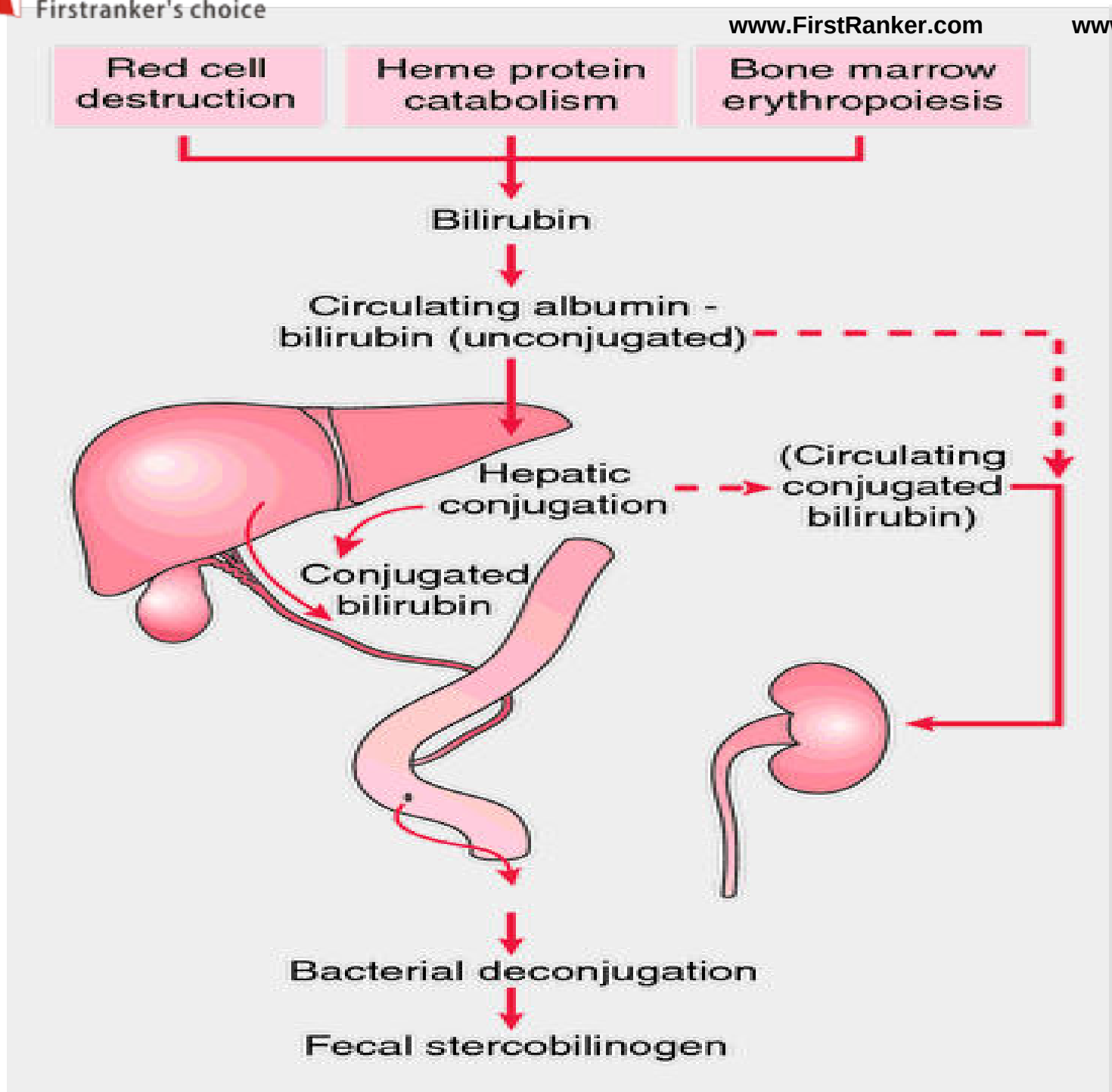
INTEGRATED TEACHING

Jaundice: Causes and Etiopathogenesis

Jaundice

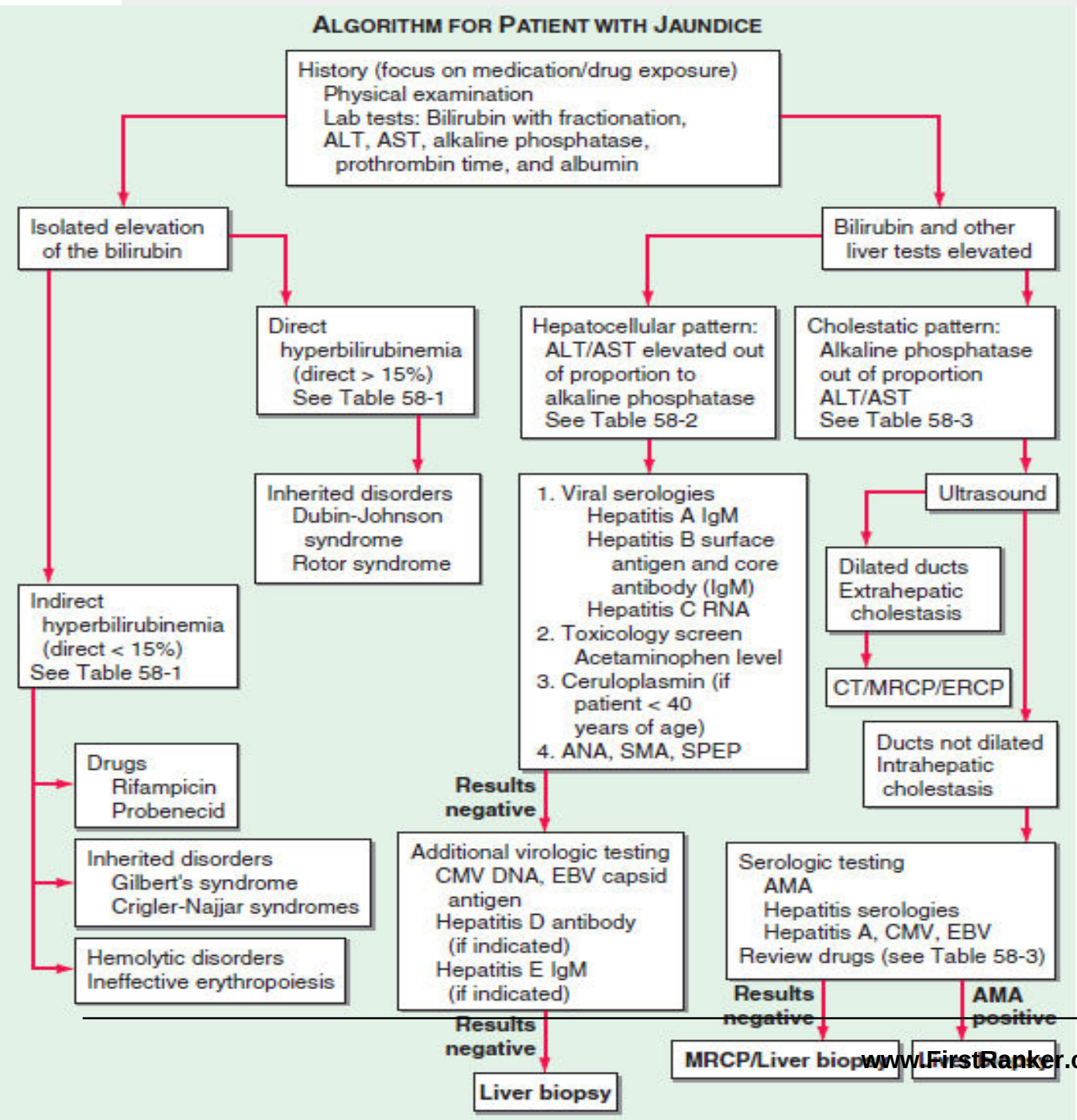
- “ Jaune” : Yellow

- Icterus
  - Latin
  - Sighting the bird was thought to cure jaundice



IMBALANCE between production and clearance

- Overproduction : hemolysis — Prehepatic
- Impaired uptake/conjugation/excretion: hepatocytes — Hepatic
- Regurgitation : Hepatocyte/ bileduct — Posthepatic



What are the different etiopathogenic patterns?

1) Haemolysis
2) Disorder of uptake and conjugation
3) Hepatocellular injury
4) Cholestasis

Role of pathology in establishing diagnosis?

1) Peripheral Smear examination
2) Liver biopsy

Haemolysis

- Inherited

1. Spherocytosis
2. Sickle cell
3. Thalassemia
4. Pyruvate kinase deficiency
5. G6PD deficiency

Vs

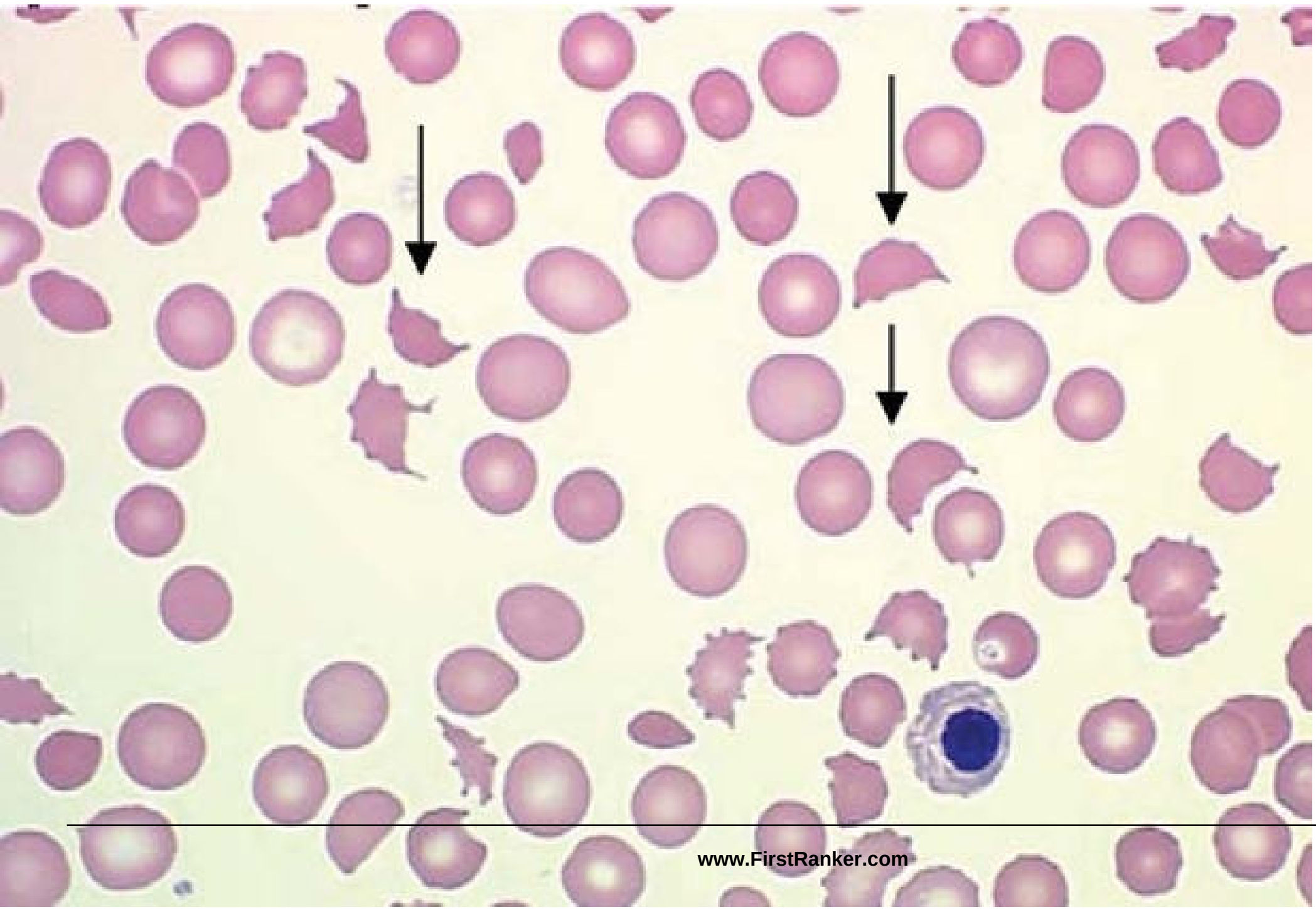
Acquired

1. Microangiopathic haemolytic anemia (HUS)
2. Paroxysmal Nocturnal Haemoglobinuria
3. Immune hemolysis
4. Parasitic infections (Malaria)
5. Ineffective erythropoiesis (B12, folate deficiency)

