LECTURE 3

PIGMENTARY DEGENERATIONS

EXOGENOUS

PIGMENTATIONS

PNEUMOCONIOSES

ANTHRACOSIS (LUNGS, LYMPH NODES), TATUAGES

SILICOSIS

CHALICOSIS

SIDEROSIS

ASBESTOSIS

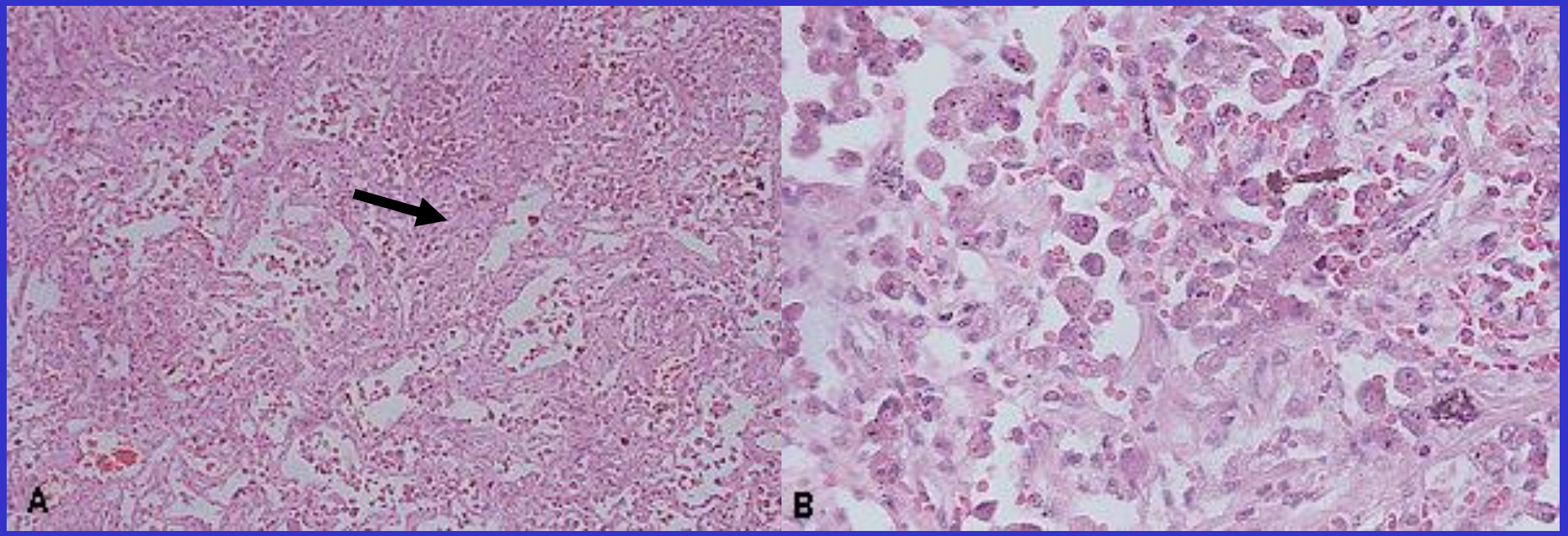
SATURNISMUS (PLUMBISMUS) – LEAD LINE (BLUISH LINE AT THE EDGE OF GUMS), INTESTINAL COLIC, ANAEMIA, NEUROPATHY

