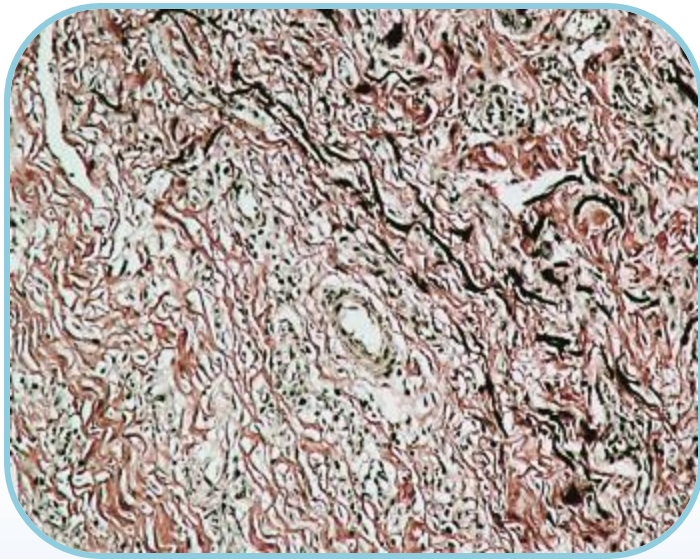
- **Elastic Stain**

  - Used to stain elastic fibers

  - Based on the affinity of elastin for hematoxylin complex

  - Retains dye longer than other tissues elements

  - Elastin stains dark brown/ black where as nucleus stains black

BioGenex

Stains for the detection of Connective Tissue


- **Gomoris Trichrome Blue**

  - Used to distinguish collagen from muscle tissue

  - Stains nucleus collagen blue, muscle, keratin and cytoplasm red and nuclei grey/blue/black

BioGenex

# Stains for the detection of Connective Tissue
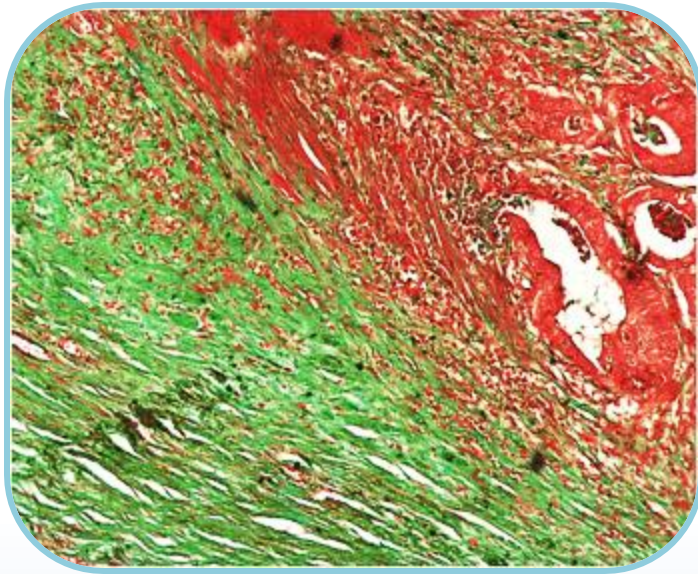
- **Gomoris Trichrome Green**

  - Useful in the study of diseases of connective tissue and muscle characterized by fibrotic and dystrophic changes and to differentiate between collagen and smooth muscle in tumors

  - Stains Nuclei(Blue), Collagen(Green), Muscle Fiber(Green)