Serum Bilirubin rarely >5 mg/dL

Intravascular Vs Extravascular

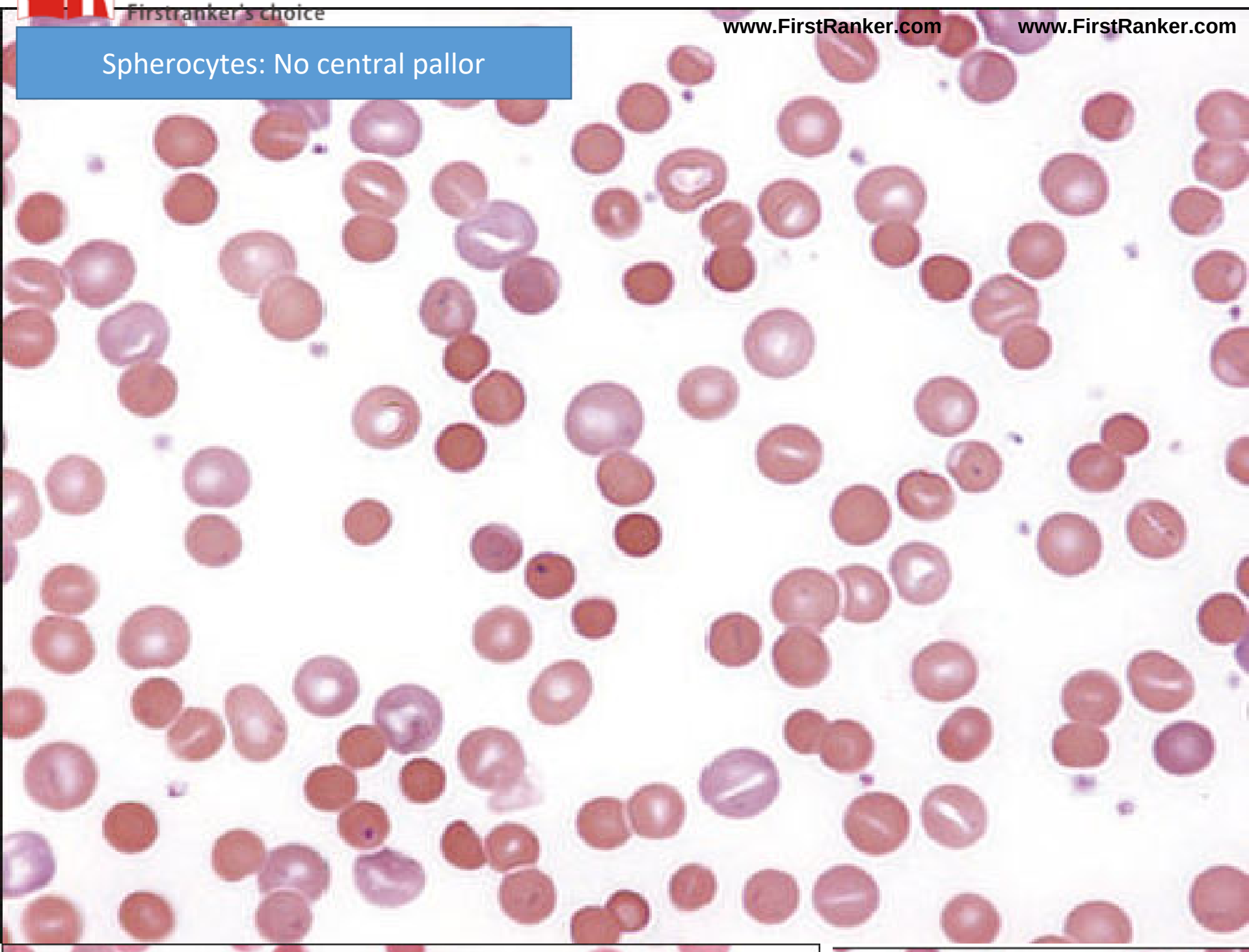
Pigmented gall stones



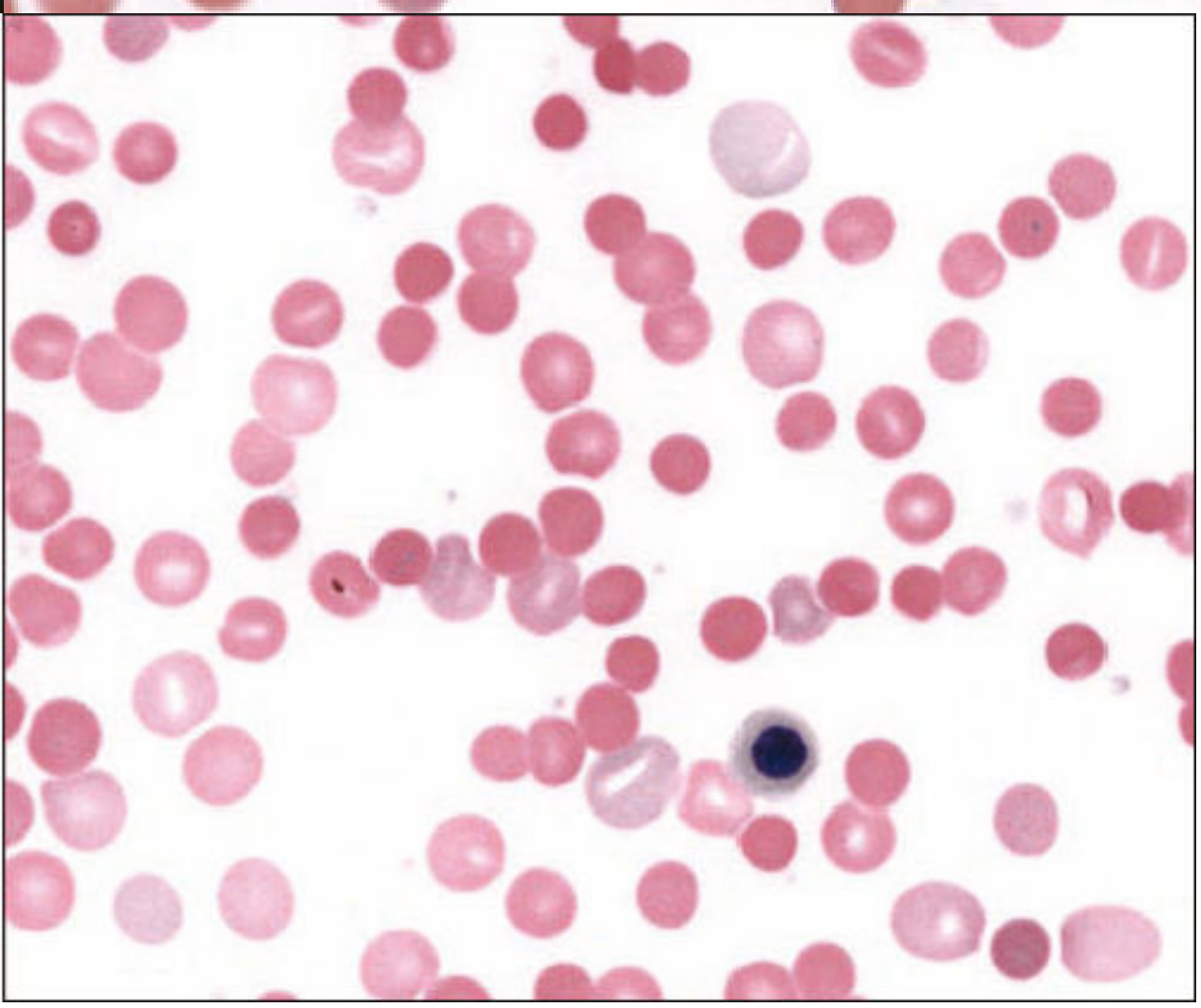
Schistocytes

Nucleated RBCs

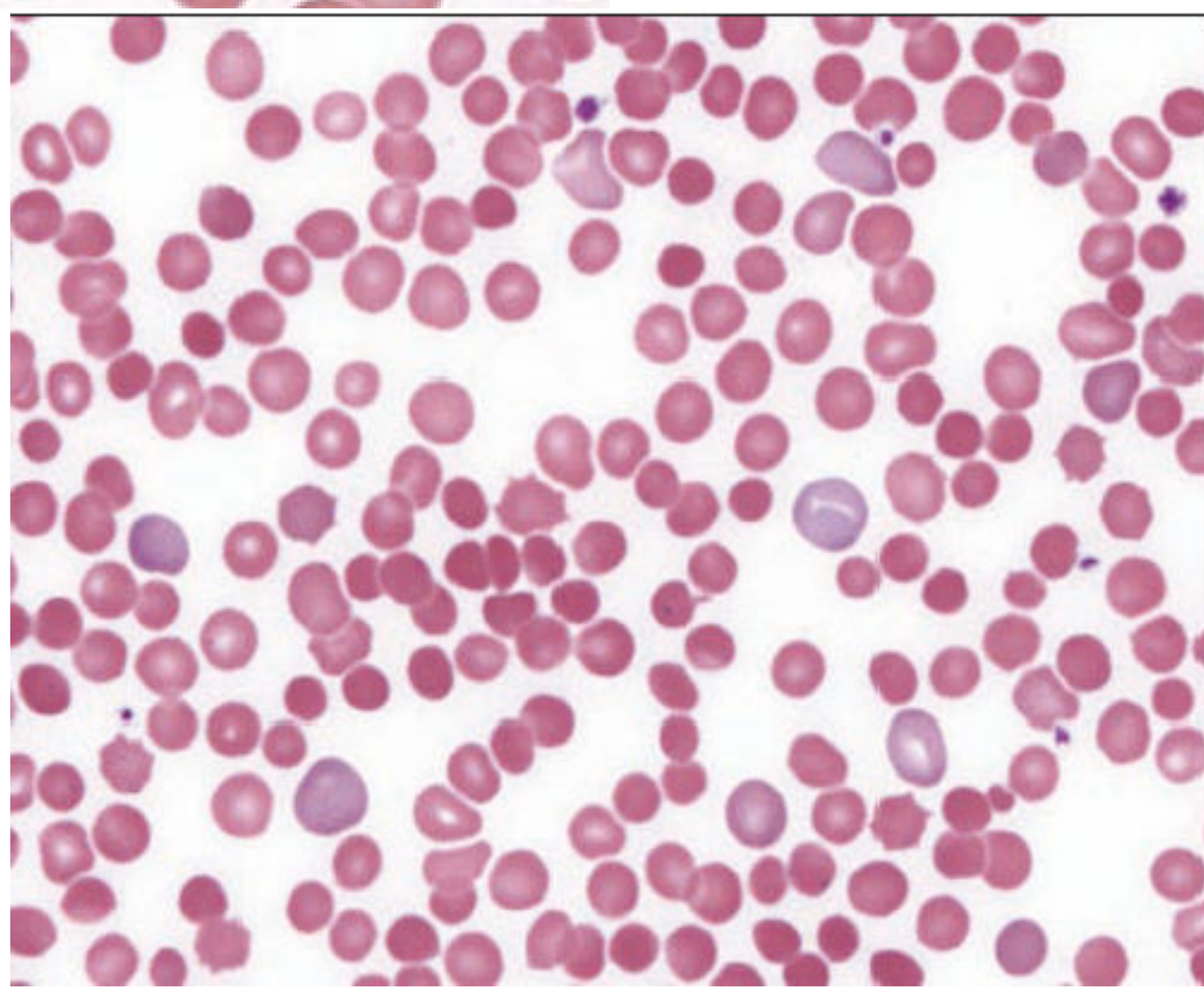
Spherocytes: No central pallor



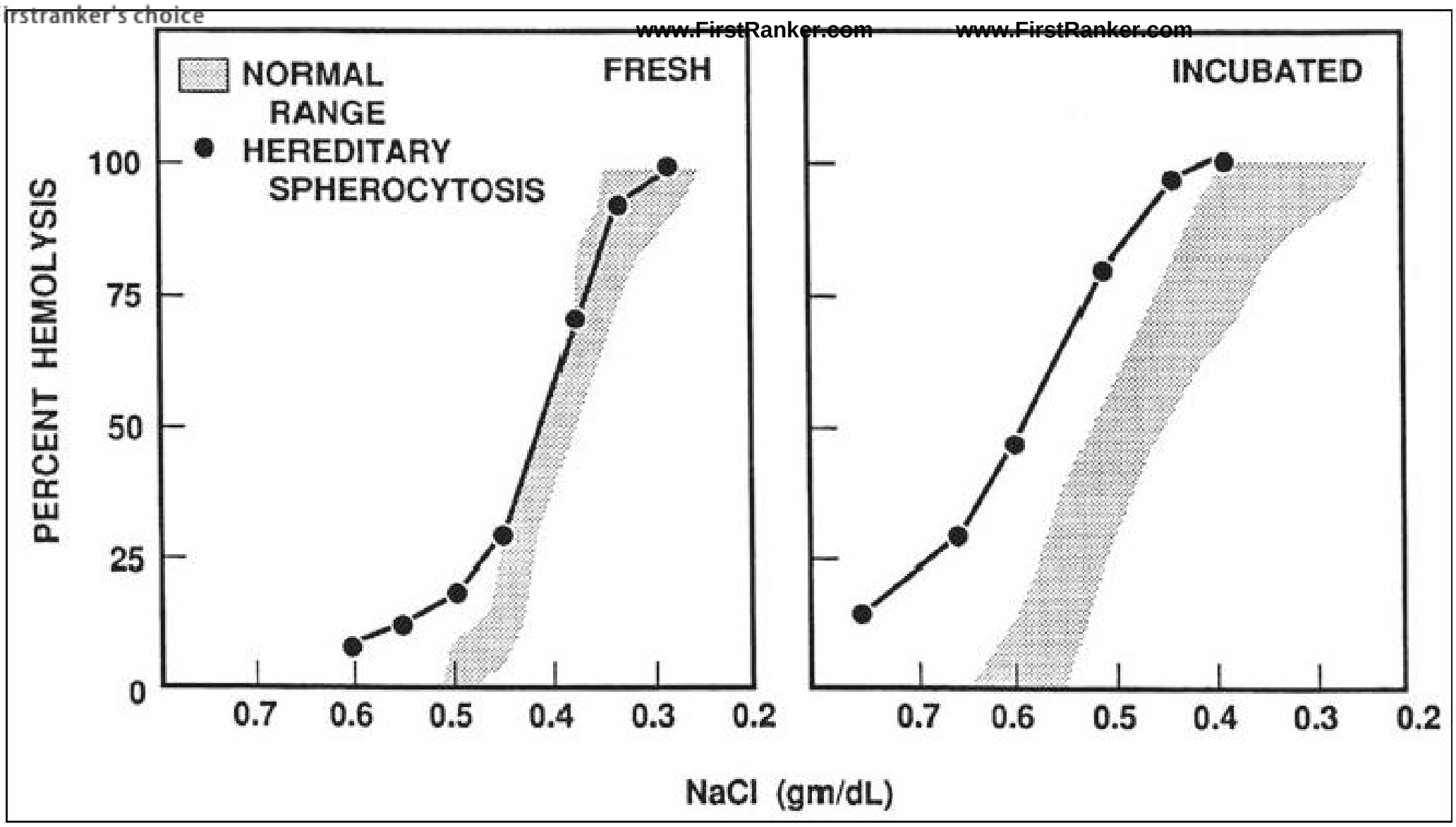
Coombs positive Autoimmune haemolytic anemia



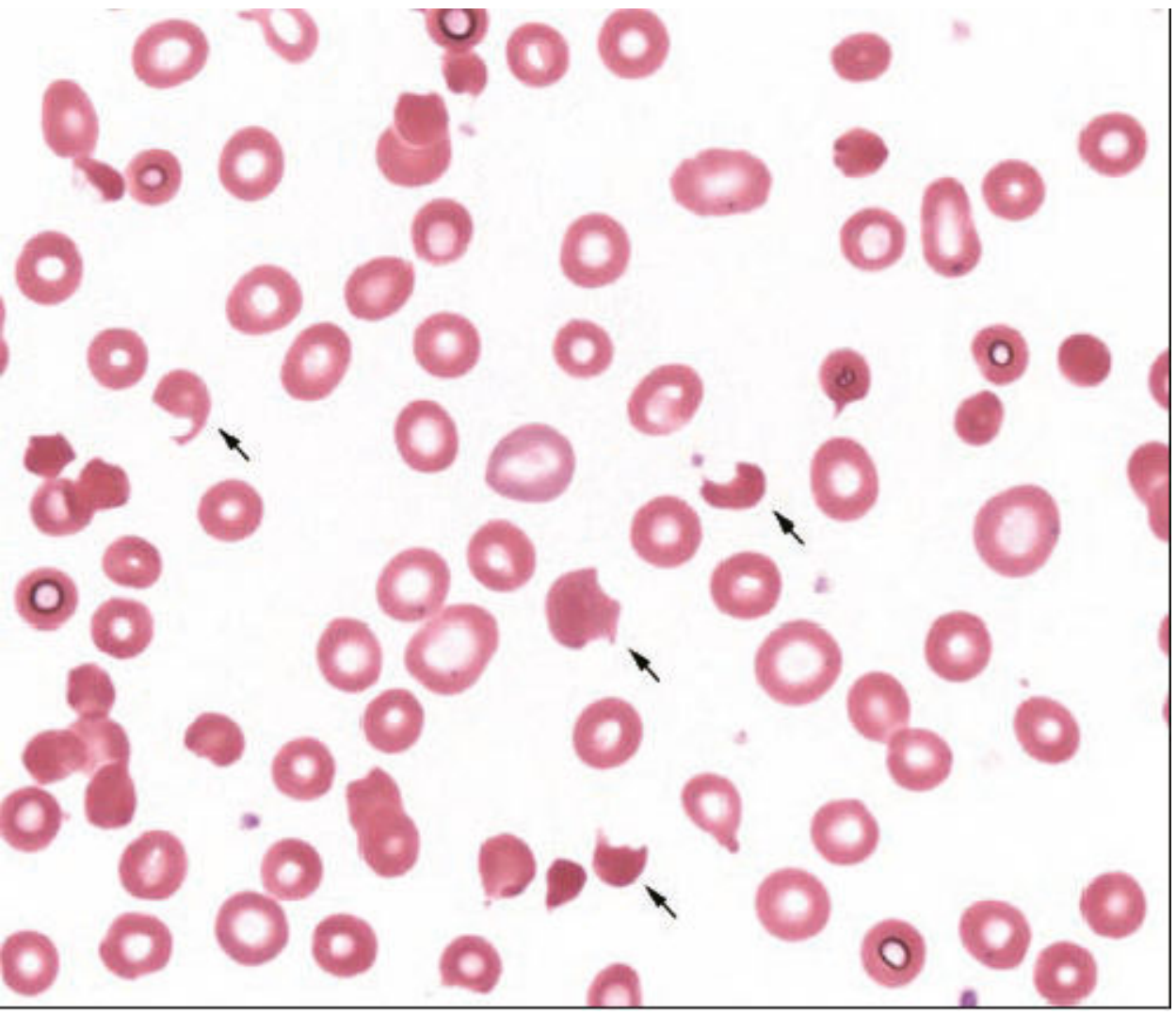
Hereditary Spherocytosis



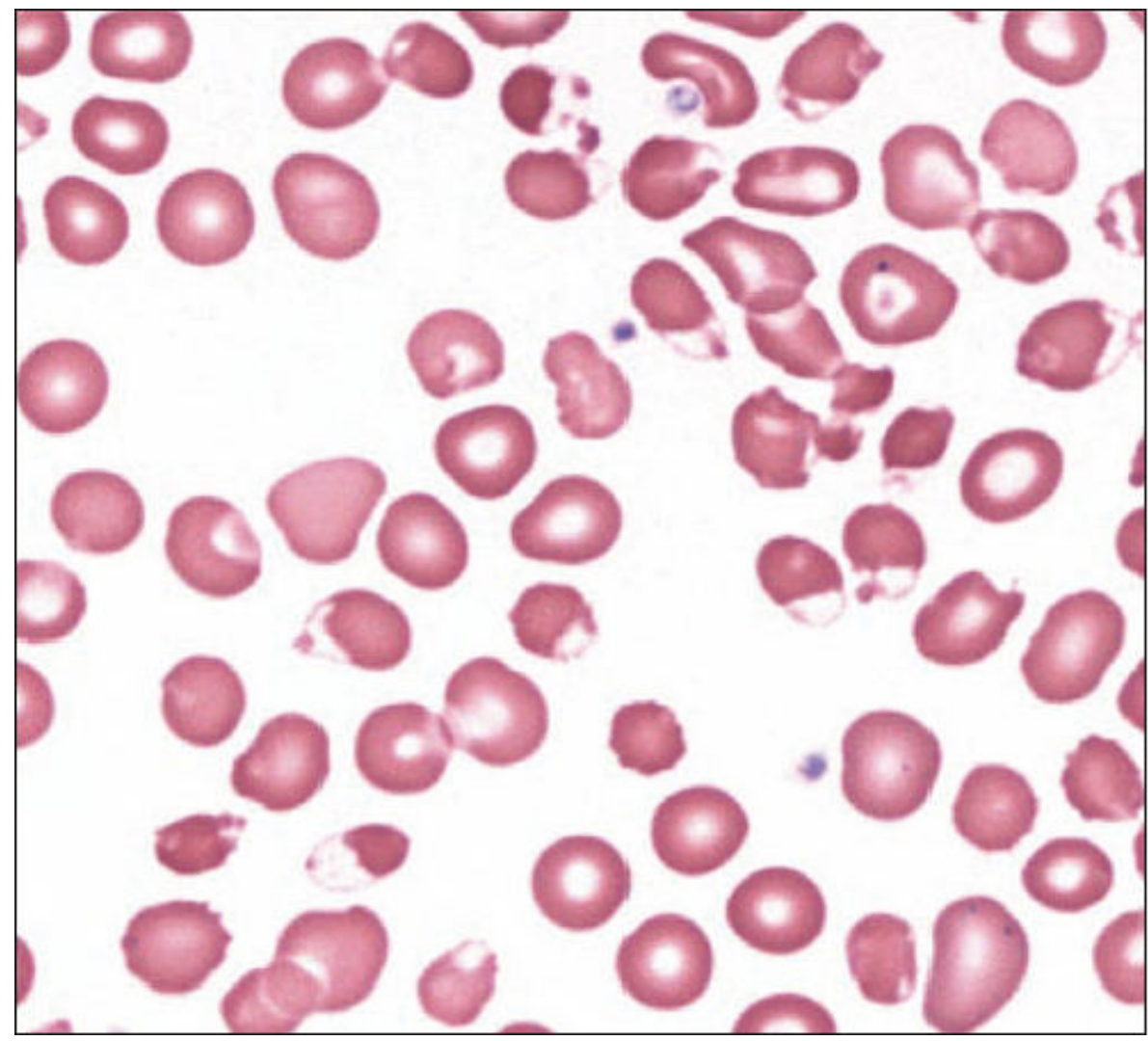
Microspherocytes in C.perfringens sepsis