ARGYROSIS

PIGMENTARY DEGENERATIONS

EXOGENOUS PIGMENTATIONS

ASBESTOSIS

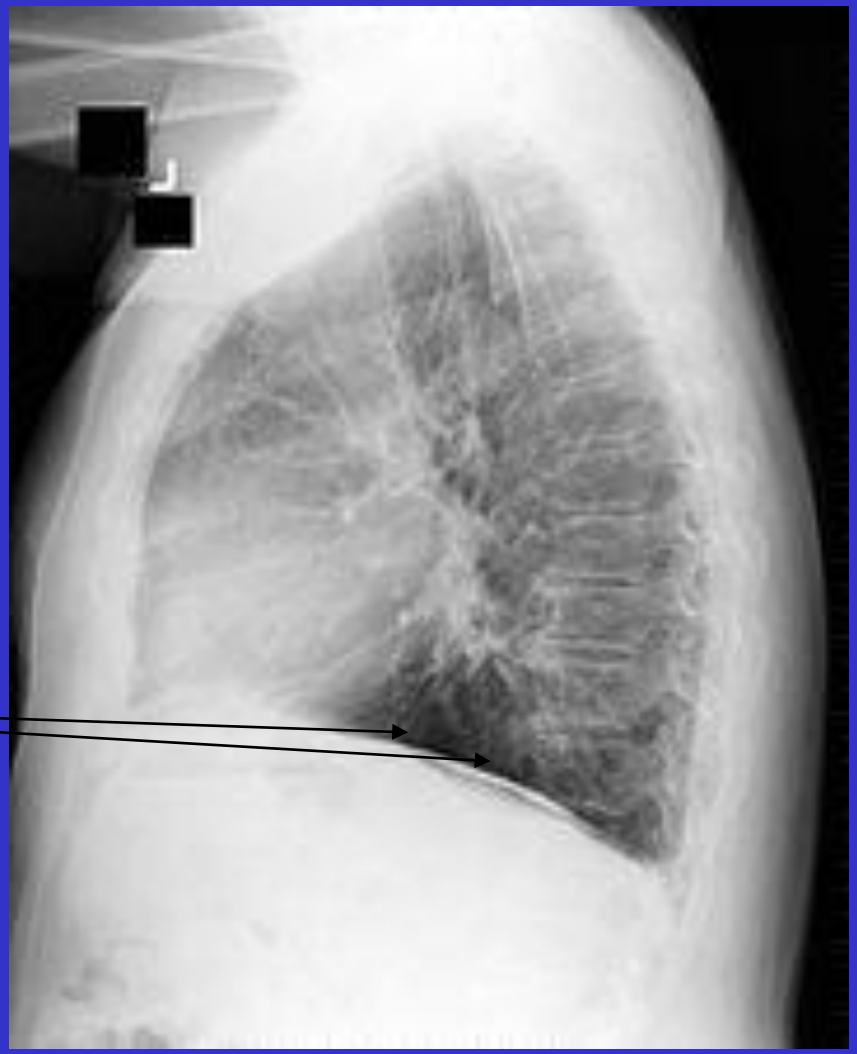


PULMONARY ASBESTOSIS

A. DIFFUSED INTRAPARENCHYMATOUS FIBROSIS

B. ASBESTOS DEPOSITS IN THE LUNG

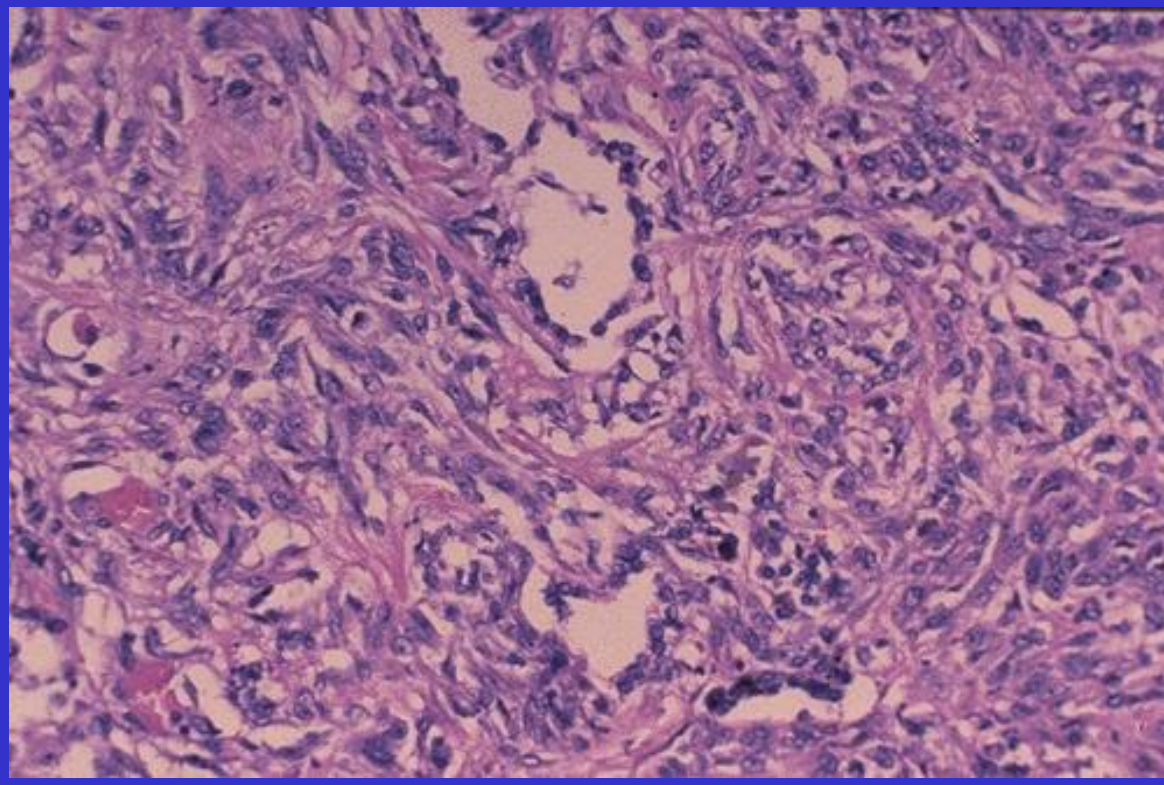
ASBESTOSIS



MESOTHELIOMA

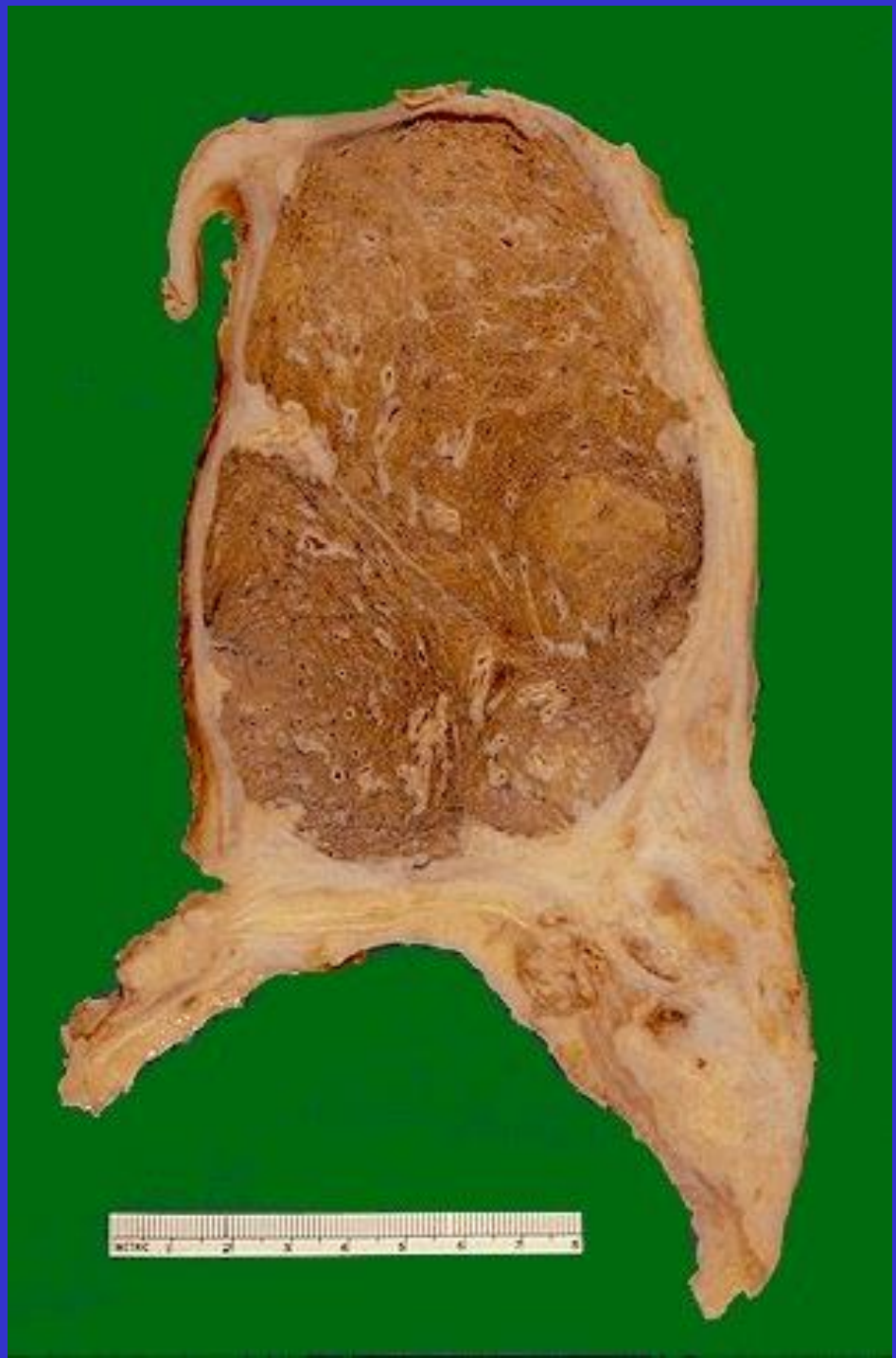
- Malignant mesothelioma arises from mesothelial lining of pleura, peritoneum, pericardium and tunica vaginalis –
- pleural mesothelioma is the most common of these

spindle cells or plump rounded cells forming gland-like configurations



MESOTHELIOMA

The dense white encircling tumor mass is arising from the visceral pleura and is a mesothelioma



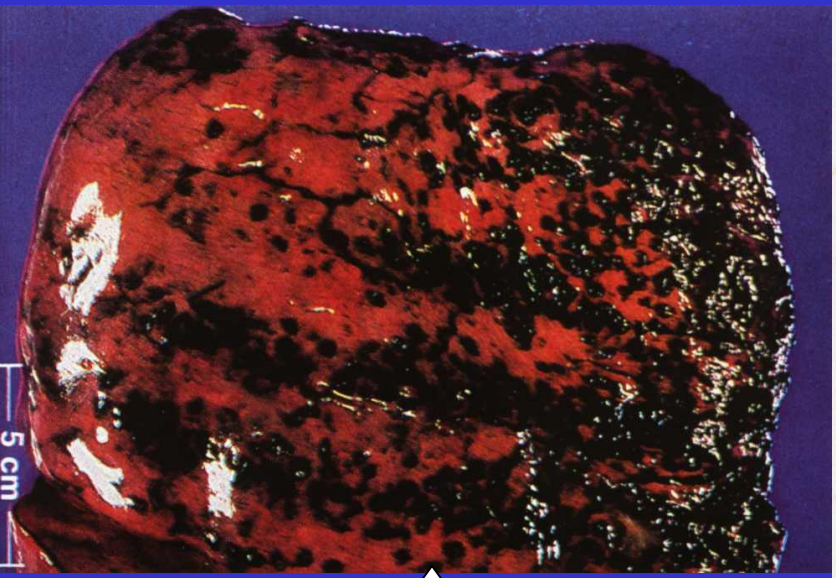
MESOTHELIOMA - ETIOLOGY

-
- Smoking is not a risk factor
- Risk factors include: Asbestos exposure:
- Usually a prolonged latency period
- Studies do not show a linear dose / response relationship between asbestos exposure and malignant mesothelioma
- Radiation
- Erionite: very carcinogenic mineral fiber used in gravel roads
- SV40 virus (association is not clear)