Stains for the detection of Connective Tissue
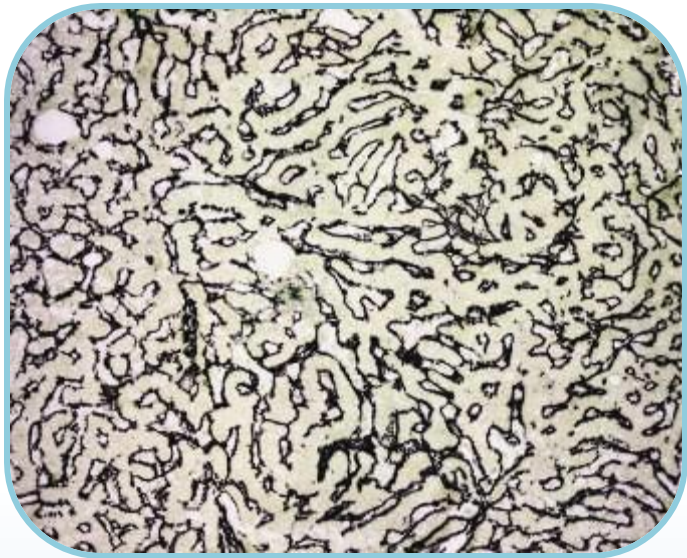

- **Reticulin no counter stain**

  - Used for the identification of Reticular fibers

  - Used for the diagnosis of carcinomas, Sarcomas, lymphosarcomas

  - Reticulin stains black with out any counter stain

X BioGenex

Stains for the detection of Connective Tissue
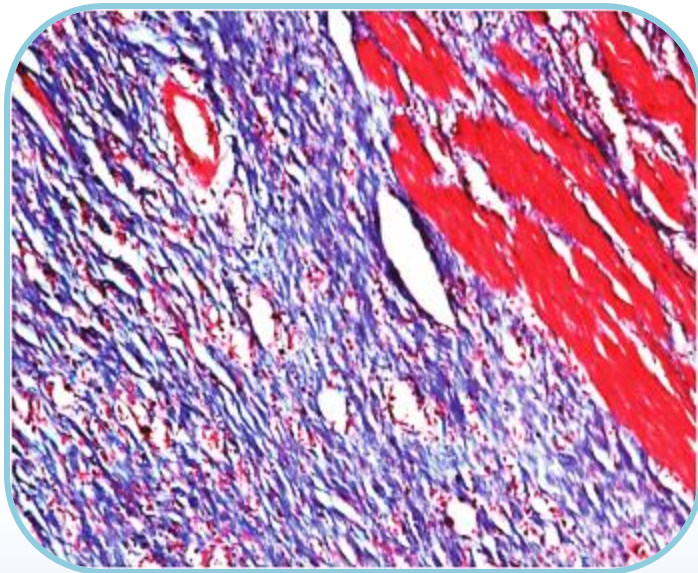

- **Massons Trichrome Stain**

  - Used to differentiate between collagen and smooth muscle in tumor

  - Increase of collagen in diseases such as Cirrhosis.

  - Stains Nuclei black, cytoplasm, muscle, erythrocytes red and collagen Blue

X BioGenex

# Stains for the detection of Connective Tissue
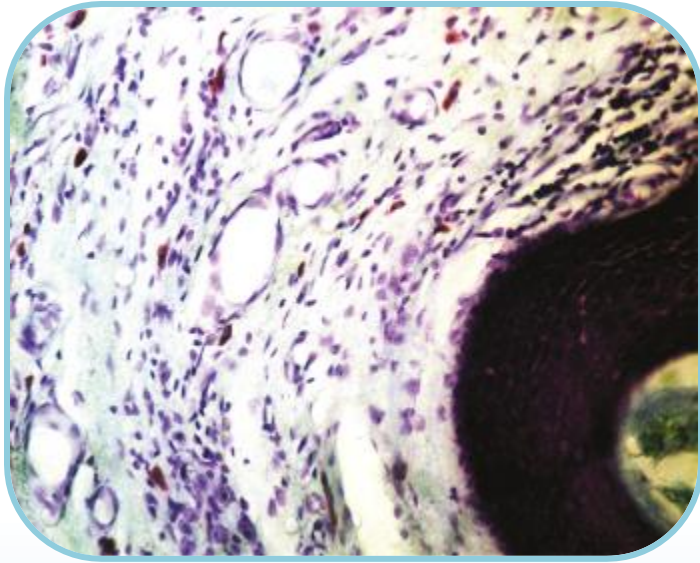
- **Azure A stain**

  - Used for the visualization of mast cells basophils and eisonophils

  - Stains Mast cell granules, sulphated and carboxylated mucins purple and Nuclei blue