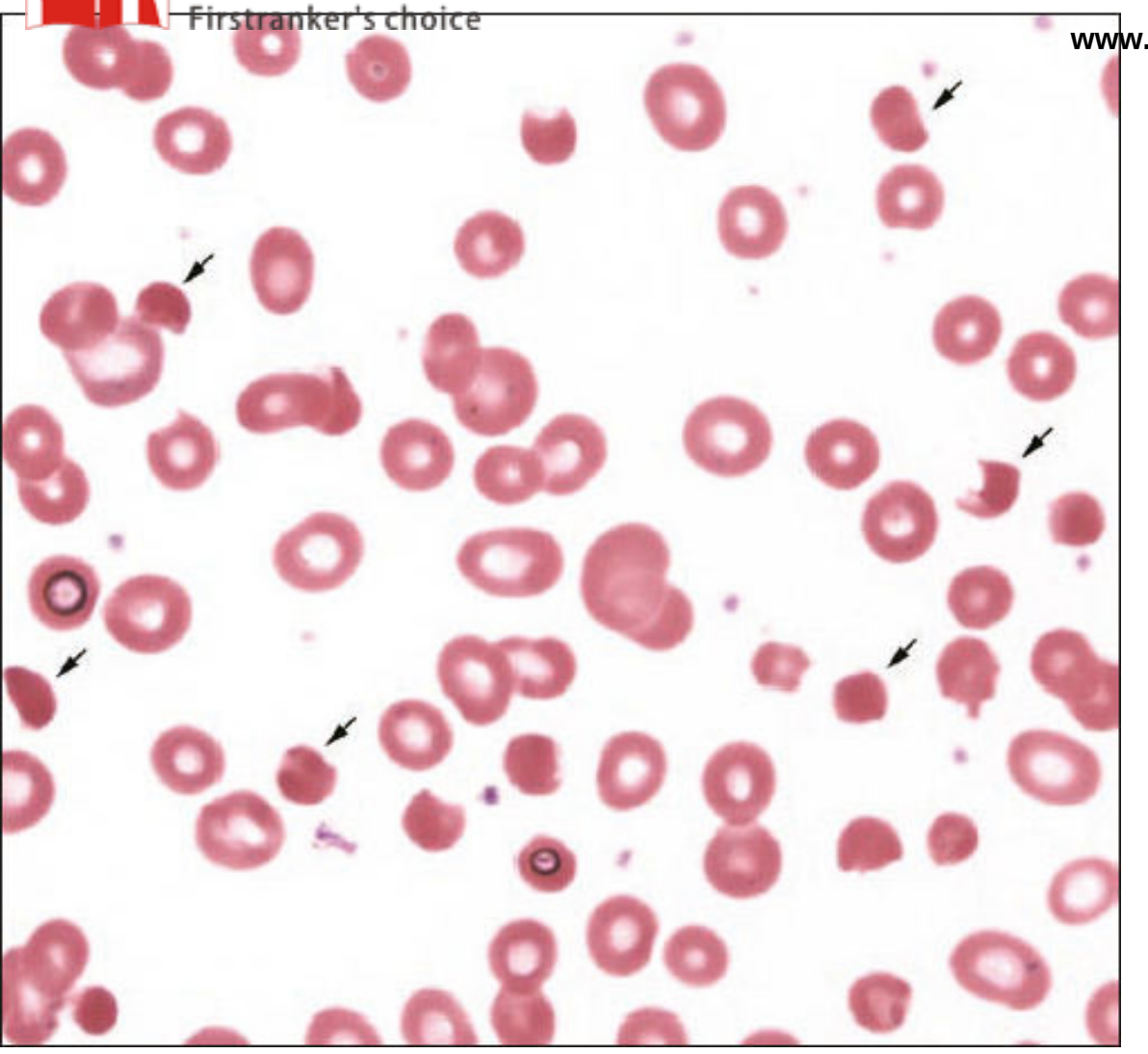
Osmotic Fragility testing



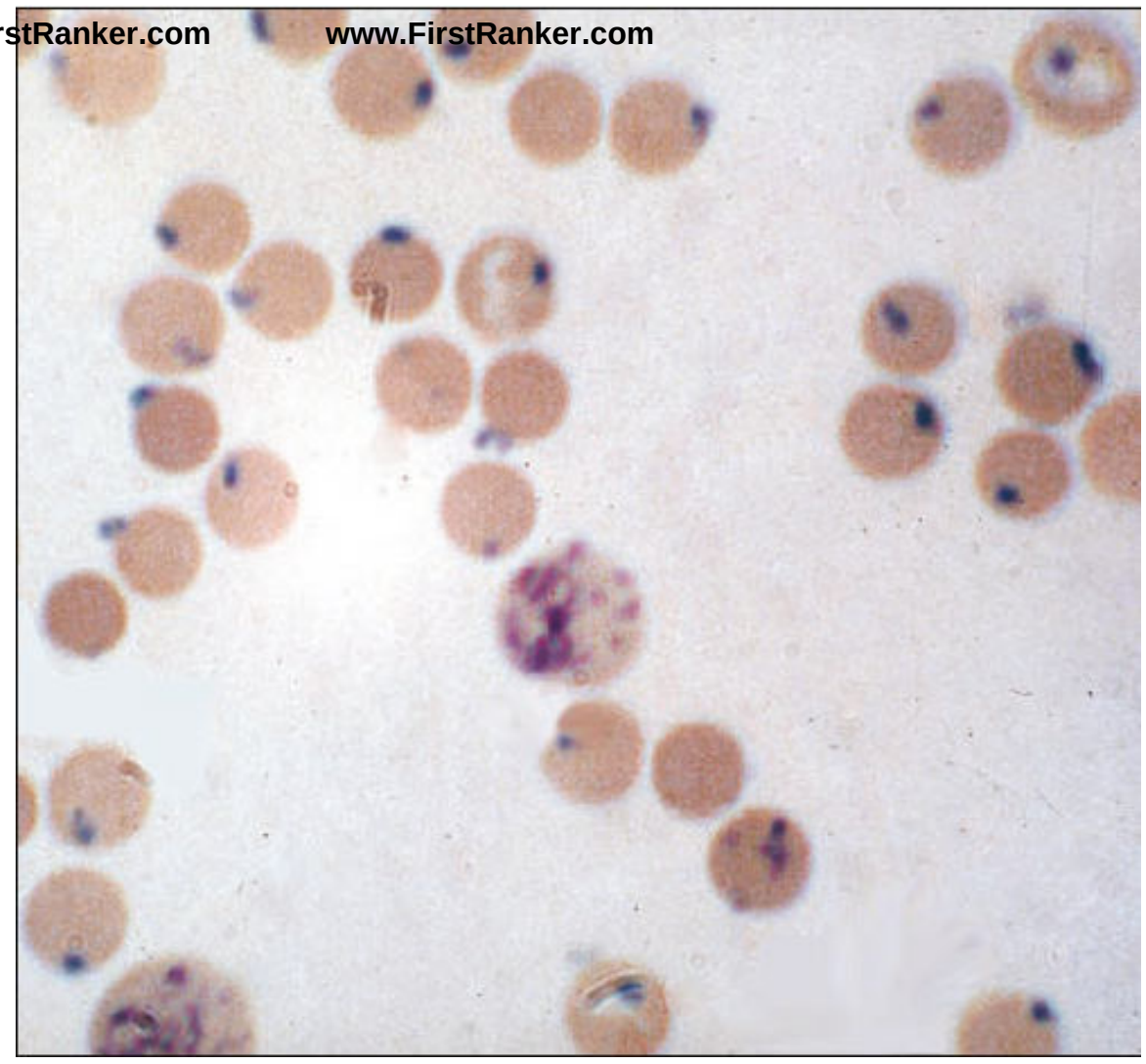
Bite cells



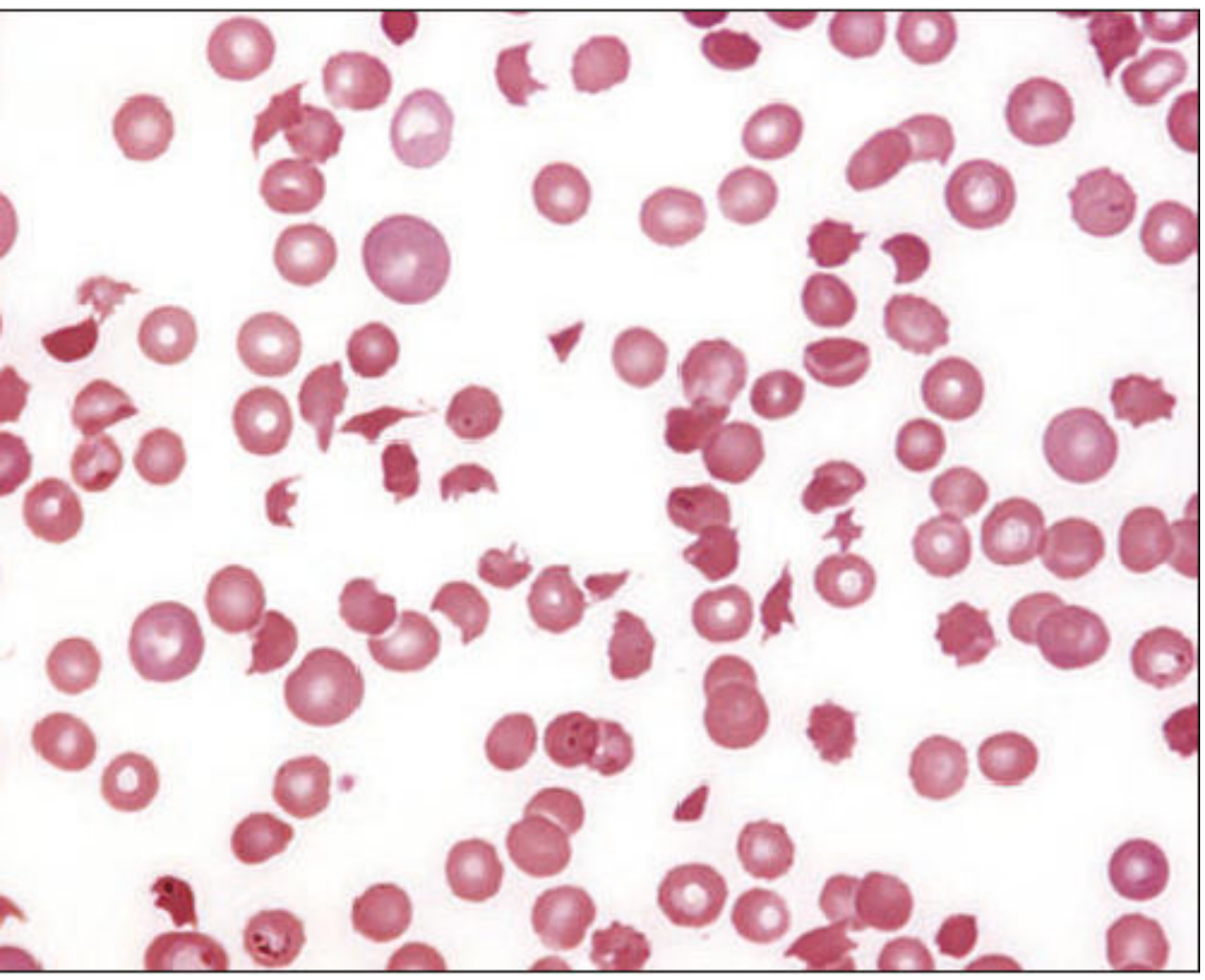
Blister cells



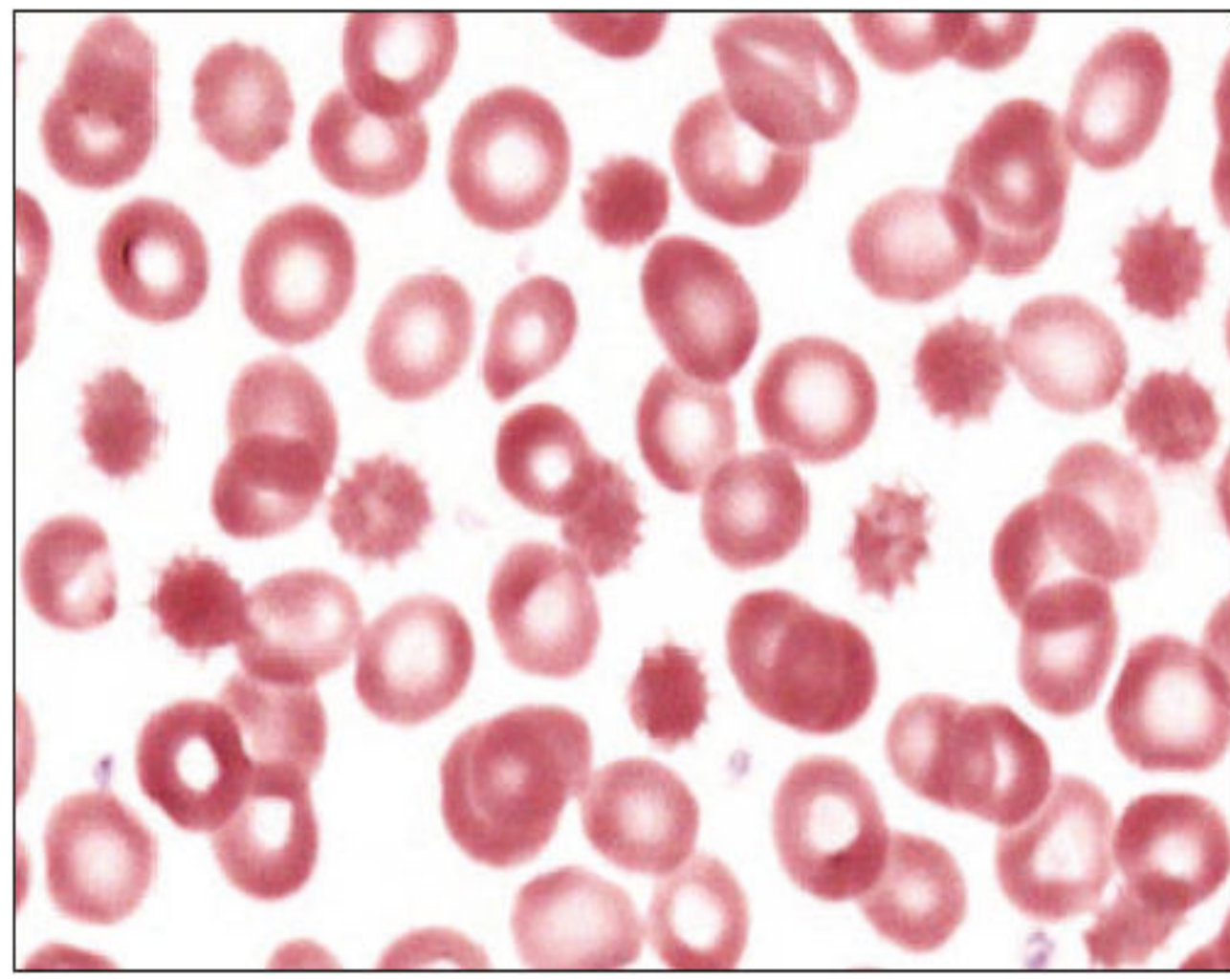
Irregularly contracted cells



Heinz bodies:
Crystal Violet stain
Unstable Hb

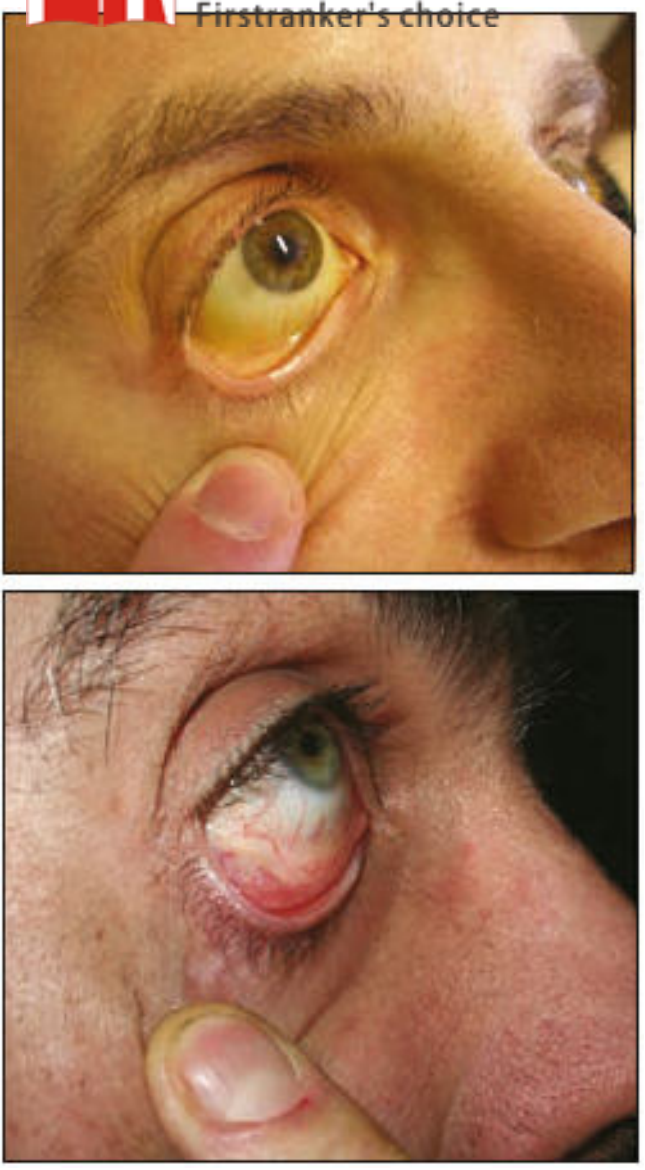


Microangiopathic Hemolytic anemia



Pyruvate Kinase def.
Spiculated spheroid cells

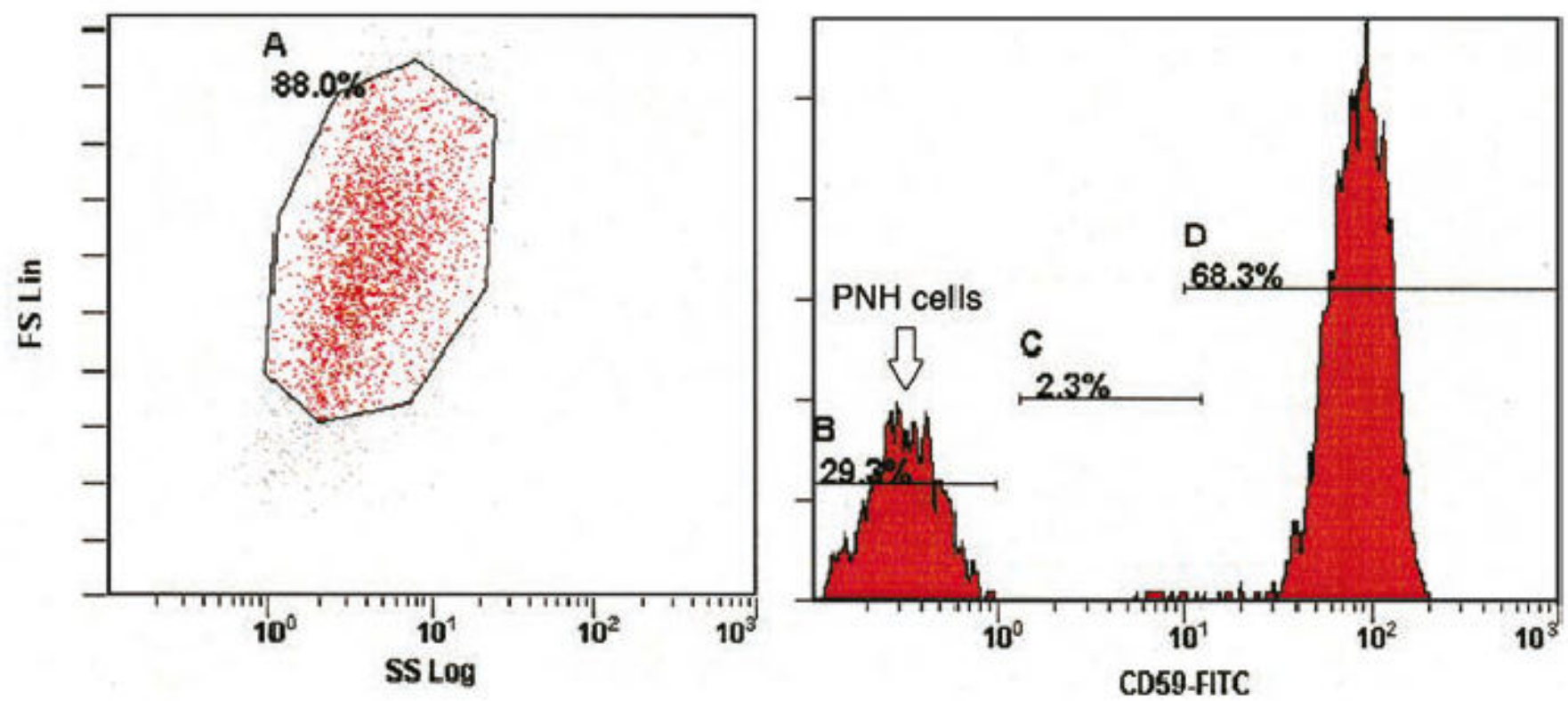
INTRAVASCULAR HEMOLYSIS



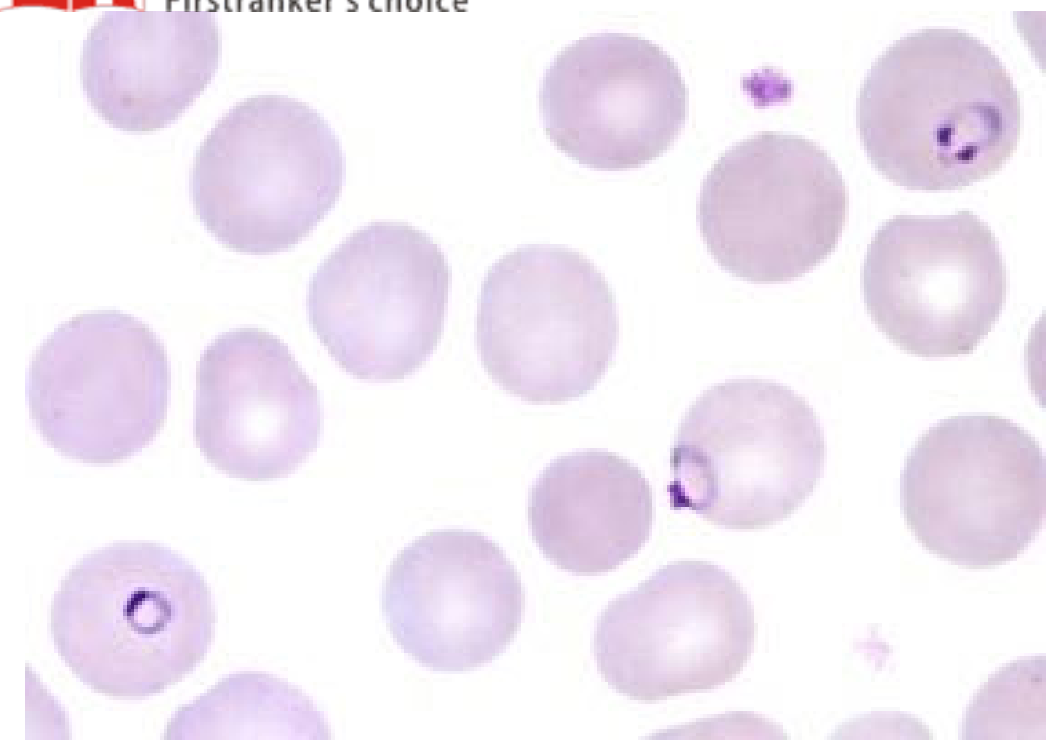
Jaundice

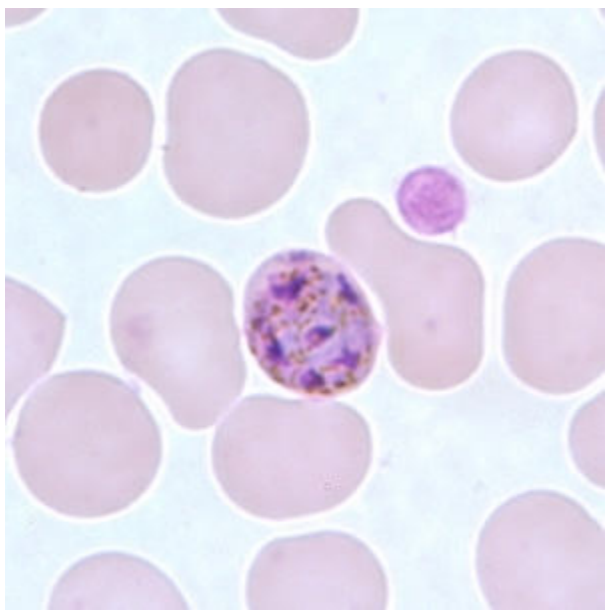
Hemolysis, serum

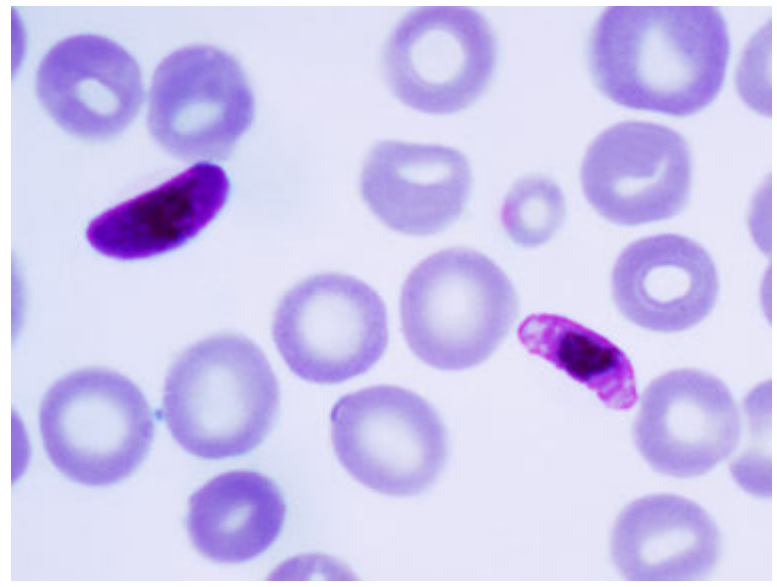
Hemoglobinuria