PIGMENTARY DEGENERATIONS

EXOGENOUS PIGMENTATIONS

ANTHRACOSIS OF THE LUNGS



MACROSCOPIC PICTURE

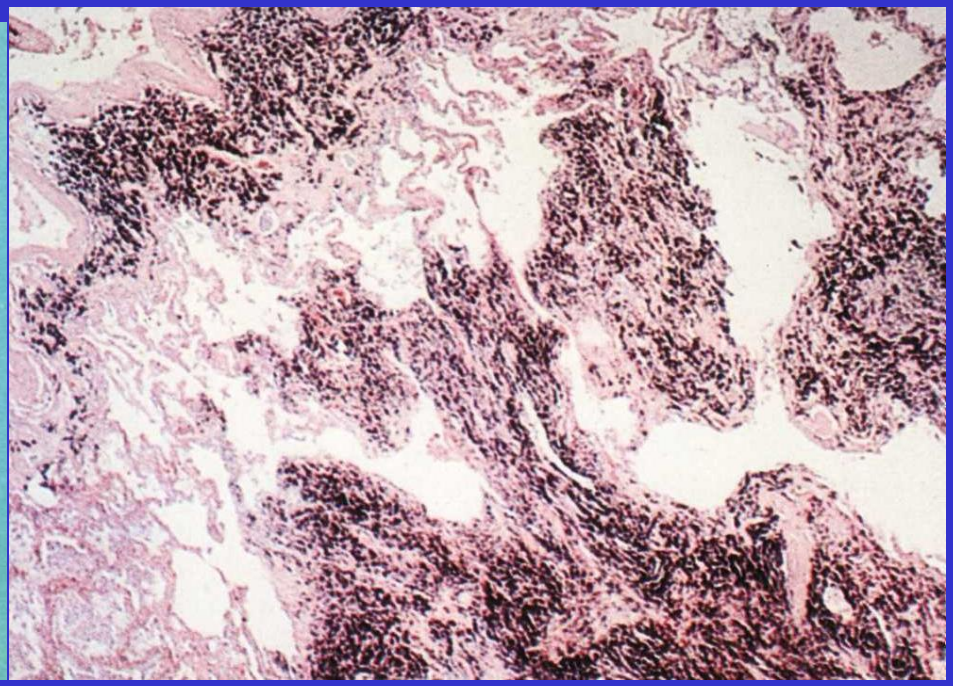
THIN PREPARATION FROM LUNG

PIGMENTARY DEGENERATIONS

EXOGENOUS PIGMENTATIONS

PULMONARY SILICOANTHRACOSIS

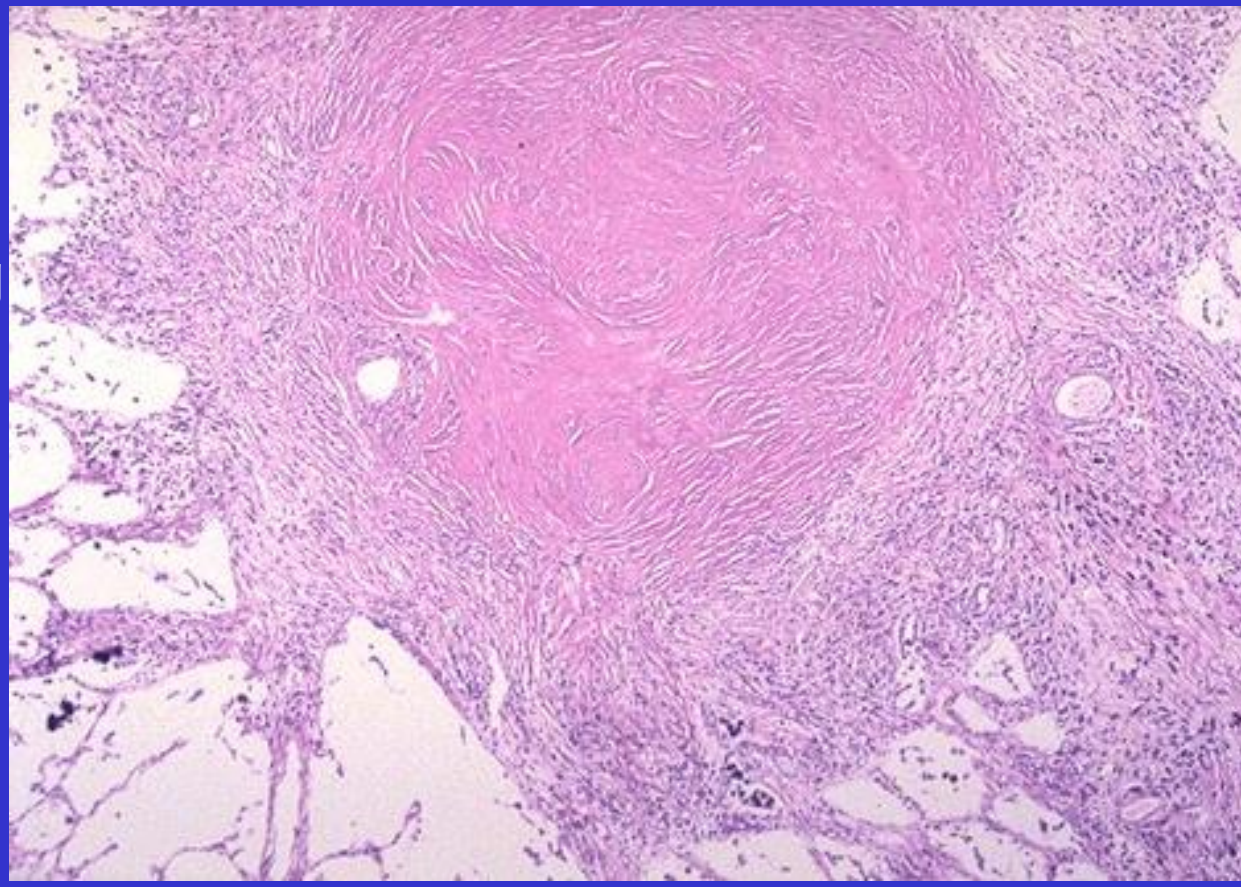
SILICOTIC NODULE IN LUNG



MICROSCOPIC PICTURE OF SILICOTIC FIBROSIS IN LUNG AND ANTHRACOSIS

SILICOTIC NODULE

composed mainly of bundles of interlacing pink collagen;
there is a minimal inflammatory reaction.



PIGMENTARY

DEGENERATIONS

ENDOGENIC PIGMENTATIONS

NON-HEMOGLOBINOUS DISCOLORATIONS

MELANIN

PRODUCED BY MELANOCYTES, TRANSPORTED BY MELANOPHORES
PRESENT IN: SKIN, HAIR, CHOROID OF EYE, PIA MATER,

MELANIN DEFICIENCY:

ALBINISM (CONGENITAL)