𝕏 BioGenex

Stains for the detection of Connective Tissue
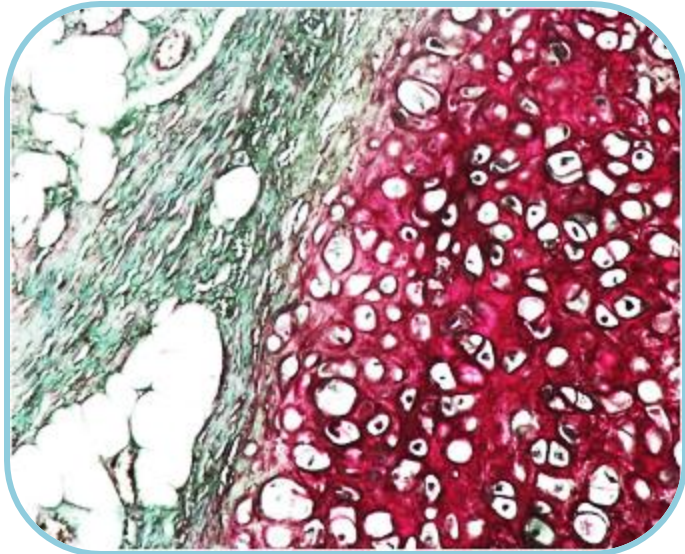
- **Safranin O staining**

  - Used for the detection of cartilage, mucin and mast cell granules

  - Stains Nuclei black, Cytoplasm bluish green, Cartilage, mucin, mast cell granules orange to red
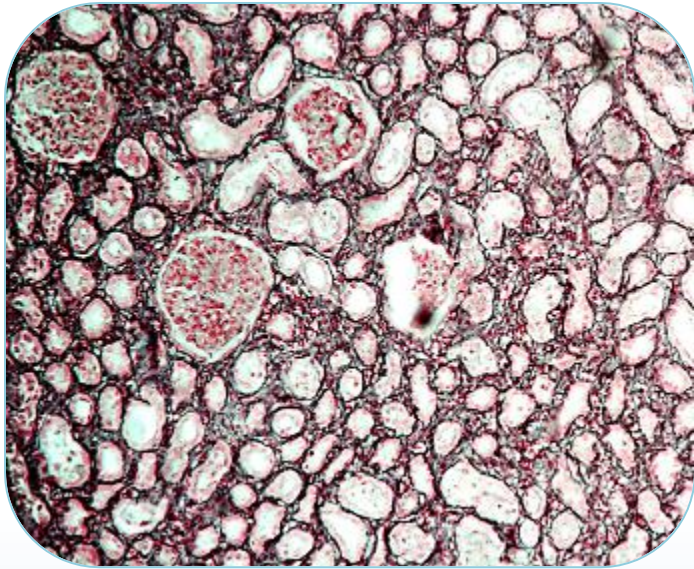
BioGenex

Stains for the detection of Connective Tissue
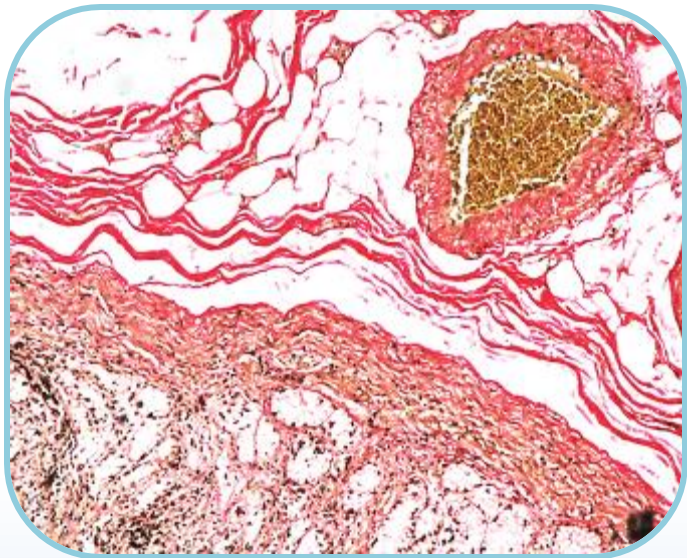