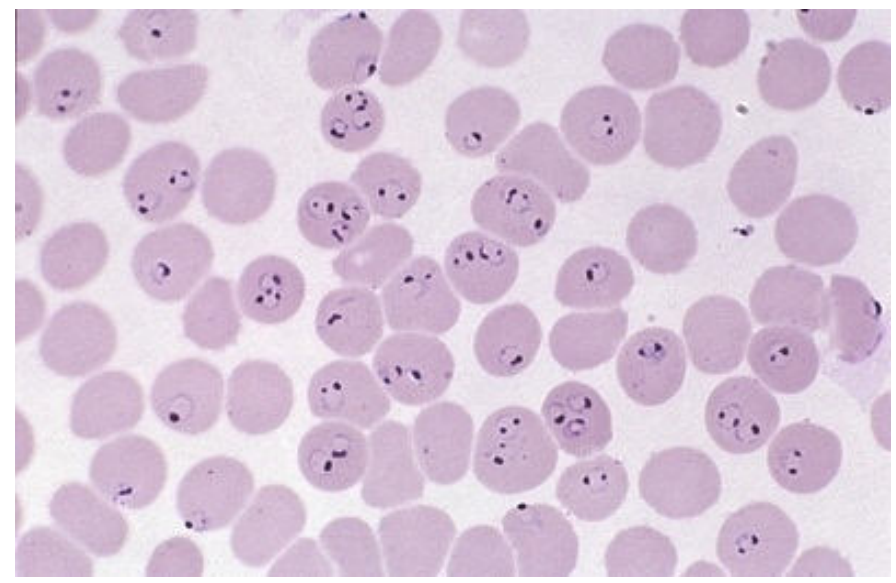


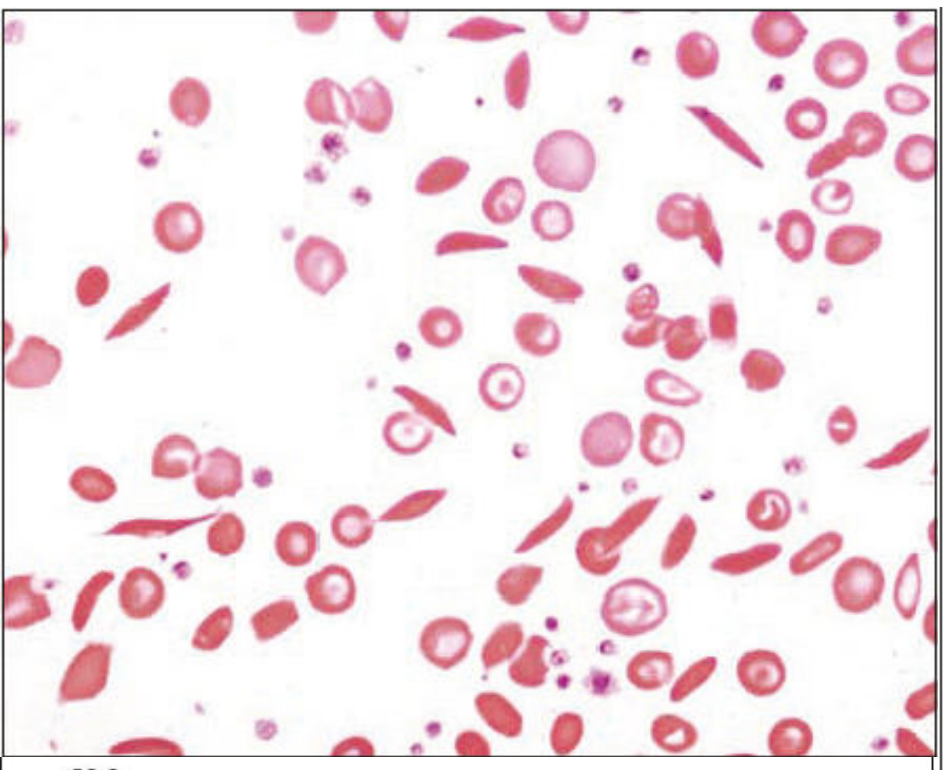
Paroxysmal Nocturnal Hemoglobinuria

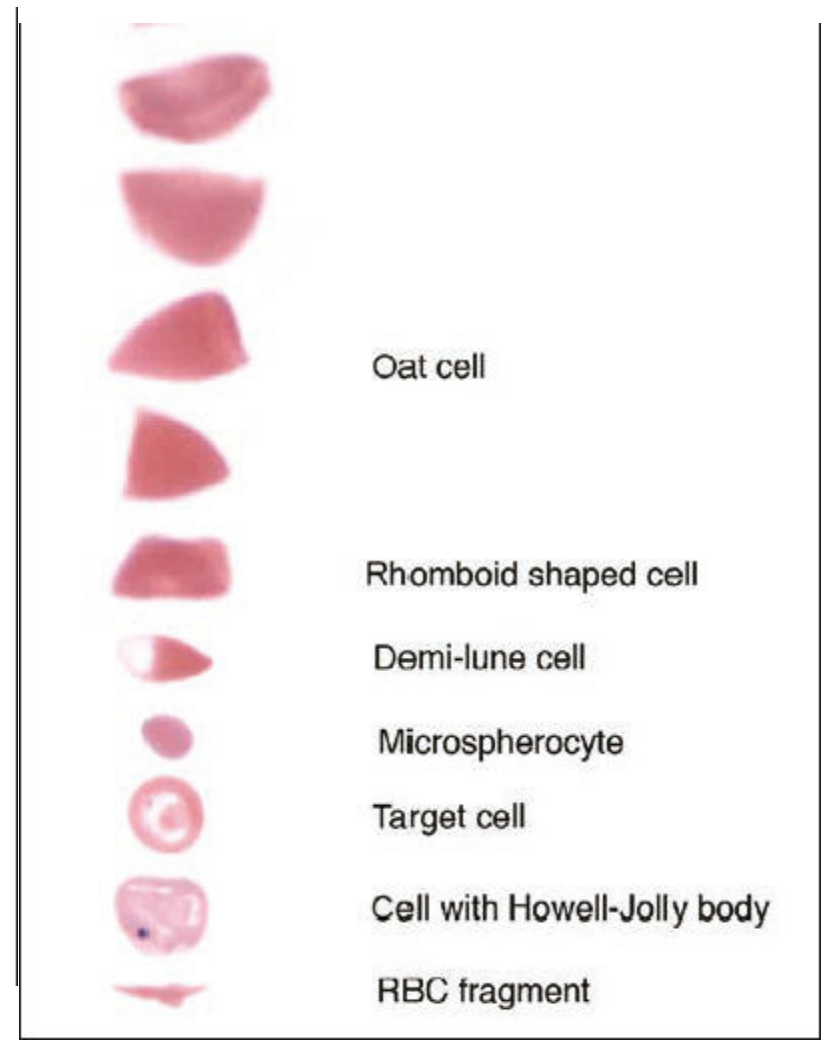


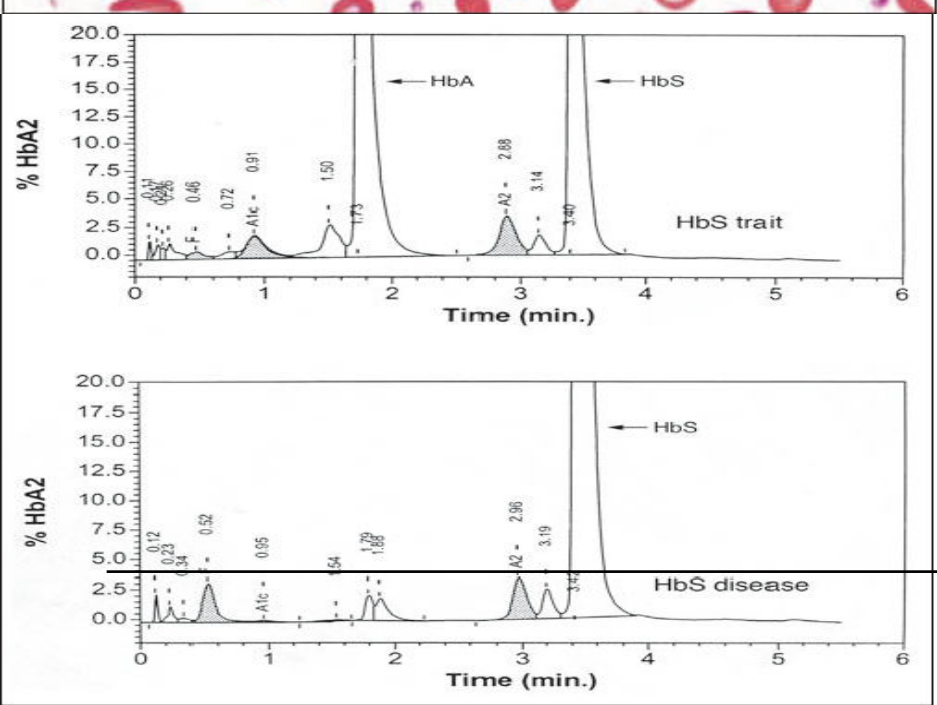






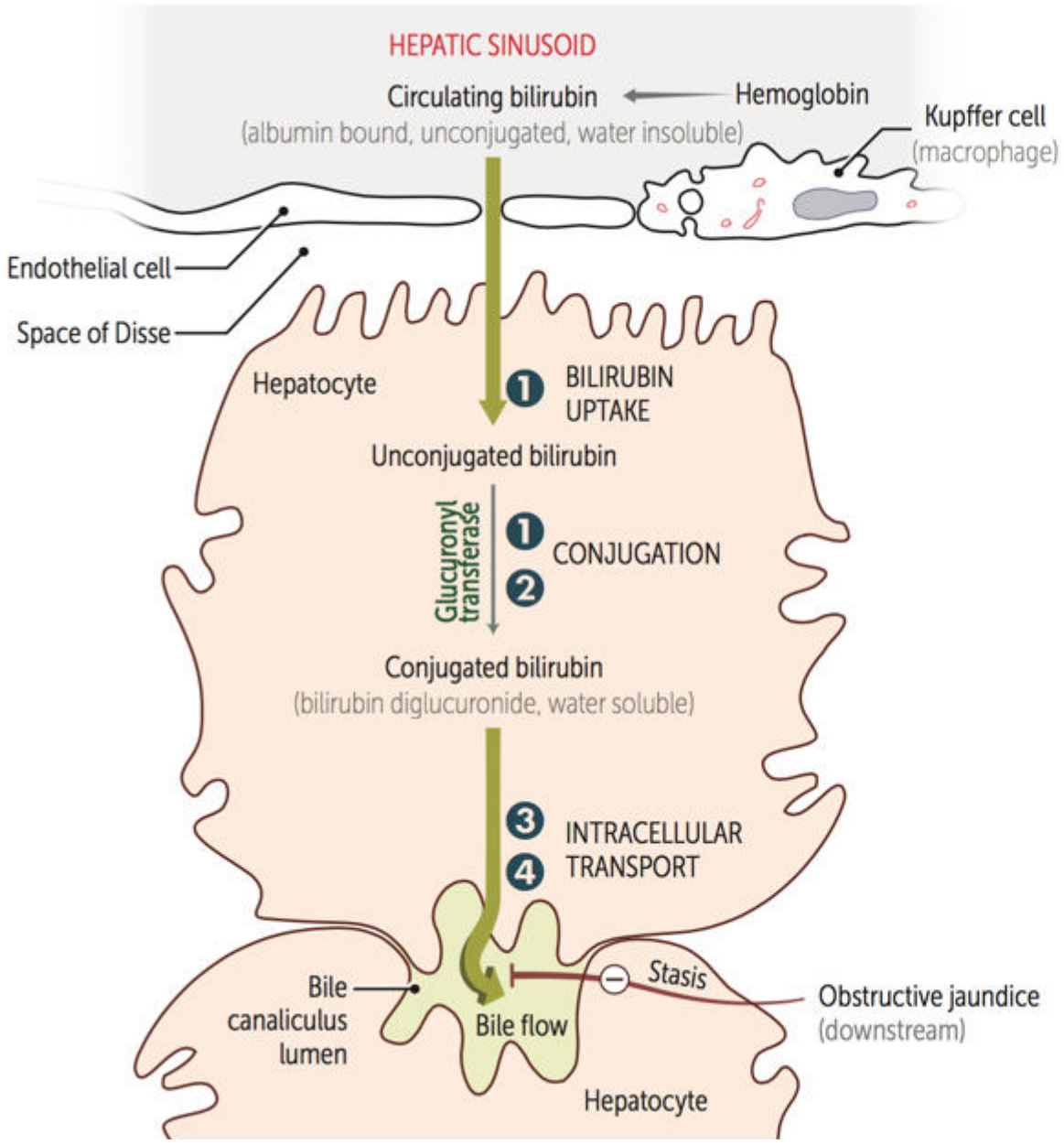






Sickle cell anemia

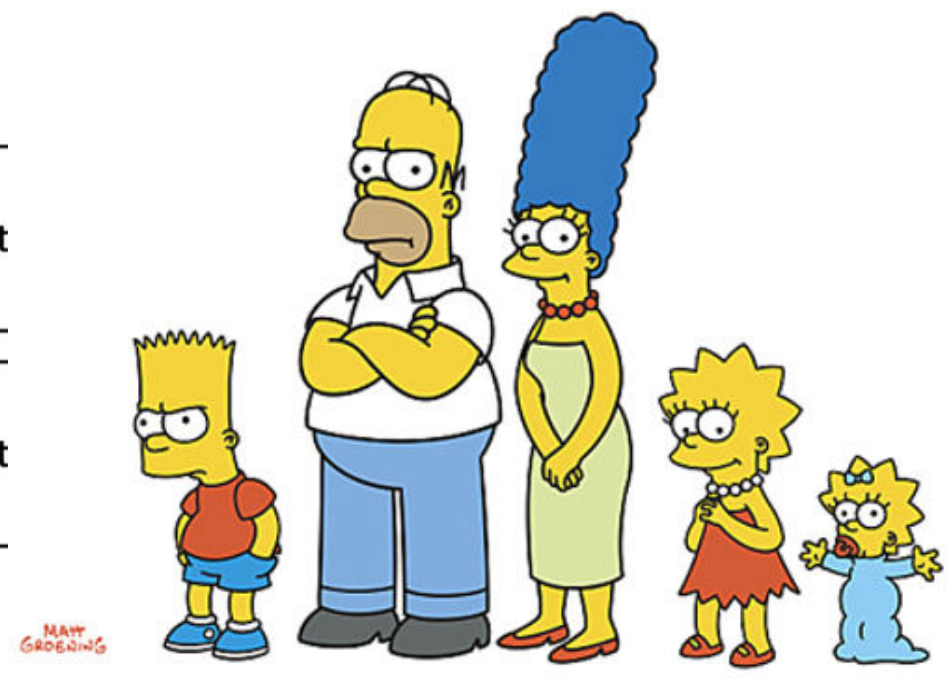
Disorders of uptake and conjugation

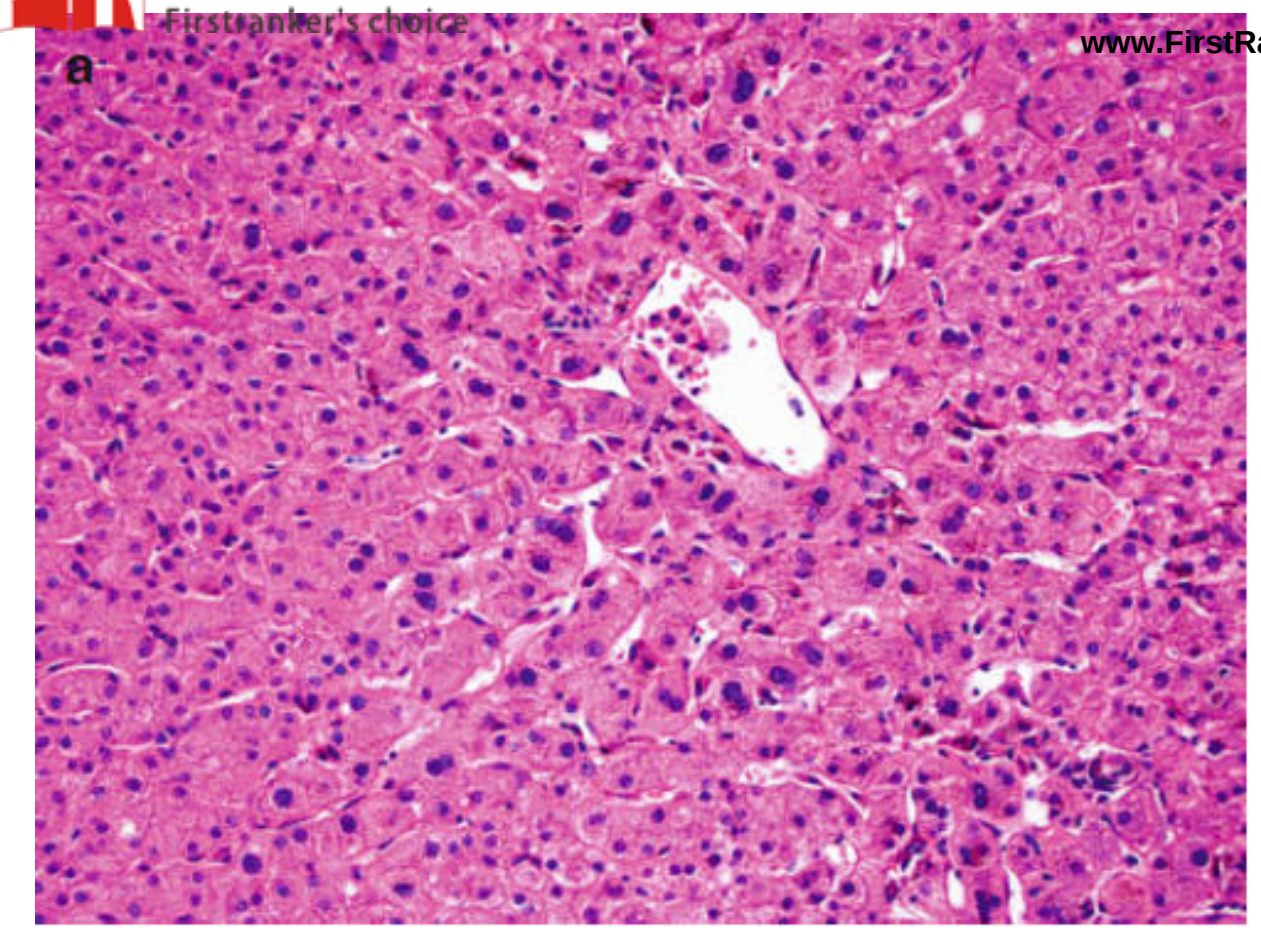


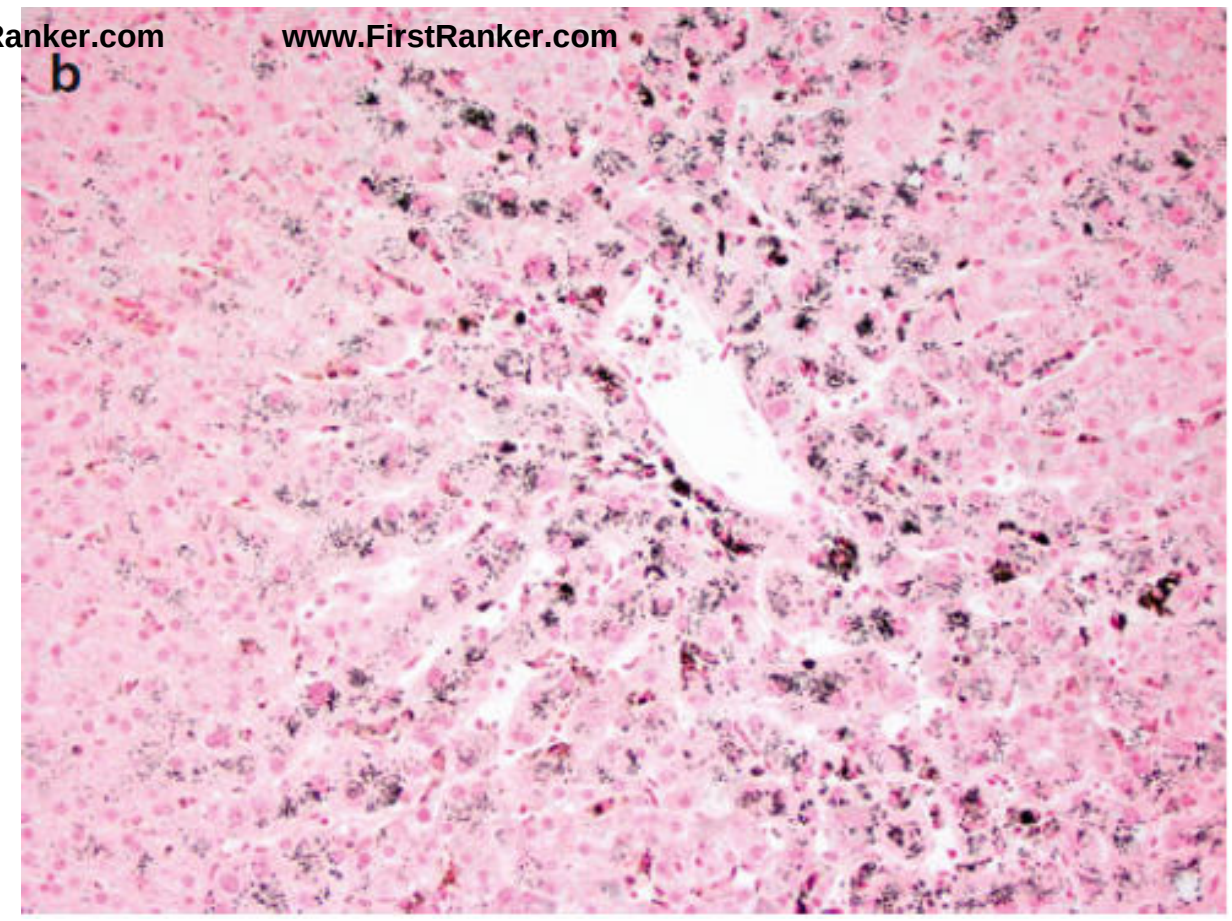
1. **Gilbert** = problem with bilirubin uptake → unconjugated bilirubinemia
2. **Crigler-Najjar** = problem with bilirubin conjugation → unconjugated bilirubinemia
3. **Dubin-Johnson** = problem with excretion of conjugated bilirubin → conjugated bilirubinemia
4. **Rotor** = mild conjugated hyperbilirubinemia

Substrate	***Biliary Transporter***	***Clinical Condition***
Phosphatidylcholines	MDR3	Progressive familial intrahepatic cholestasis type 3
Aminophospholipids	FIC1	Progressive familial intrahepatic cholestasis type 1; Benign recurrent intrahepatic cholestasis type 1
Bile acids	BSEP	Progressive familial intrahepatic cholestasis type 2; Benign recurrent intrahepatic cholestasis type 2
Conjugated bilirubin	MRP2	Dubin-Johnson syndrome
Hepatocyte	Canalicular membrane	

INHERITED JAUNDICE







Dubin Johson syndrome
Lipofuscin like pigment in Zone 3
Positive on Fontana Mason stain