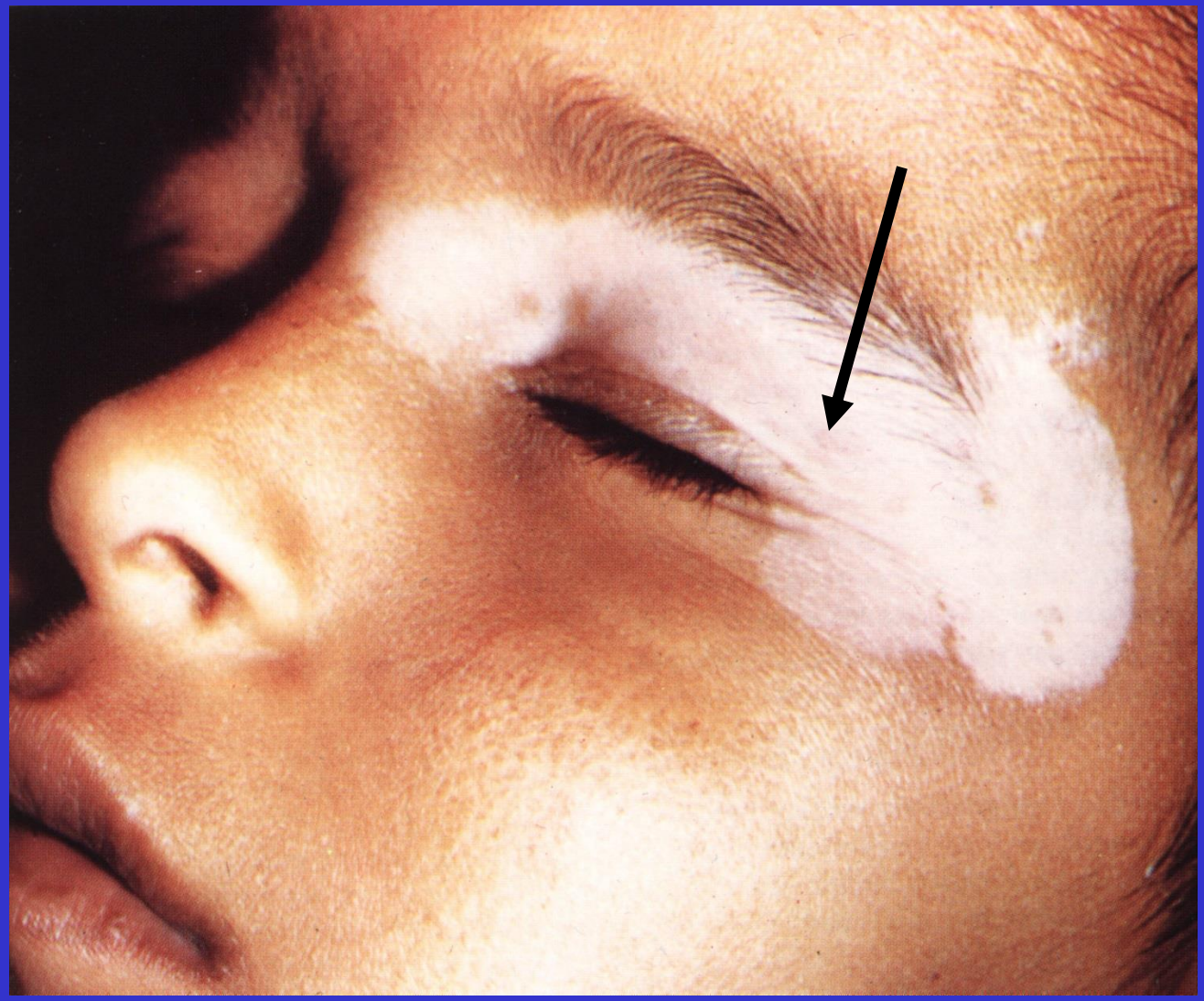
VITILIGO (ACQUIRED)

POLIOSIS

PIGMENTARY DEGENERATIONS

ENDOGENIC PIGMENTATIONS

VITILIGO



PIGMENTARY DEGENERATIONS

ENDOGENIC PIGMENTATIONS

NON-HEMOGLOBINOUS DISCOLORATIONS

MELANIN EXCESS

SOLAR IRRADIATION

ARSENIC MELANOSIS

SUPRARENAL MELASMA (ADDISON DISEASE)

MELASMA: OF PREGNANCY; IN CACHEXY

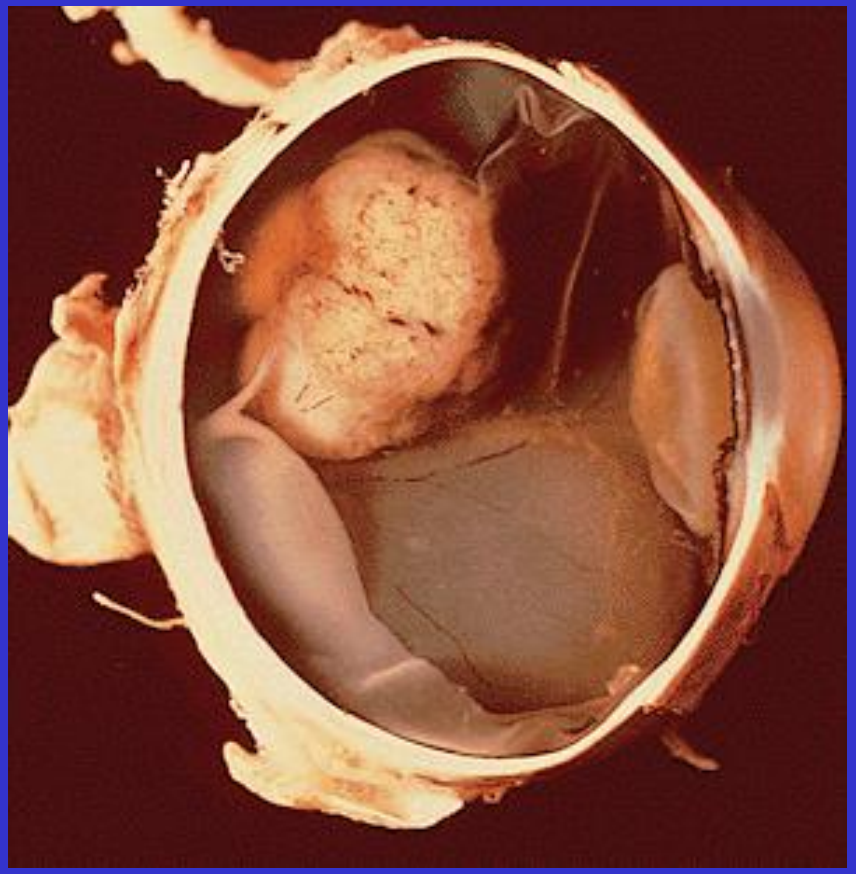
PIGMENTED NEVUS

MALIGNANT MELANOMA

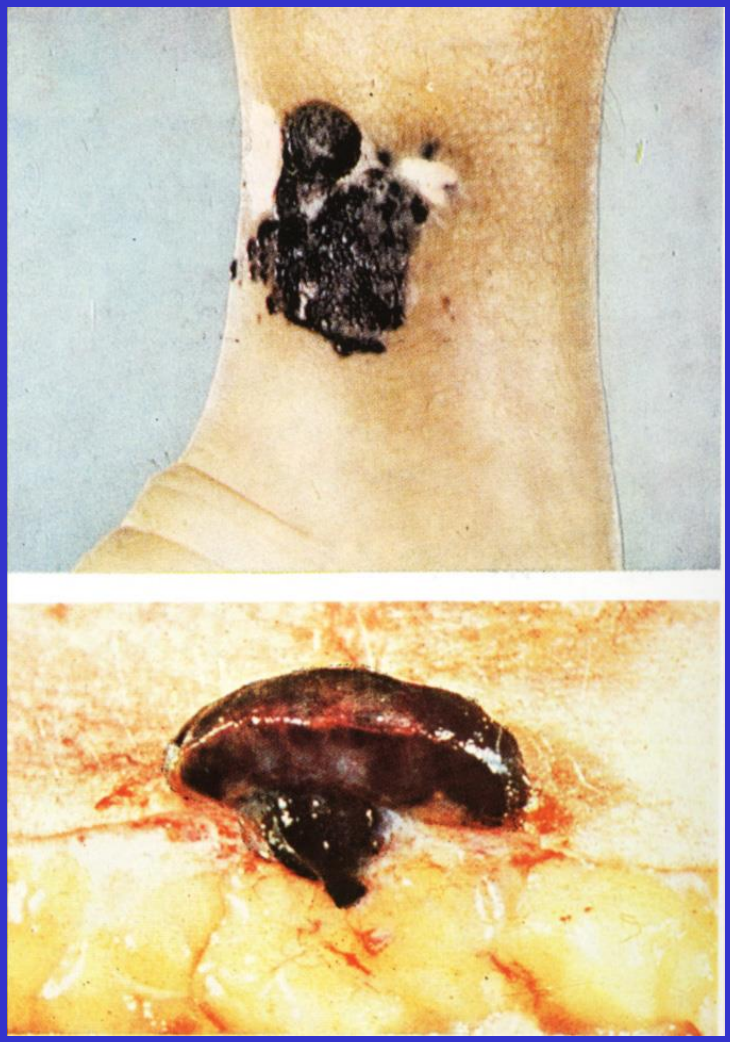
PIGMENTARY DEGENERATIONS

ENDOGENIC PIGMENTATIONS

MALIGNANT MELANOMA



MALIGNANT MELANOMA OF THE EYE



MALIGNANT MELANOMA
OF THE SKIN

• MELANOMA

- Malignancy of melanocytes, predominantly in skin, but also eyes, ears, GI tract, leptomeninges, mucous membranes
- Only 4% of skin cancers but majority of skin cancer deaths
- Usually due to sun (UV light) exposure
- Incidence increasing worldwide