- **Van Gieson Stain:**

  - Used to differentiate collagen and smooth muscle

  - Can be used to demonstrate the presence of collagen in pathological conditions

  - Stains nuclei blue, Collagen bright red, Cytoplasm, muscle, fibrin and red blood cells yellow

BioGenex

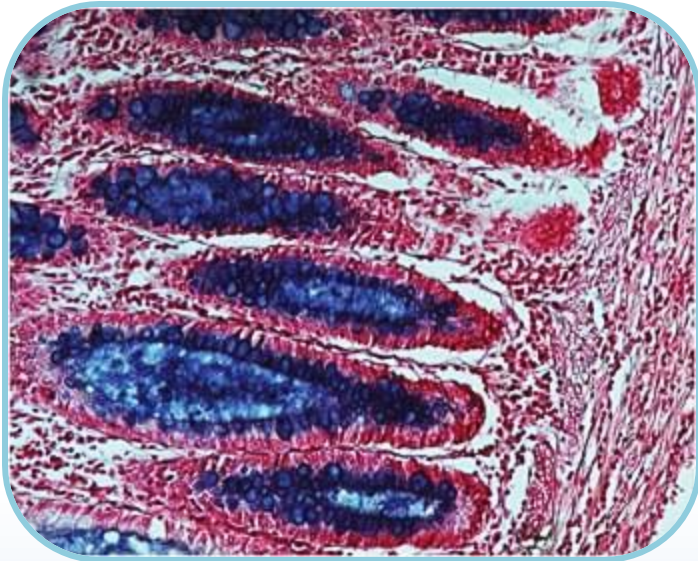# Stains for the detection of Connective Tissue

- **Reticulin Nuclear Fast Red:**

  - Used to identify reticulin fibers

  - Can be used for differential diagnosis of tumors such as carcinomas, sarcomas and lymphosarcomas

  - Stains reticulin black with a pink to rose background

X BioGenex

Stains for the detection of Carbohydrates
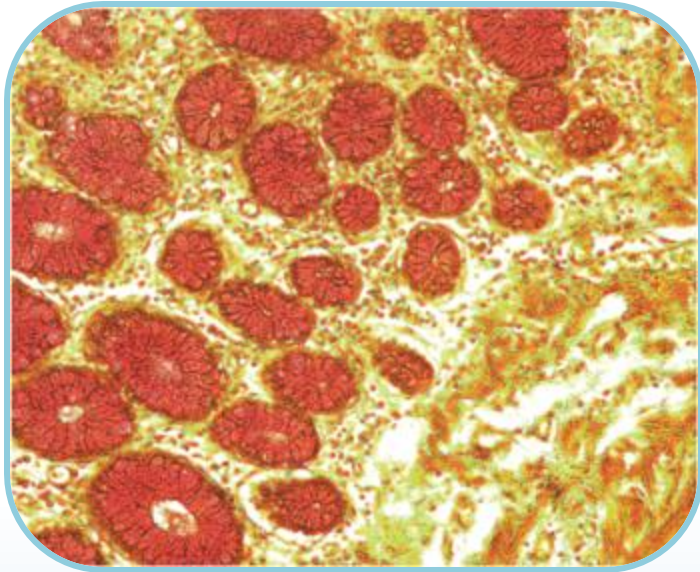
- **Mucicarmine Stain**