Hepatocellular Injury

Alcohol

Viruses

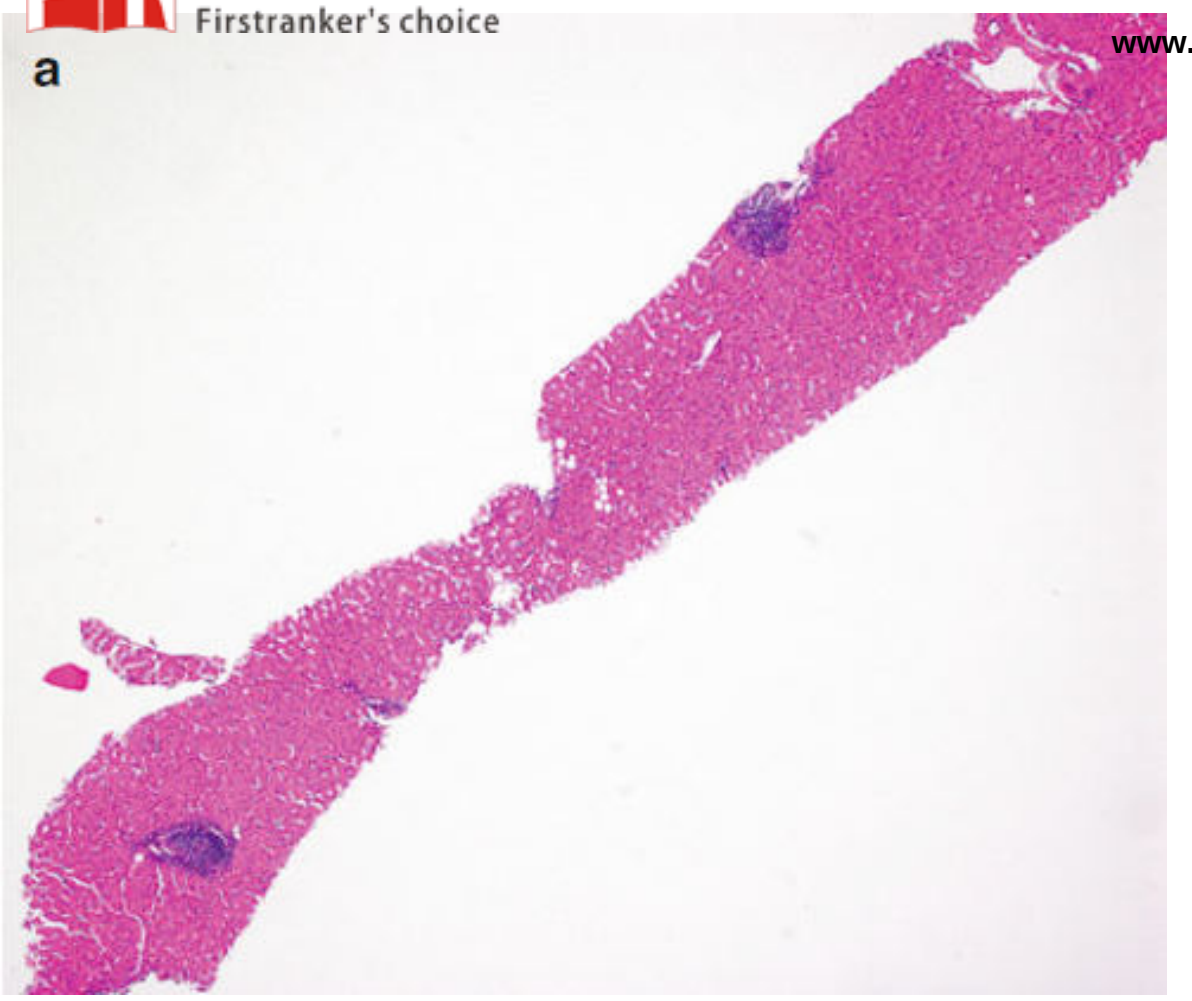
B
C
E
EBV
CMV

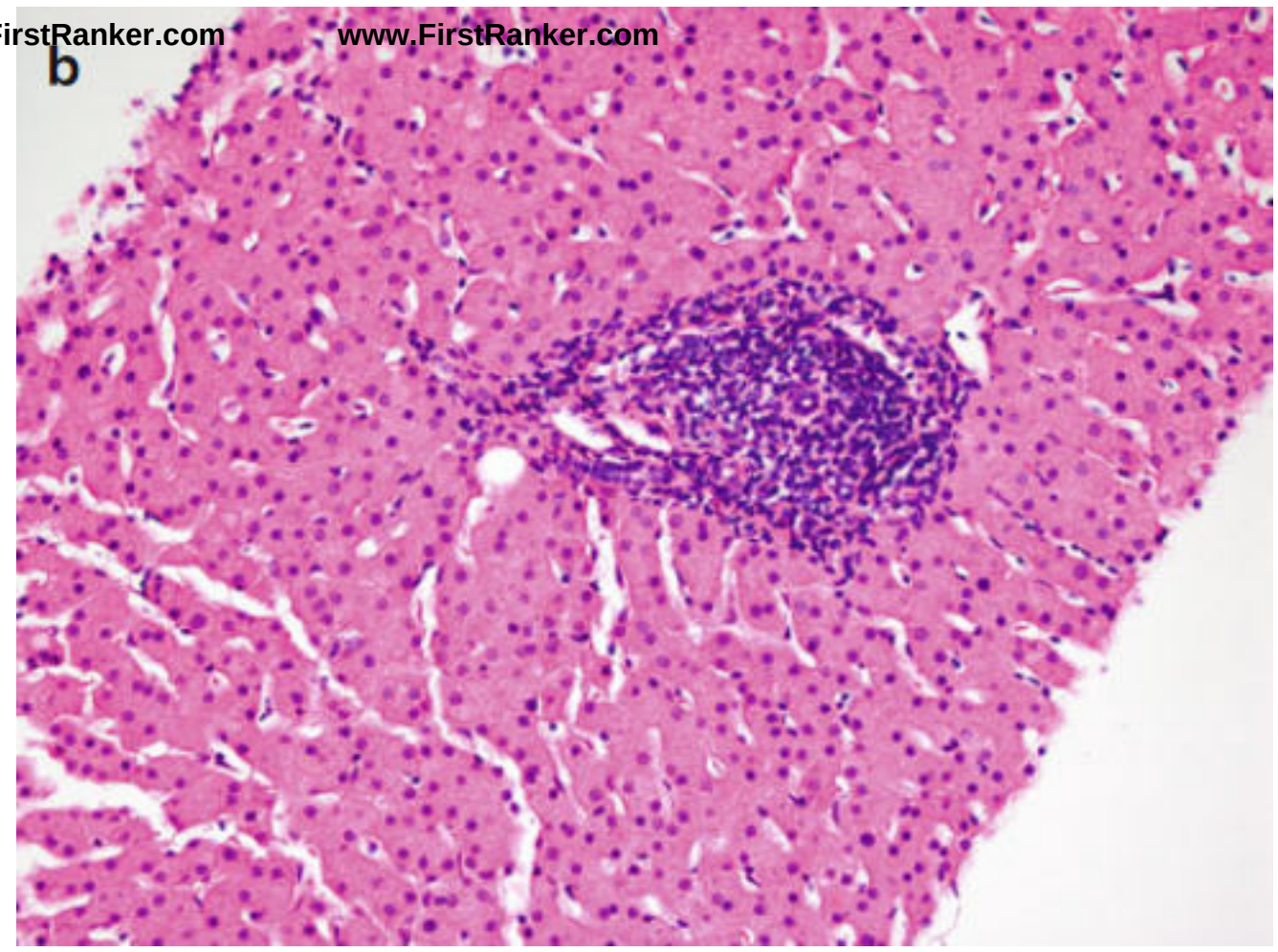
Autoimmune

Drugs

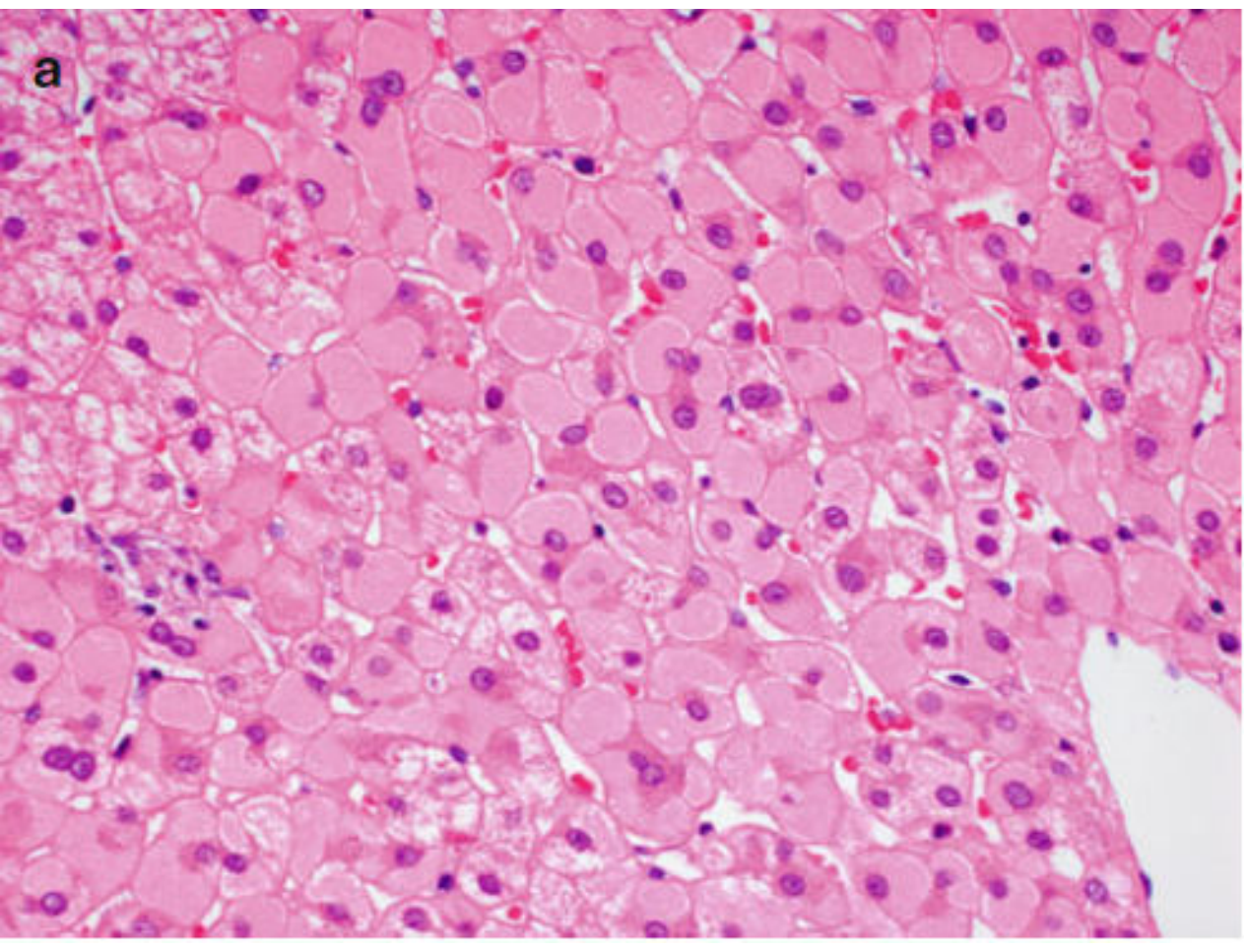
Combination of reduced conjugation and cholestasis