Clinical warning signs

Change in color of pigmented lesion

Enlargement of existing mole

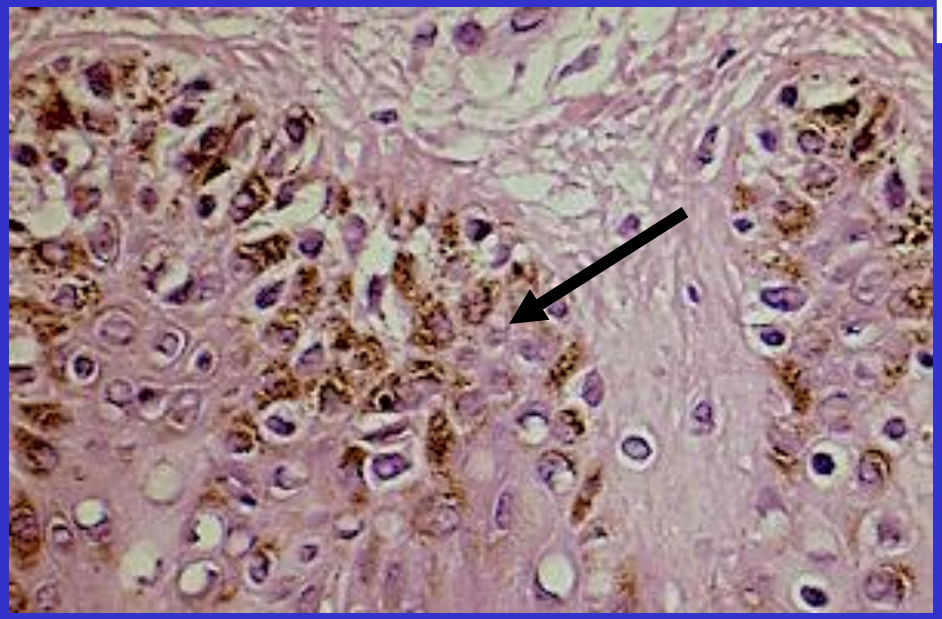
Itching or pain in mole

Development of new pigmented lesion in adult life

Irregular borders in pigmented lesion

Variegation of color in pigmented lesion

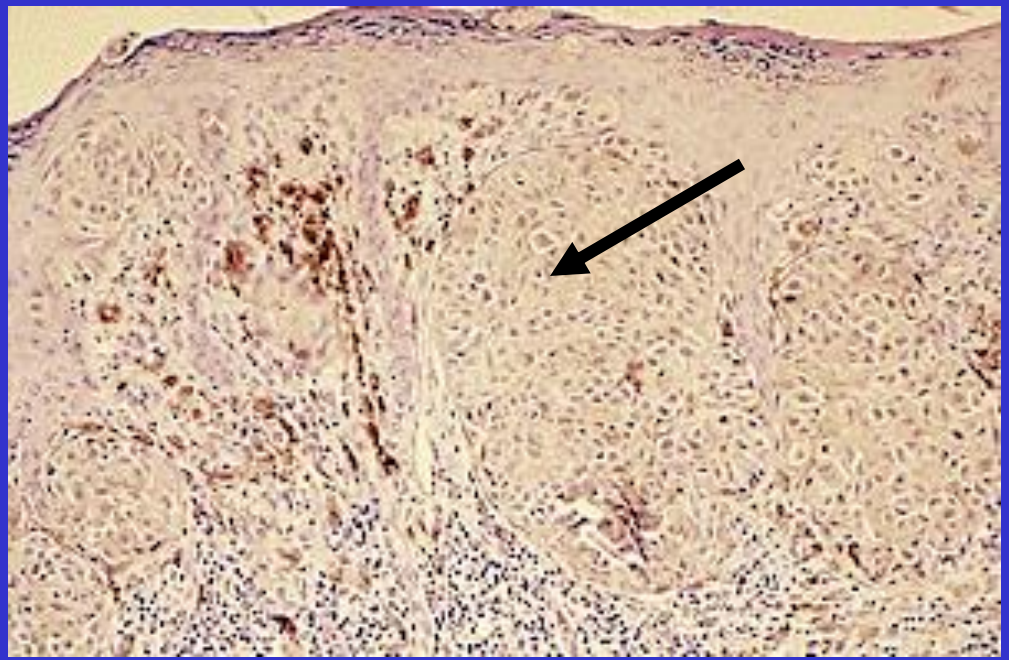
PIGMENTARY DEGENERATIONS



ENDOGENIC PIGMENTATIONS

EPIDERMO-DERMAL

NEVUS PIGMENTOSUS



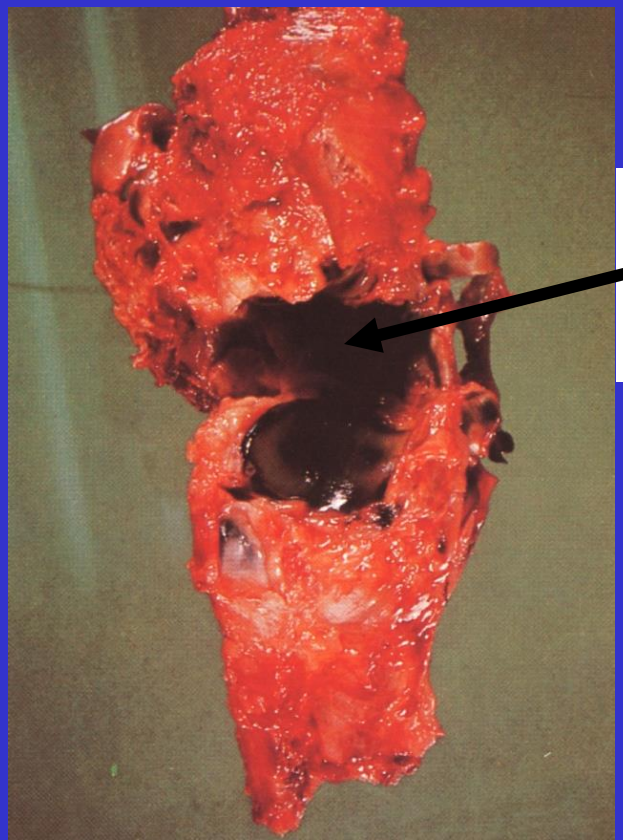
MELANOMA MALIGNUM

DEGENERATIONS PIGMENTARY

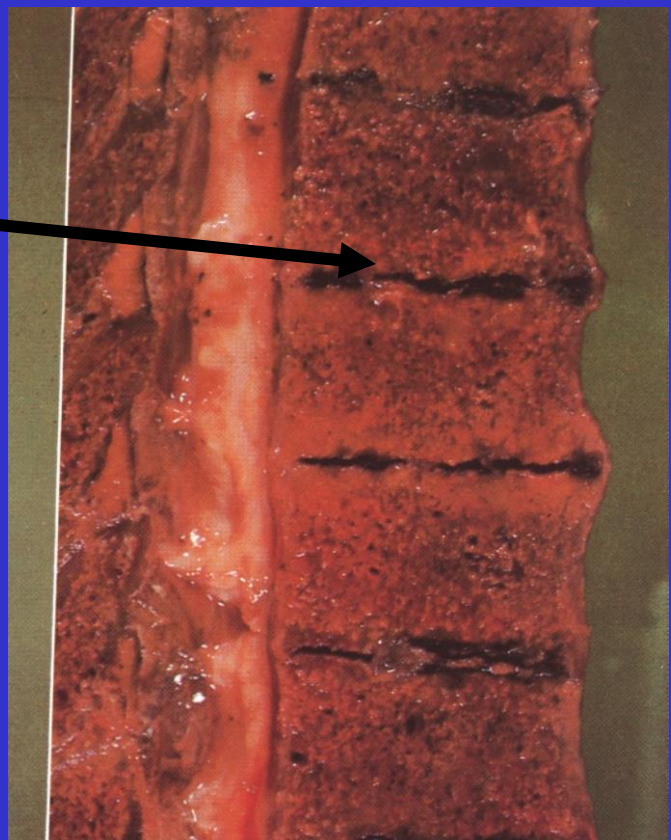
ENDOGENIC PIGMENTATIONS

NON-HEMOGLOBINOUS DISCOLORATIONS

ALKAPTONURIA (OCHRONOSIS, a symptom in alkaptonuria; 1908 r. GARROD - „inborn metabolic mistake” – CONGENITAL ENZYMOPATHY)



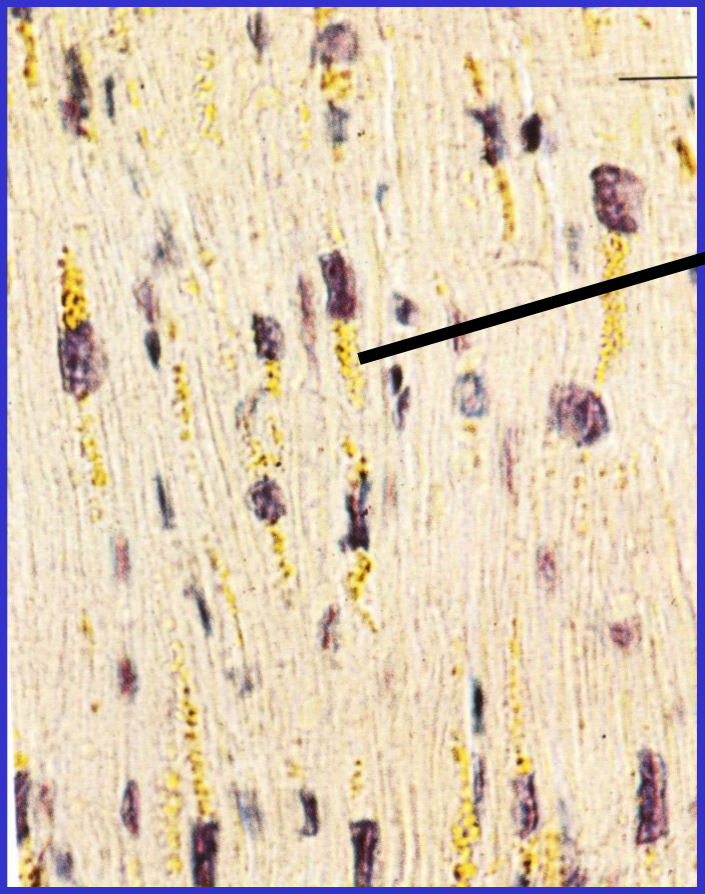
BLACK COLORATION OF CARTILAGE



PIGMENTARY DEGENERATIONS