  - Used to detect epithelial mucin

  - Exhibits strong staining of epithelial mucins where as fibroblastic mucin show a poor staining
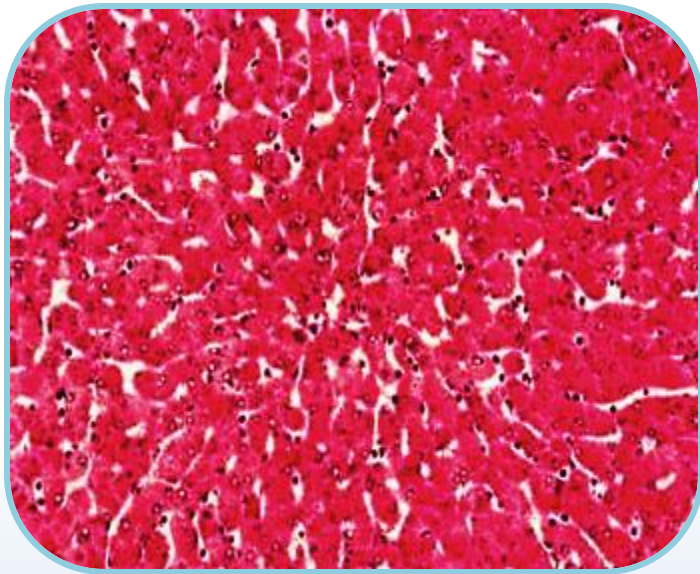
  - Stains mucin in shades of red

Stains for the detection of Carbohydrates

- **Alcian Blue**

  - Stains acid mucins and mucopolysaccharides

  - Copper in the stain is responsible for the blue stain

  - Strongly acidic muco substances stain blue, nuclei pink to red and cytoplasm pale pink

BioGenex

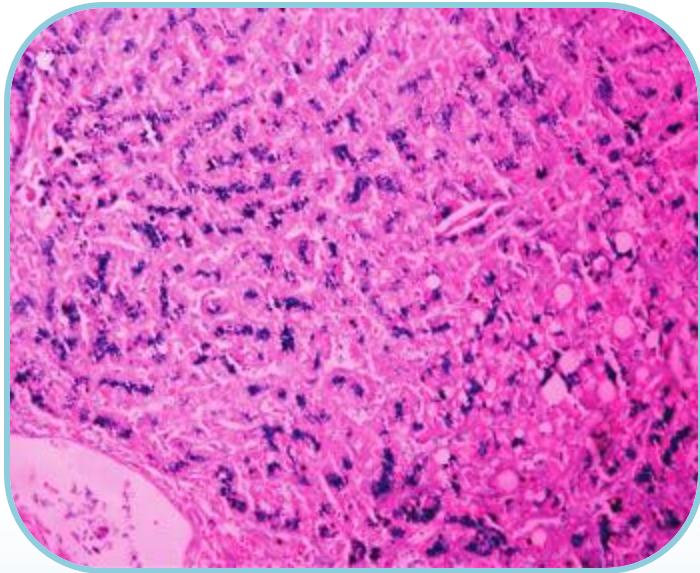# Stains for the detection of Carbohydrates

- **Acid-Schiff**

  - Used to detect glycogen, glycoproteins, mucopolysaccharides, basement membrane and mucin

  - Based on the reaction of the free aldehyde group of monosaccharrides with Schiff's reagent

  - PAS stains glycogen, mucin, mucoprotein, and glycoproteins magenta. The nuclei will stain blue. Collagen will stain pink.