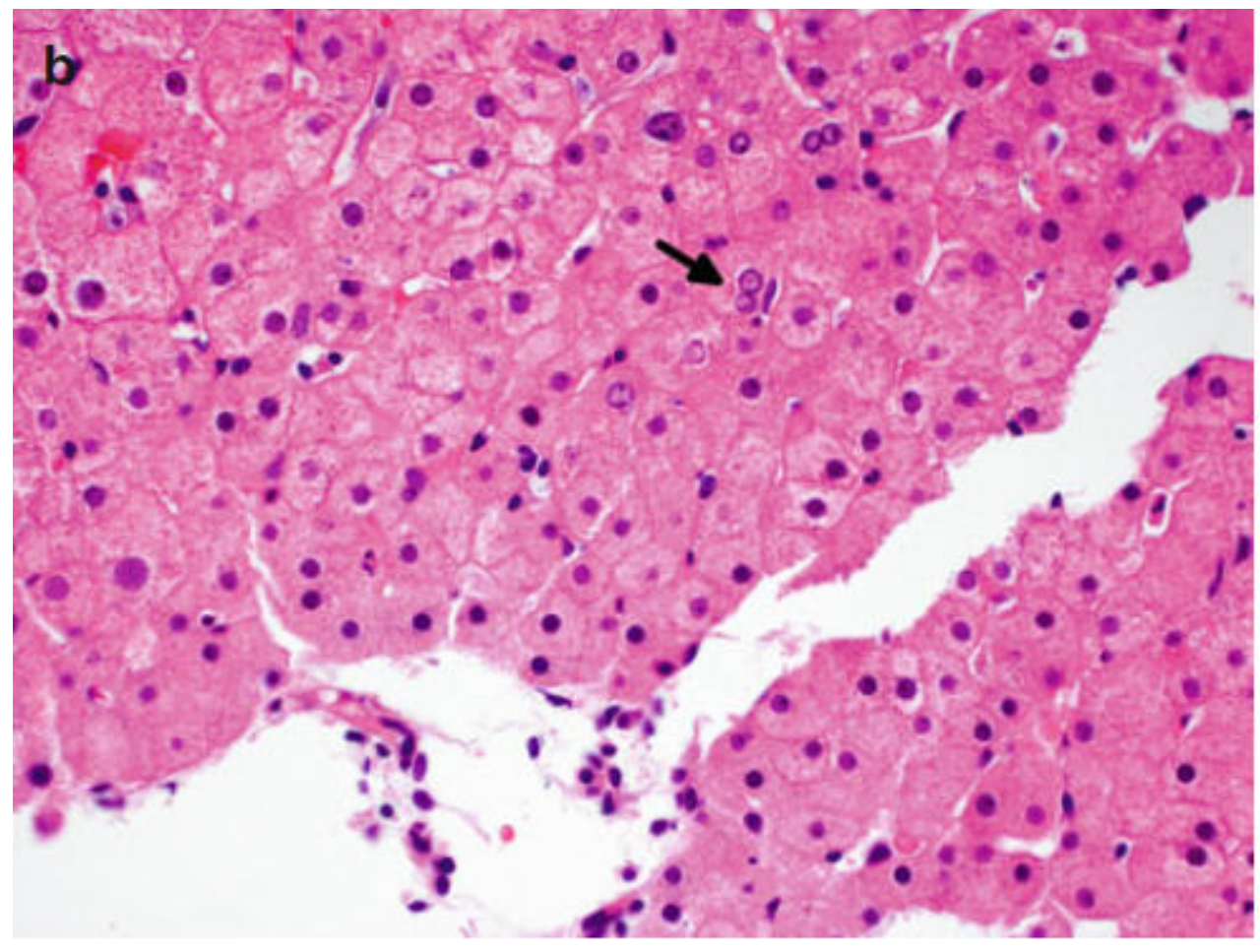
CIRRHOSIS



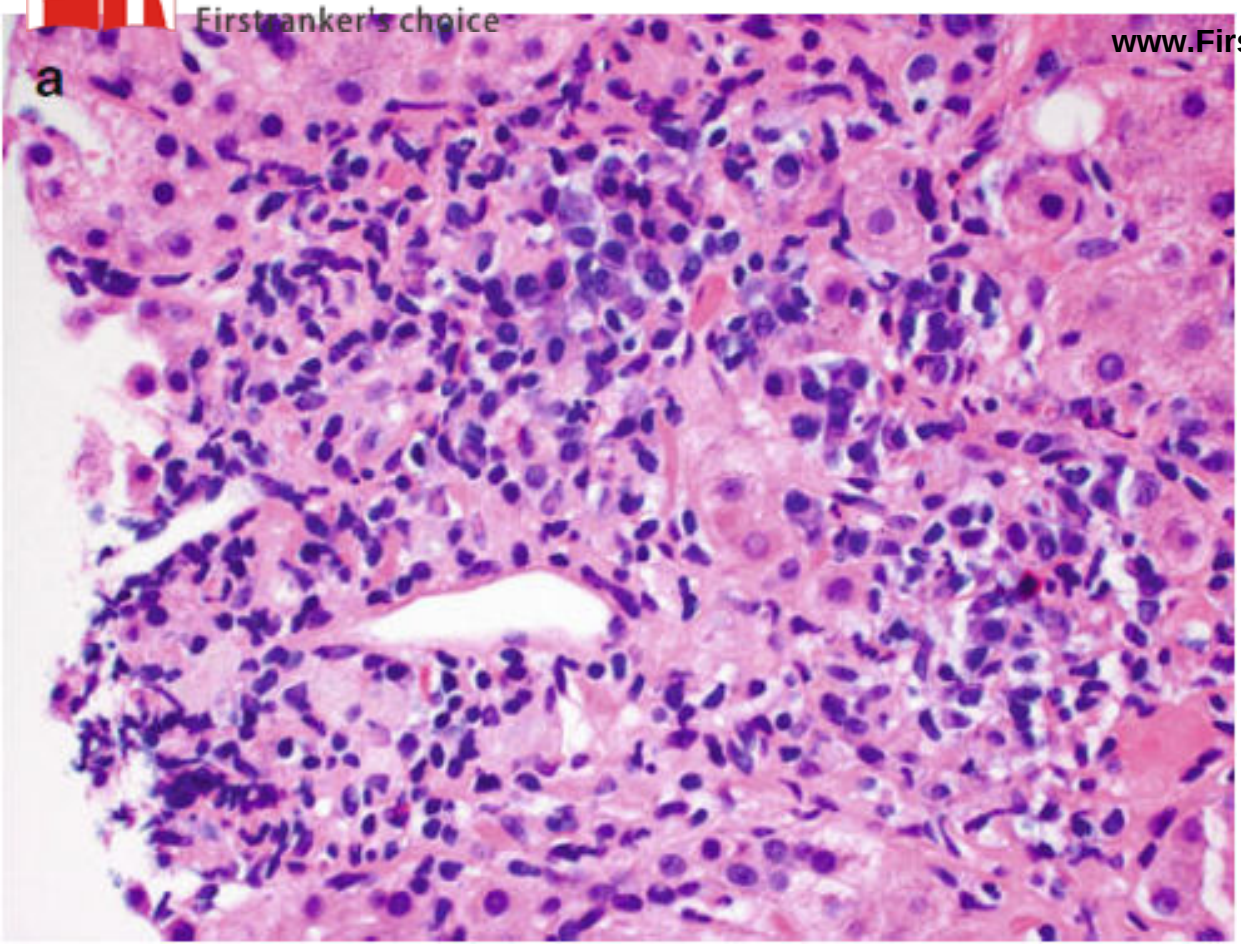


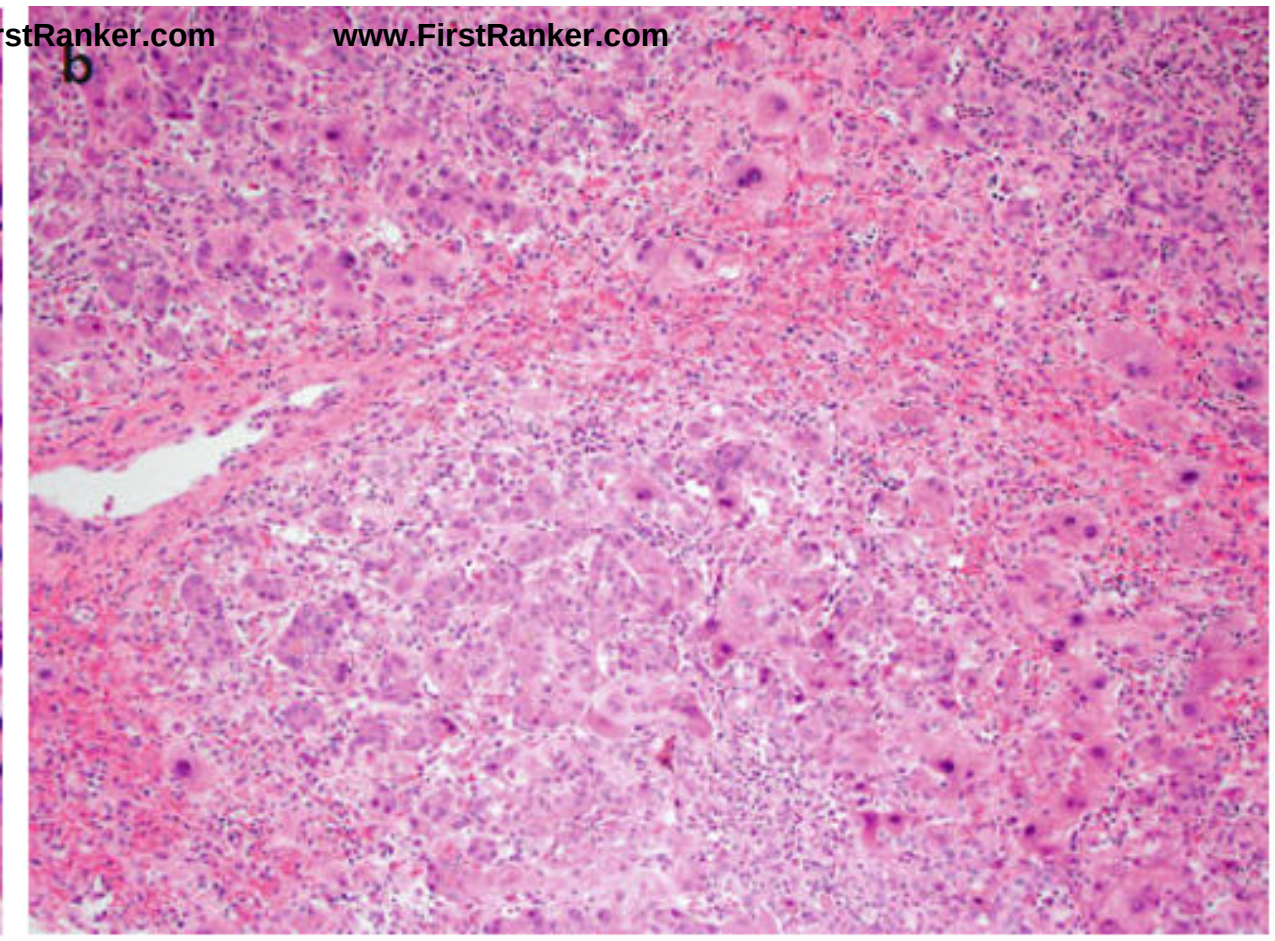
Hepatitis C



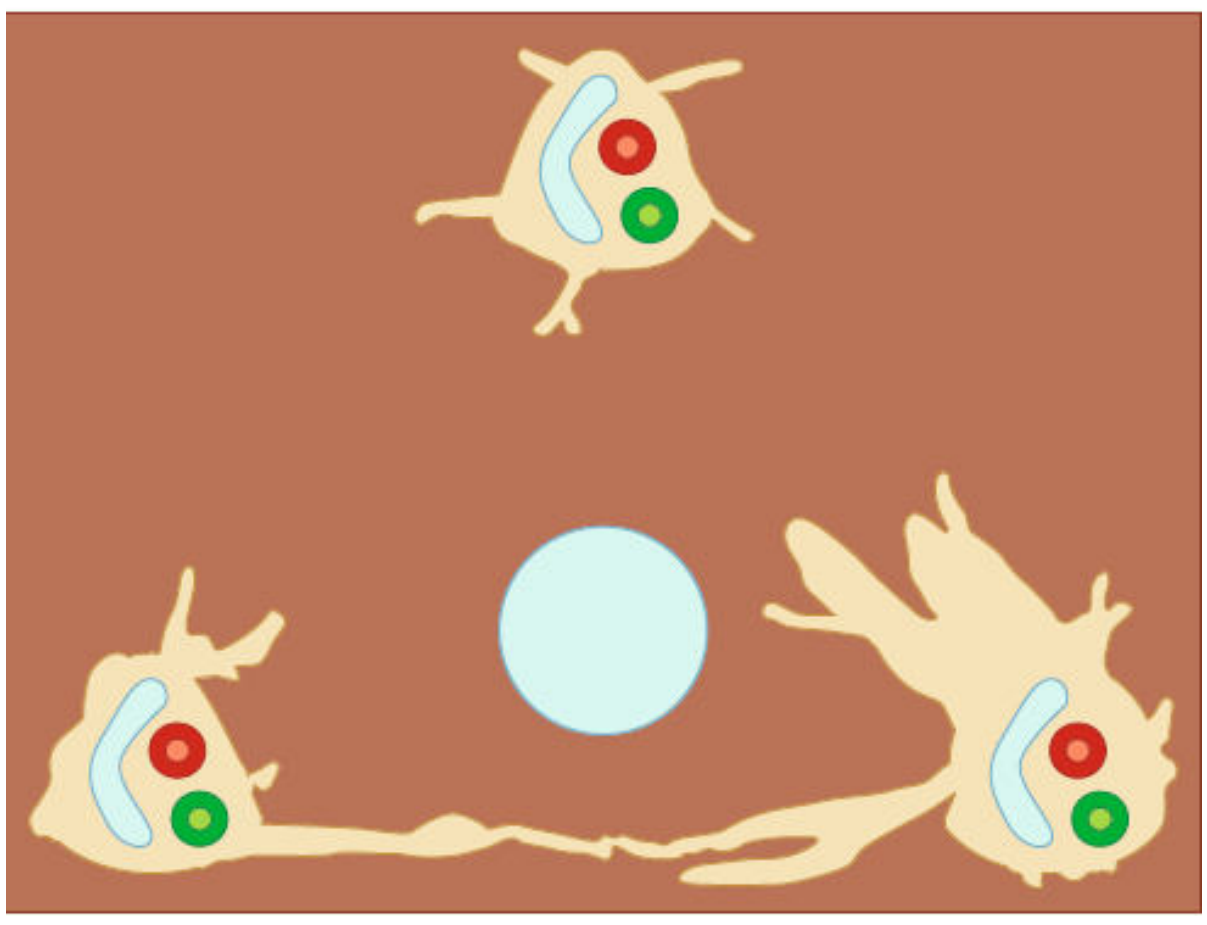


Hepatitis B

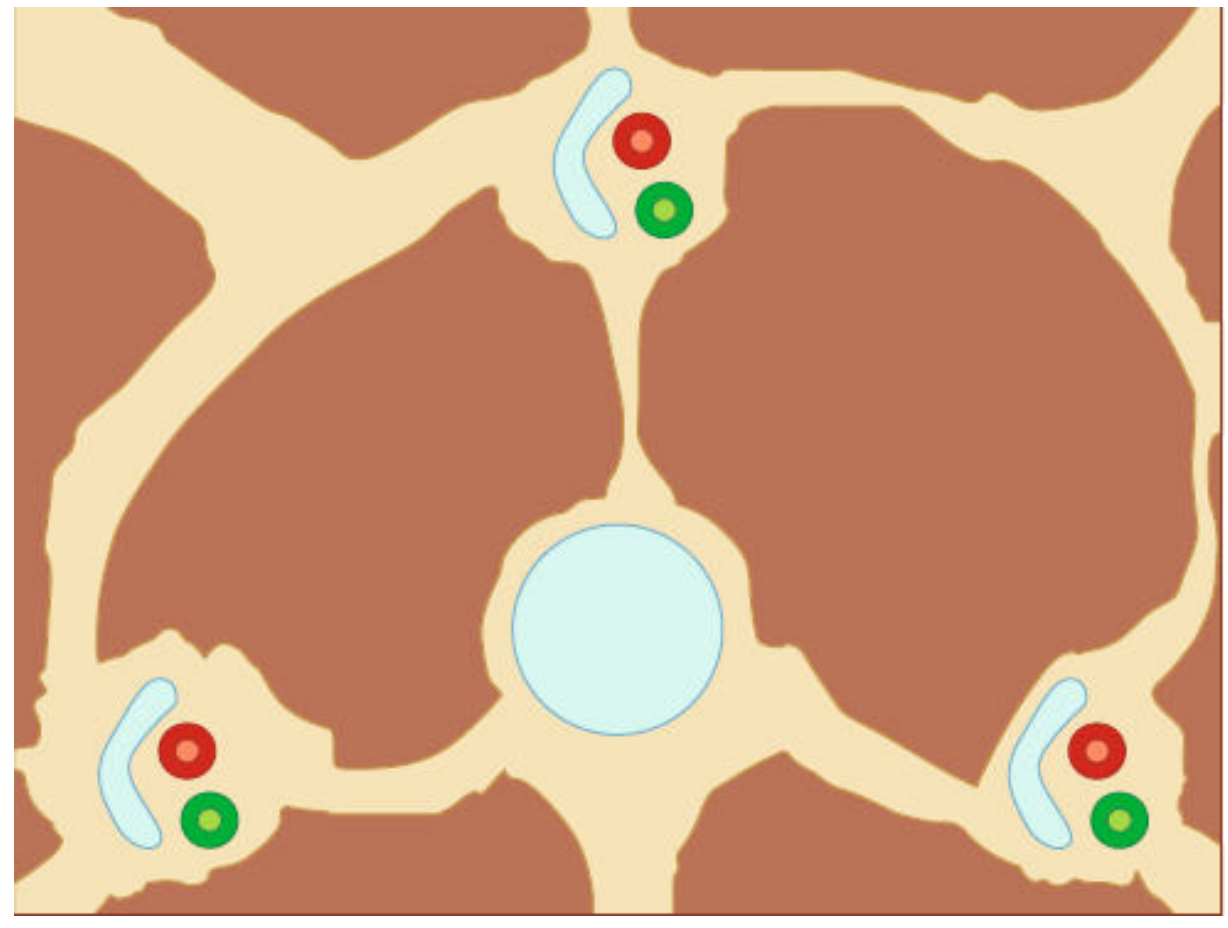




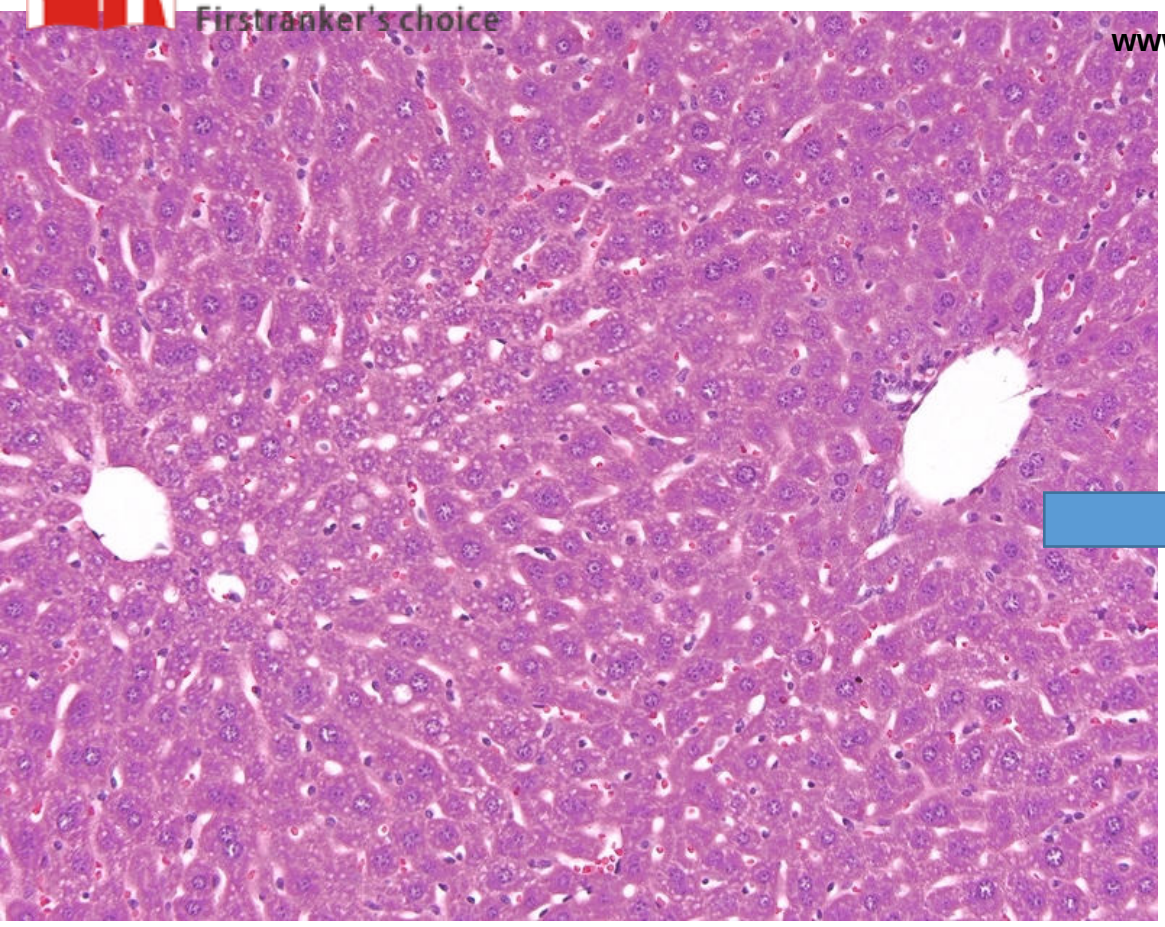
Autoimmune hepatitis



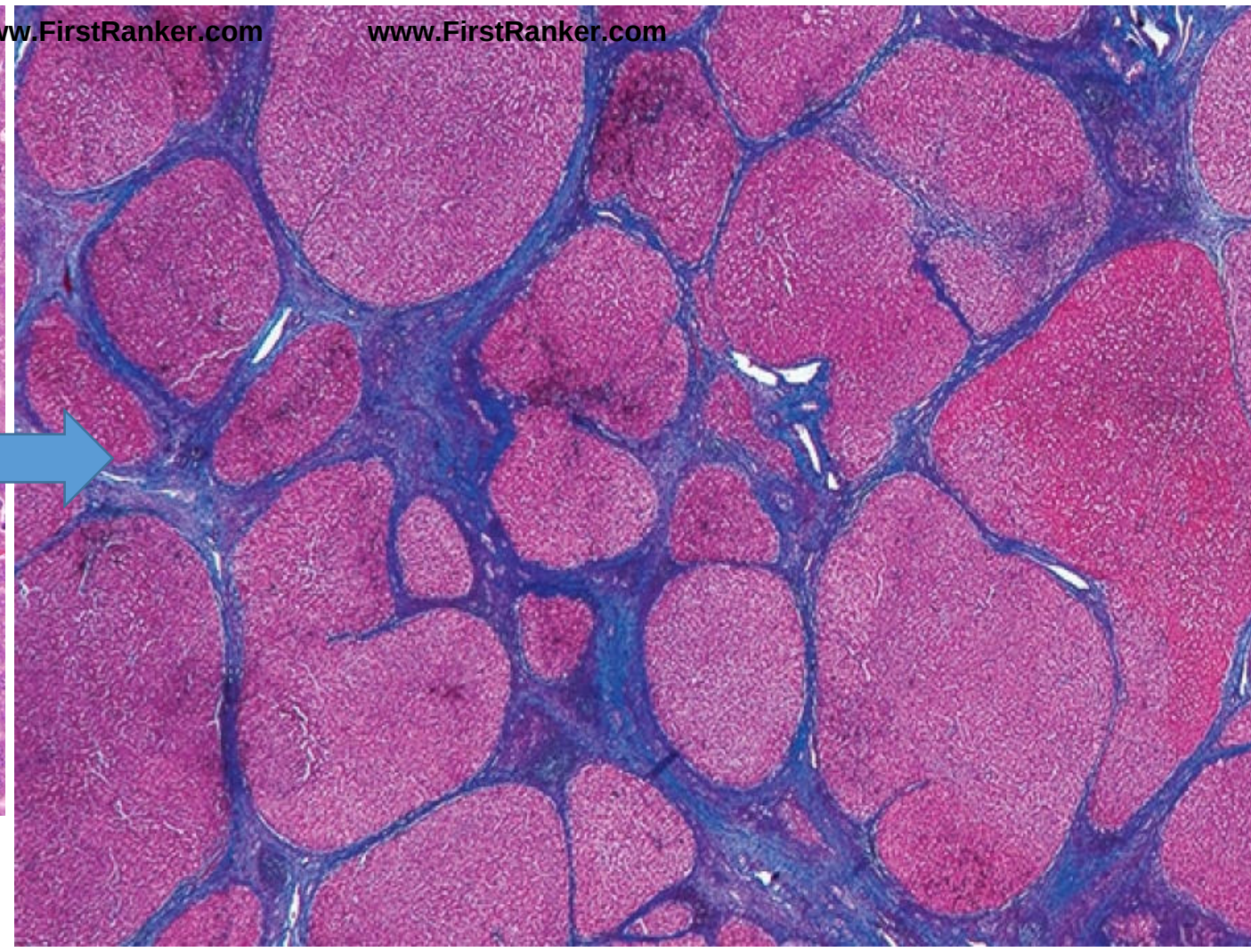
Fibrosis



Cirrhosis

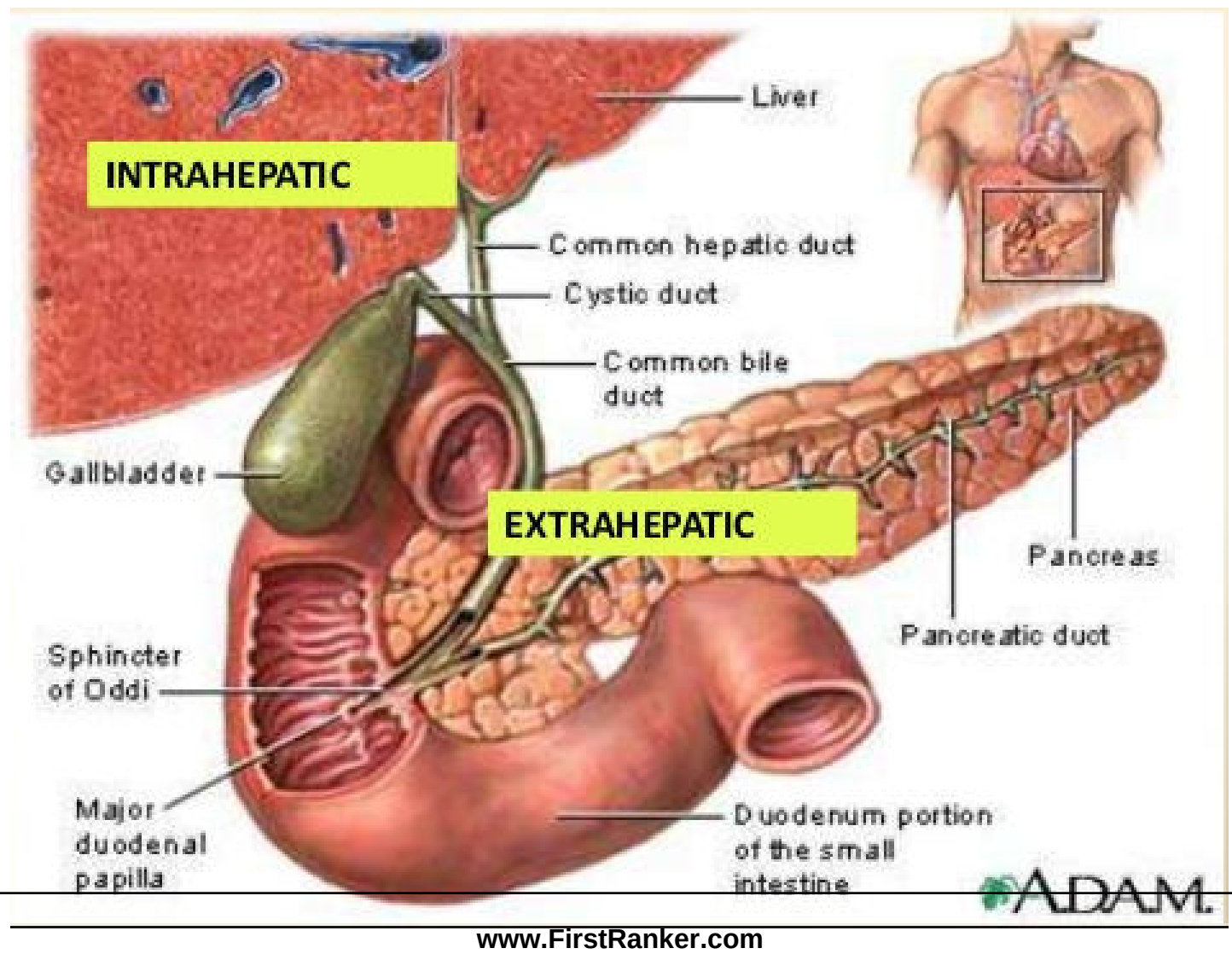


Normal liver



Cirrhotic liver

Cholestasis



Stercobilin
excreted in faeces

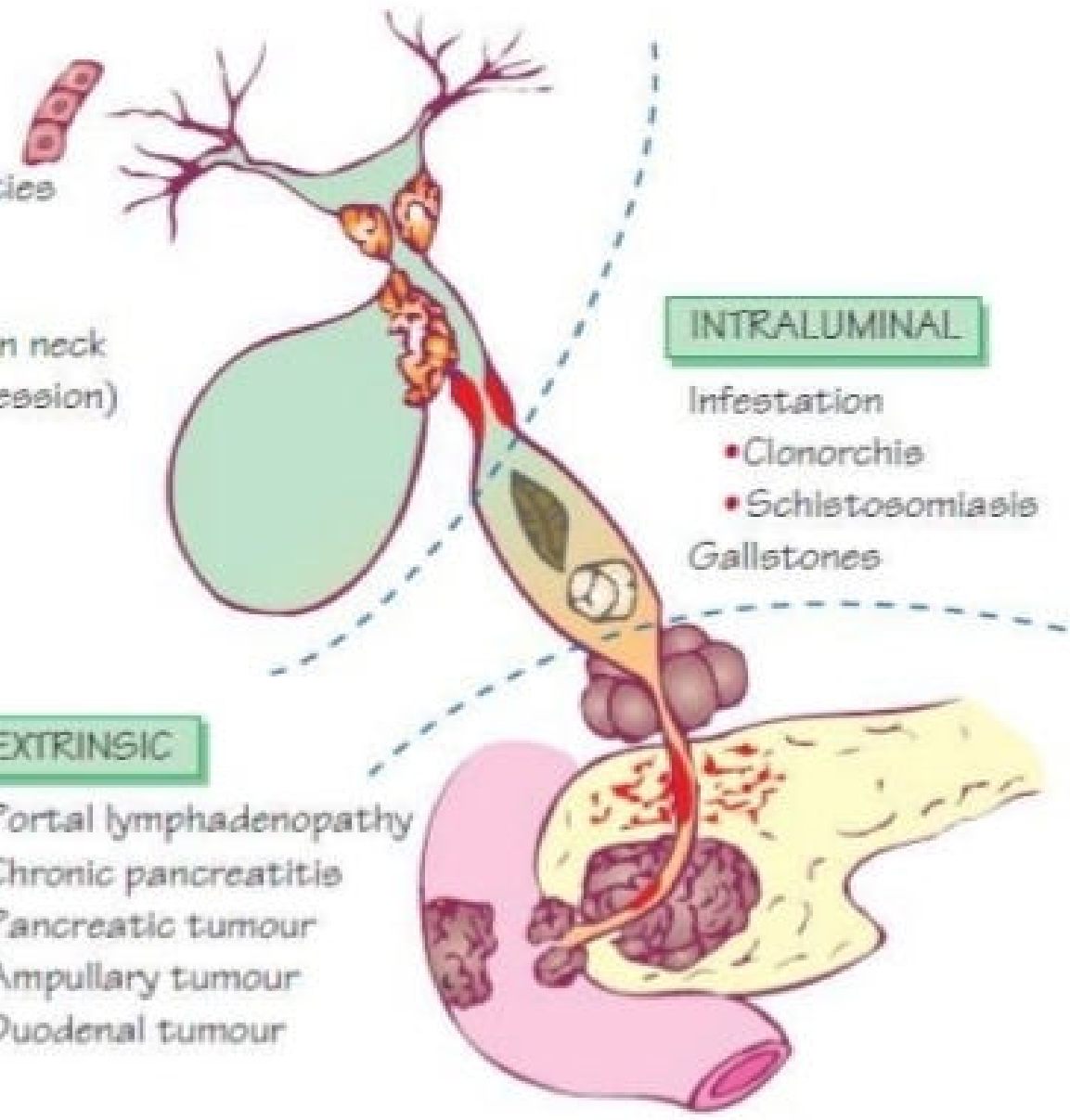
CAUSES OF OBSTRUCTIVE JAUNDICE

BENIGN

MALIGNANT

MURAL / INTRINSIC

Liver cell transport abnormalities
Sclerosing cholangitis
Cholangiocarcinoma