NONHEMOGLOBINOUS DISCOLORATIONS

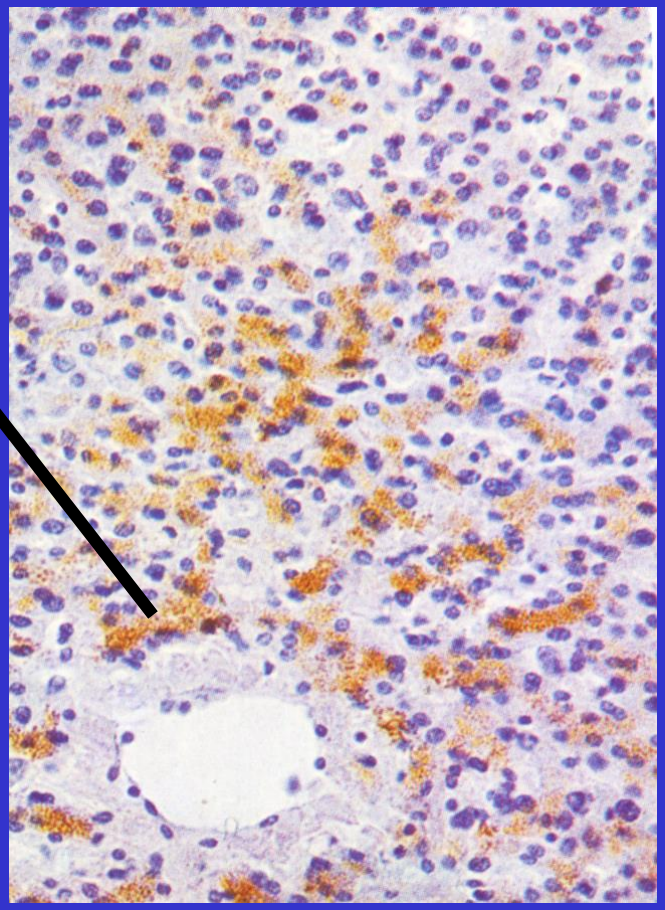
LIPOFUSCIN (LIPOCHROME)



ATROPHIA FUSCA **(BROWN ATROPHY)**

HEART MUSCLE

LIVER



PIGMENTARY DEGENERATIONS

ENDOGENIC PIGMENTATIONS

HEMOGLOBINOUS DISCOLORATIONS

HEMATOIDIN

(DOUBTS: exists or not ?)

1. **Does not contain IRON**

2. **Originates during the period of three weeks**

3. **Originates without living cells in the center of large haemorrhage**

PIGMENTARY DEGENERATIONS

ENDOGENIC PIGMENTATIONS

HEMOGLOBINOUS DISCOLORATIONS

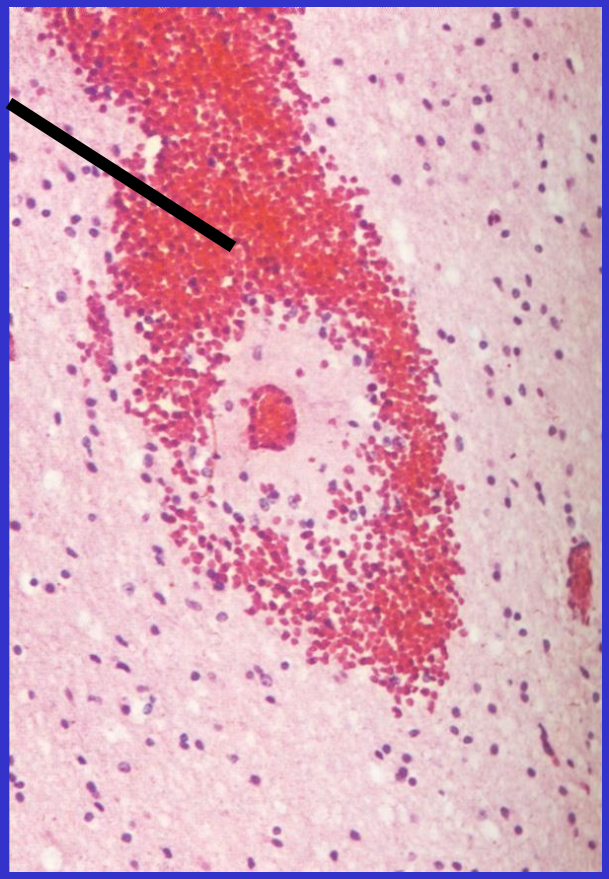
HEMOSIDERIN

1. JUNCTION OF IRON HYDROXIDE WITH PROTEIN
2. ORIGINATES FROM IRON WHEN LEVELS OF APOFERRITIN ARE TOO LOW
3. YELLOW-BROWN GRANULAR DISCOLORATION
4. IRON POSITIVE IN STAINING
5. ORIGINATES FROM ERYTHROCYTES WITHIN 5 DAYS
6. OCCURS IN LIVING CELLS ONLY