✗ BioGenex

# Stains for the detection of Carbohydrates
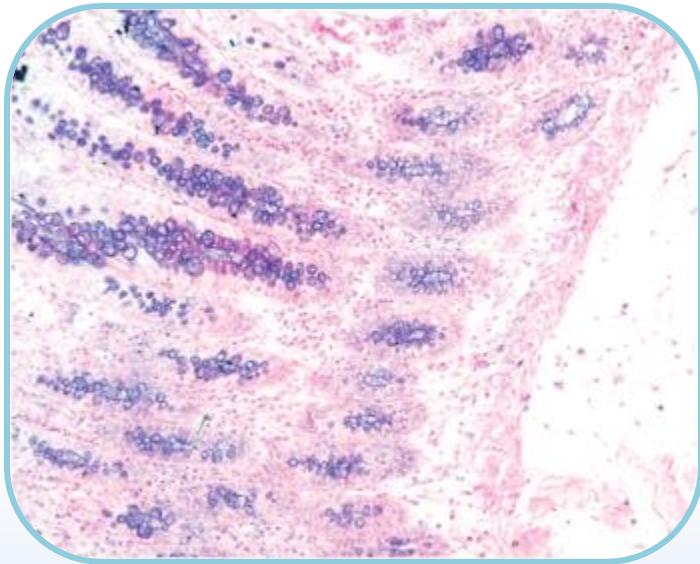
- **Alcian Blue PAS**

  - Combination of Alcian Blue and PAS technique

  - Demonstrates both acidic- neutral and mixtures of acidic and neutral mucins

  - Stains acid mucopolysaccharides blue and Neutral polysaccharides magenta

# Stains for the detection of Minerals

- **Iron Stain**

  - Used to detect iron in specimens

  - Ferric iron present in tissues react with ferrocyanide to form insoluble prussian blue dye

  - Ferric iron stains bright blue, nuclei Red and cytoplasm stains pink

X BioGenex

Stains for the detection of Minerals
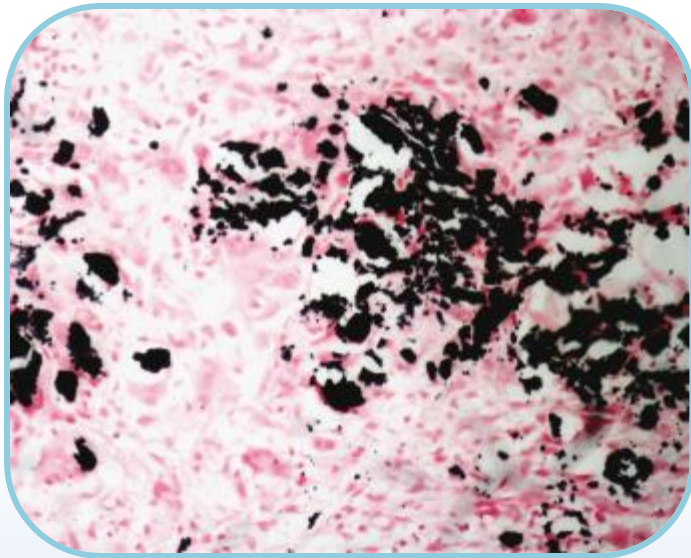
- **von Kossa Stain:**

  - Used for demonstrating calcium or its Salts and is not specific for calcium

  - Tissue sections are treated with silver nitrate solution, the calcium is reduced by the strong light and replaced with silver deposits, visualized as metallic silver

  - Stains Calcium salts black, Nuclei red, Cytoplasm pink

Stains for the detection of Minerals
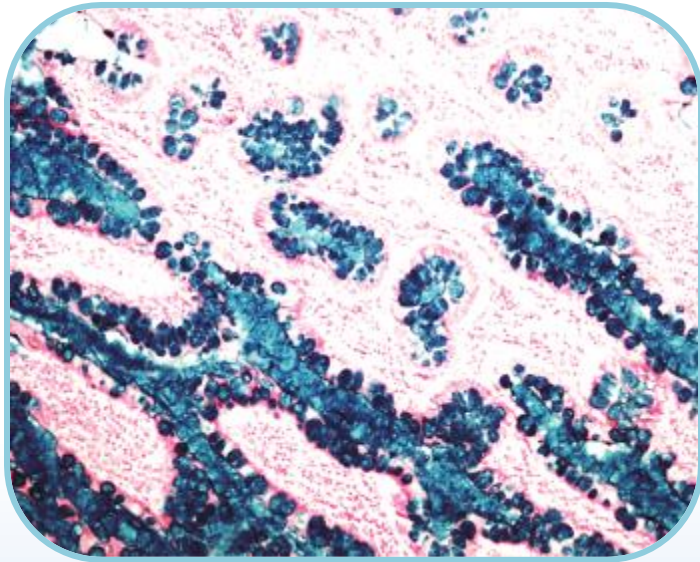
- **Colloidal Iron:**

  - Used demonstrate carboxylated and sulfated mucopolysaccharides and glycoproteins.

  - Stains Acid mucopolysaccharides and sialomucins deep blue, Nuclei Pink-red and Cytoplasm pink

Molecular Pathology Workflow Solution

Please visit www.biogenex.com for more details on our product portfolio