Mirrizi's syndrome (gallstone in neck with associated CHD compression)
Benign stricture
- Postinflammatory
- Postoperative
- Postradiotherapy



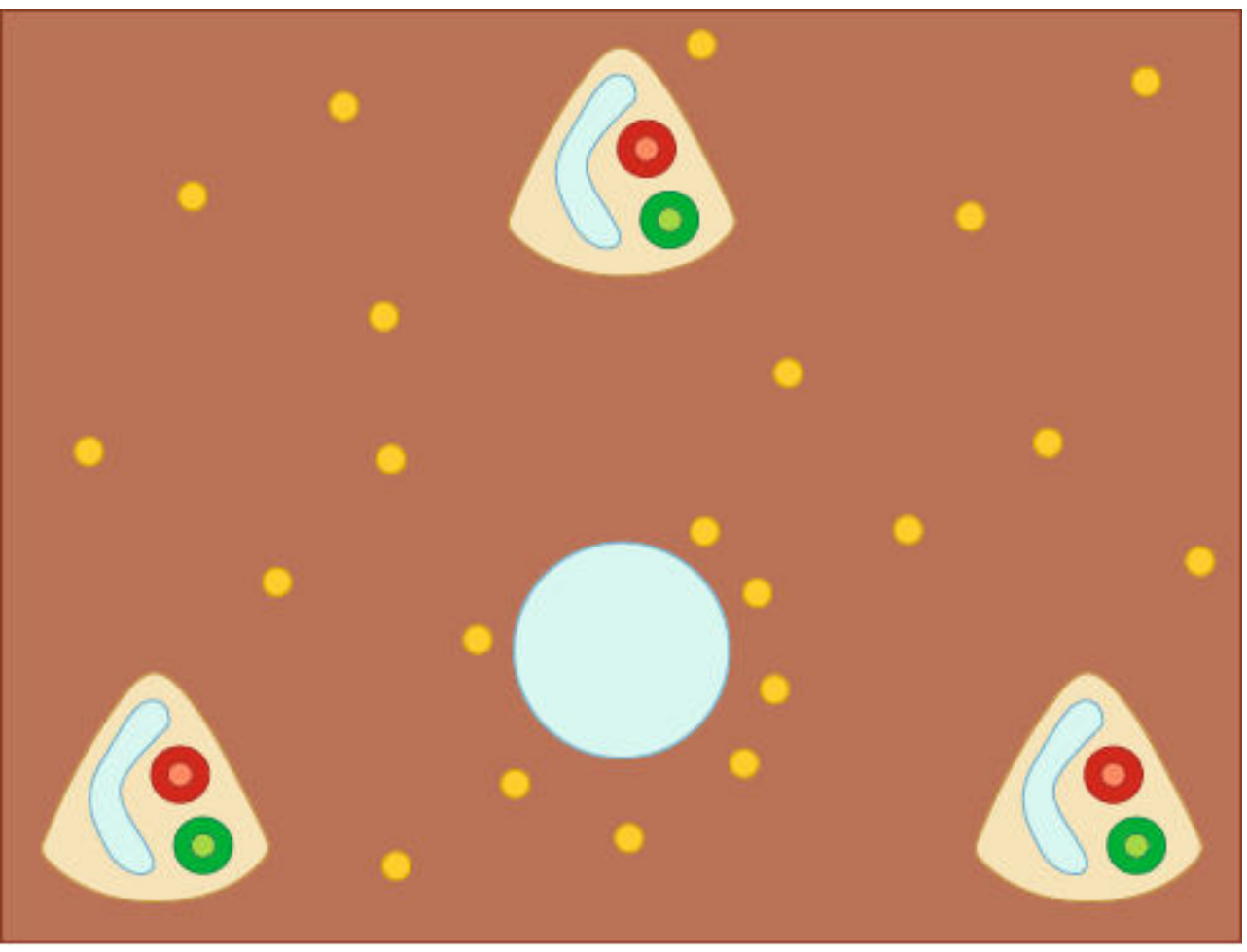
INTRALUMINAL

Infestation
- Clonorchis
- Schistosomiasis

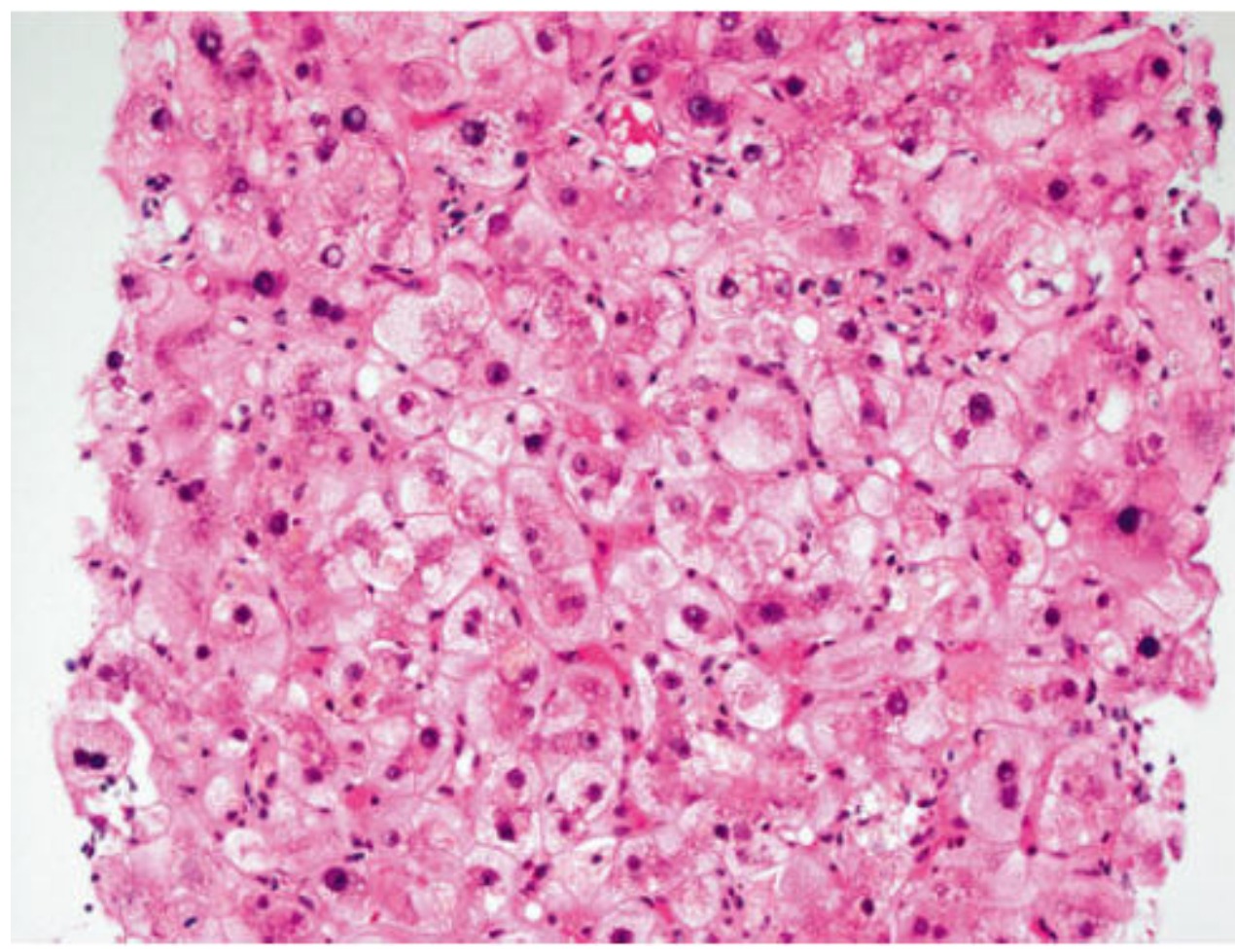
Gallstones

EXTRINSIC

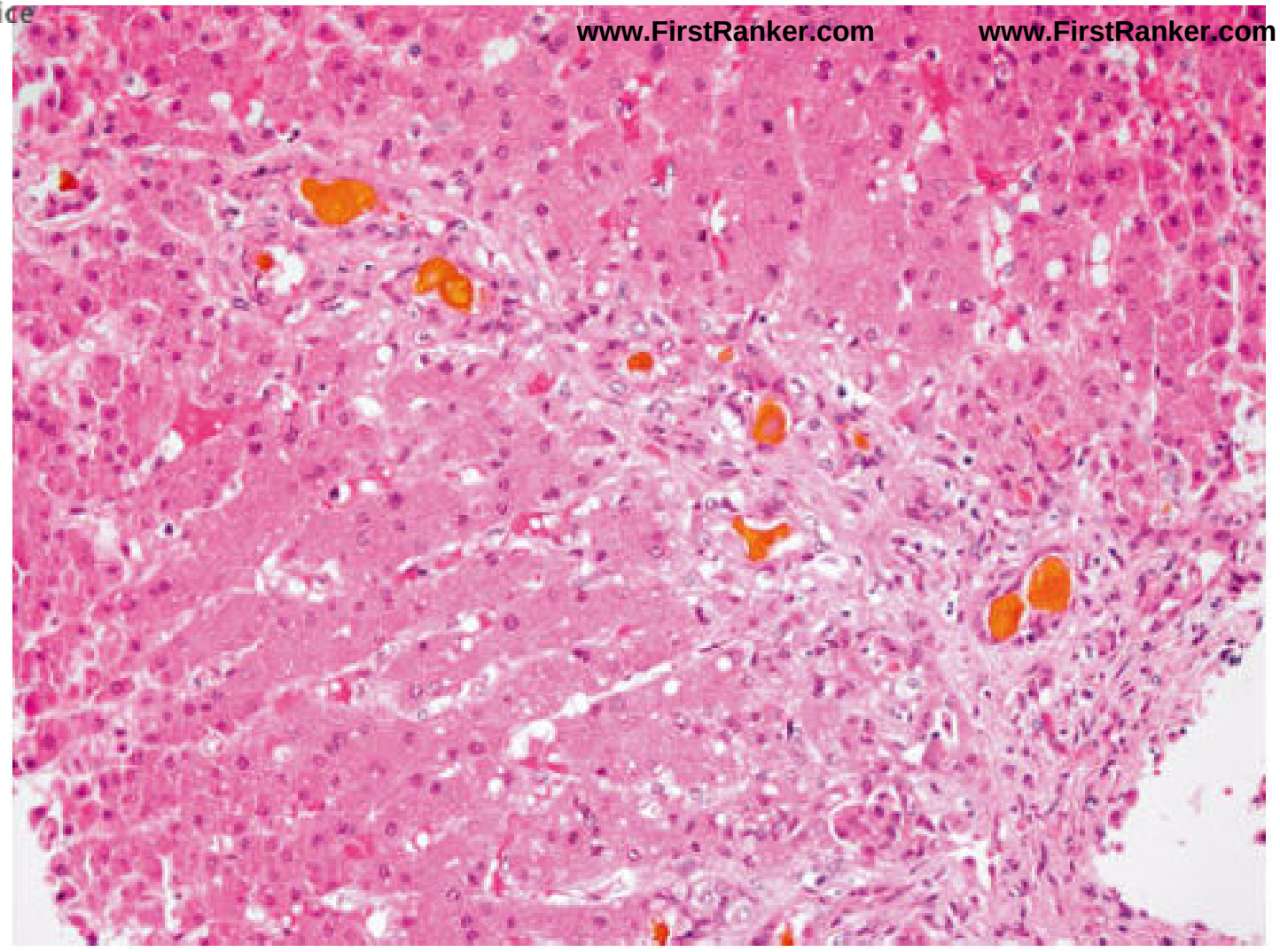
Portal lymphadenopathy
Chronic pancreatitis
Pancreatic tumour
Ampullary tumour
Duodenal tumour



Cholestasis pattern



Feathery degeneration



Cholestasis

SUMMARY

IMBALANCE between production and clearance

- Overproduction : hemolysis — Prehepatic
- Impaired uptake/conjugation/excretion: hepatocytes — Hepatic
- Regurgitation : Hepatocyte/ bileduct — Posthepatic