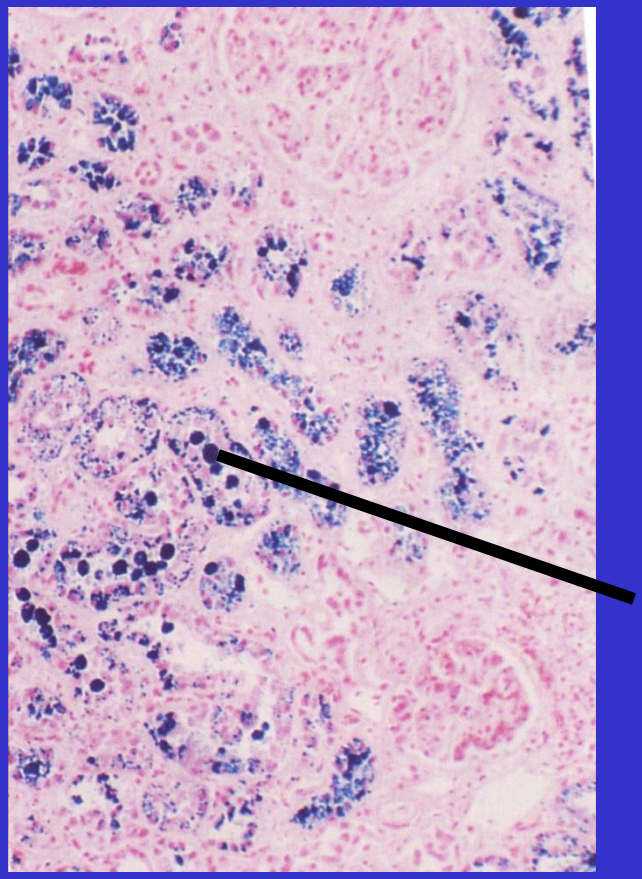
PIGMENTARY DEGENERATIONS

ENDOGENIC PIGMENTATIONS

HEMOGLOBINOUS DISCOLORATIONS



HEMOGLOBIN



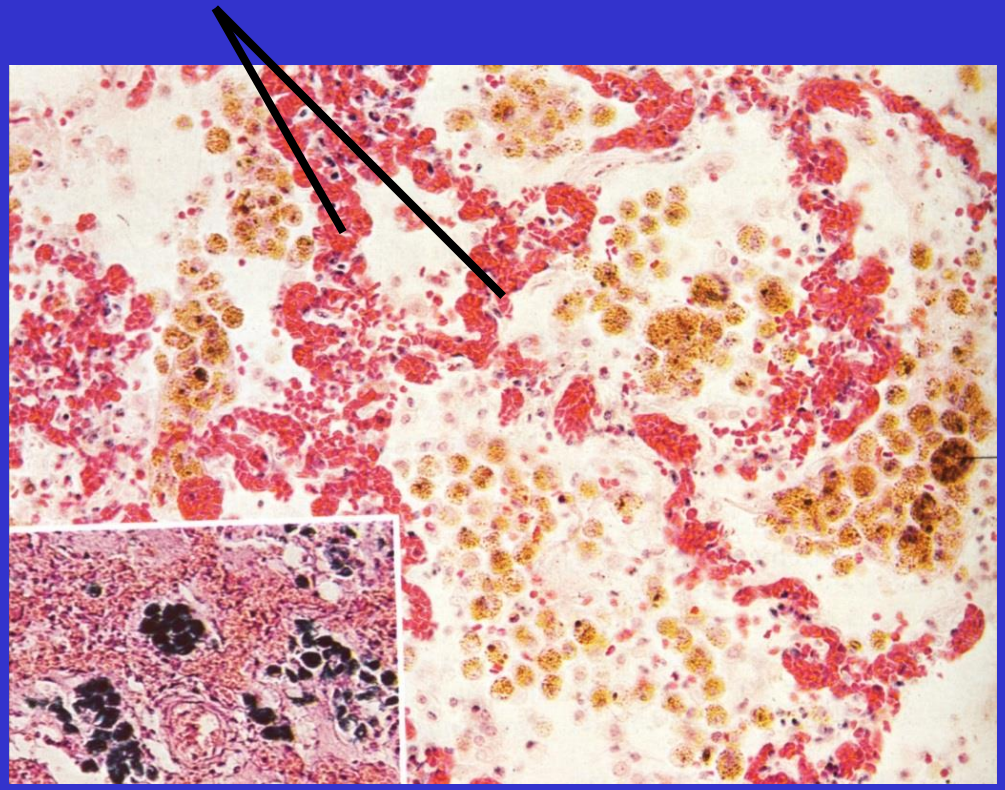
HEMOSIDEROSIS OF KIDNEY

PIGMENTARY DEGENERATIONS

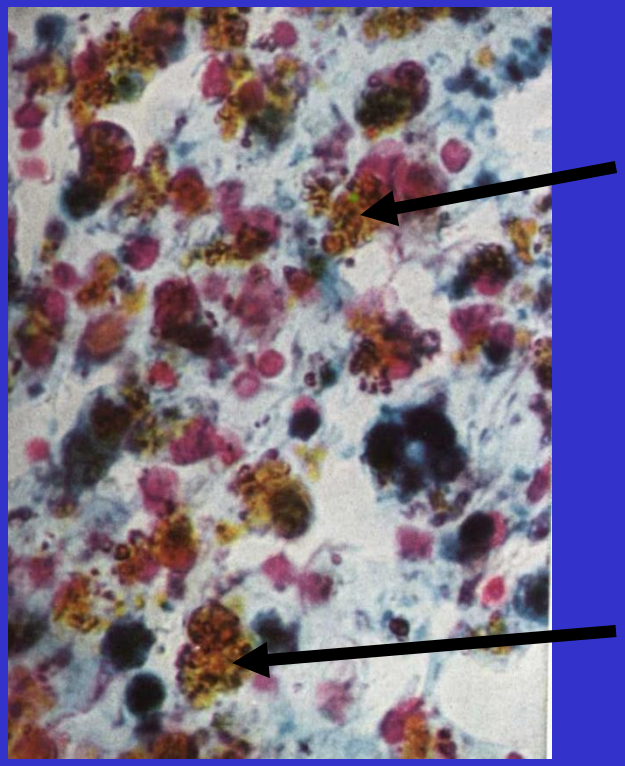
ENDOGENIC PIGMENTATIONS

HEMOGLOBINOUS DISCOLORATIONS
HEMOSIDERIN

LOCAL HEMOSIDEROSIS



CHRONIC VENOSTASIS
(CONGESTION) IN LUNG



OLD RED INFARCT MACROPHAGES
FILLED WITH HEMOSIDERIN

PIGMENTARY DEGENERATIONS

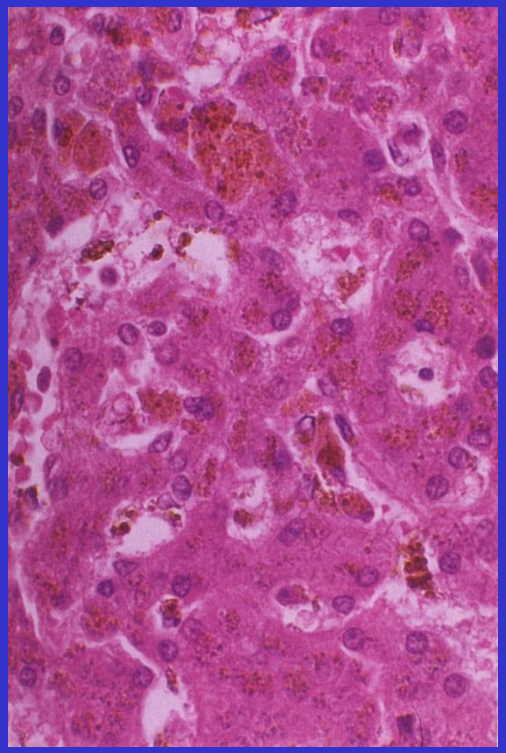
ENDOGENIC PIGMENTATIONS

HEMOGLOBINOUS DISCOLORATIONS

HEMOSIDERIN

GENERALIZED HEMOSIDEROSIS

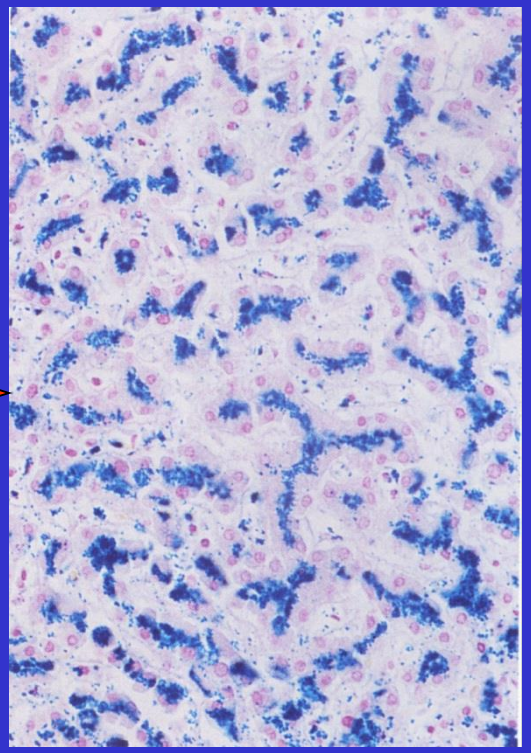
CONGENITAL HEMOCHROMATOSIS – AUTOSOMAL AND RECESSIVE



HEMOCHROMATOSIS OF LIVER

H&E

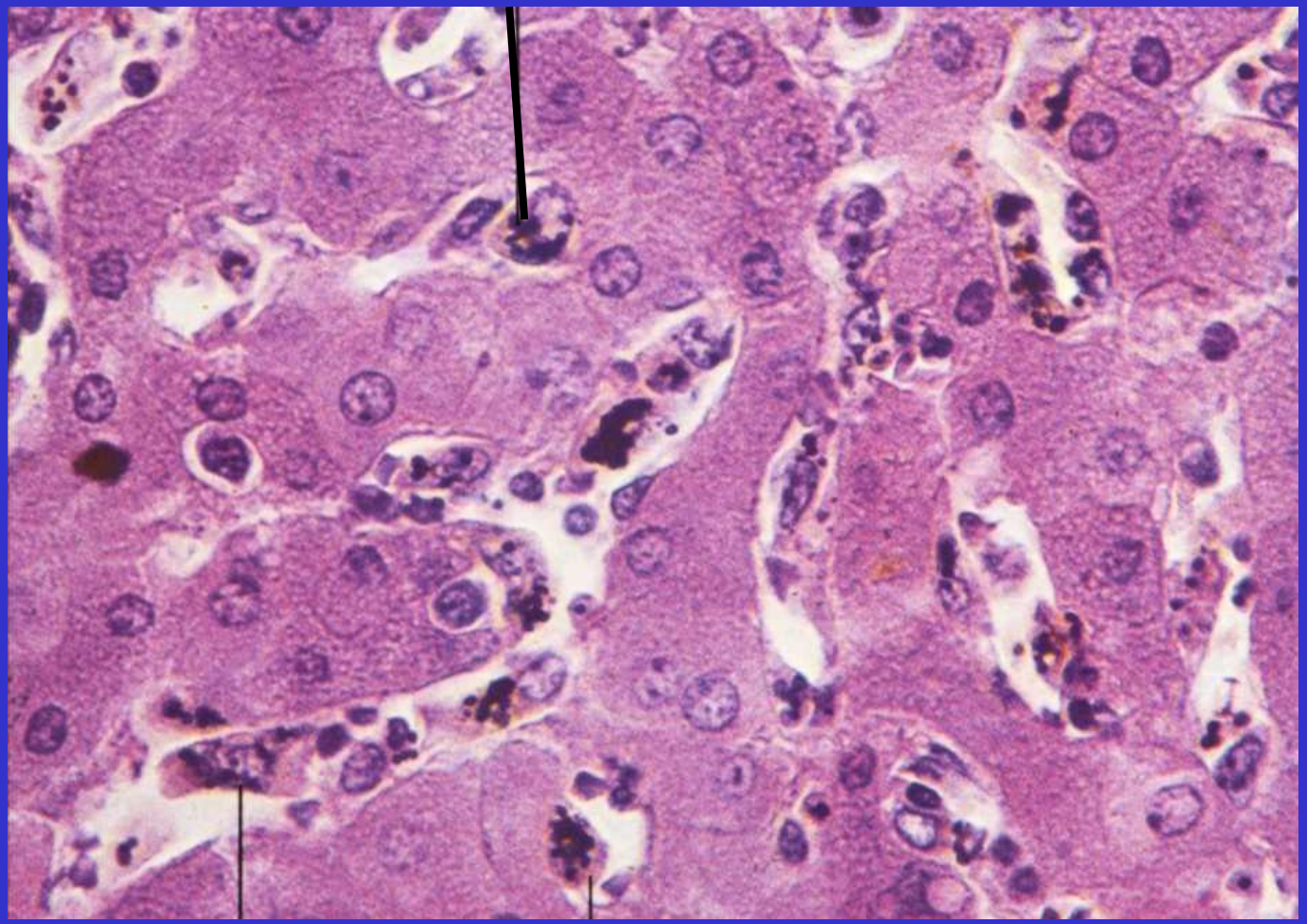
BERLIN BLUE



PIGMENTARY DEGENERATIONS

HEMOGLOBINOUS DISCOLORATIONS

MALARIAL DYE

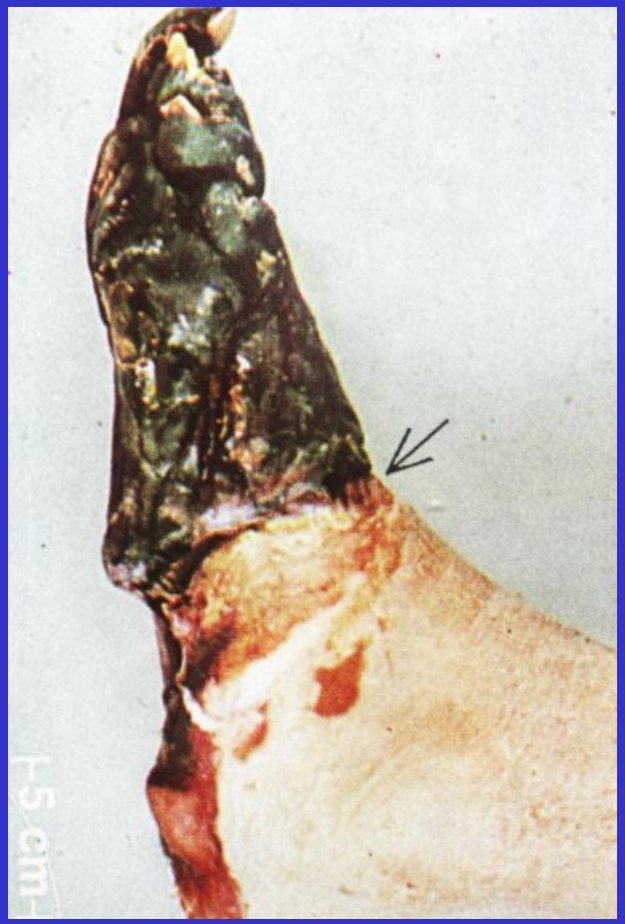


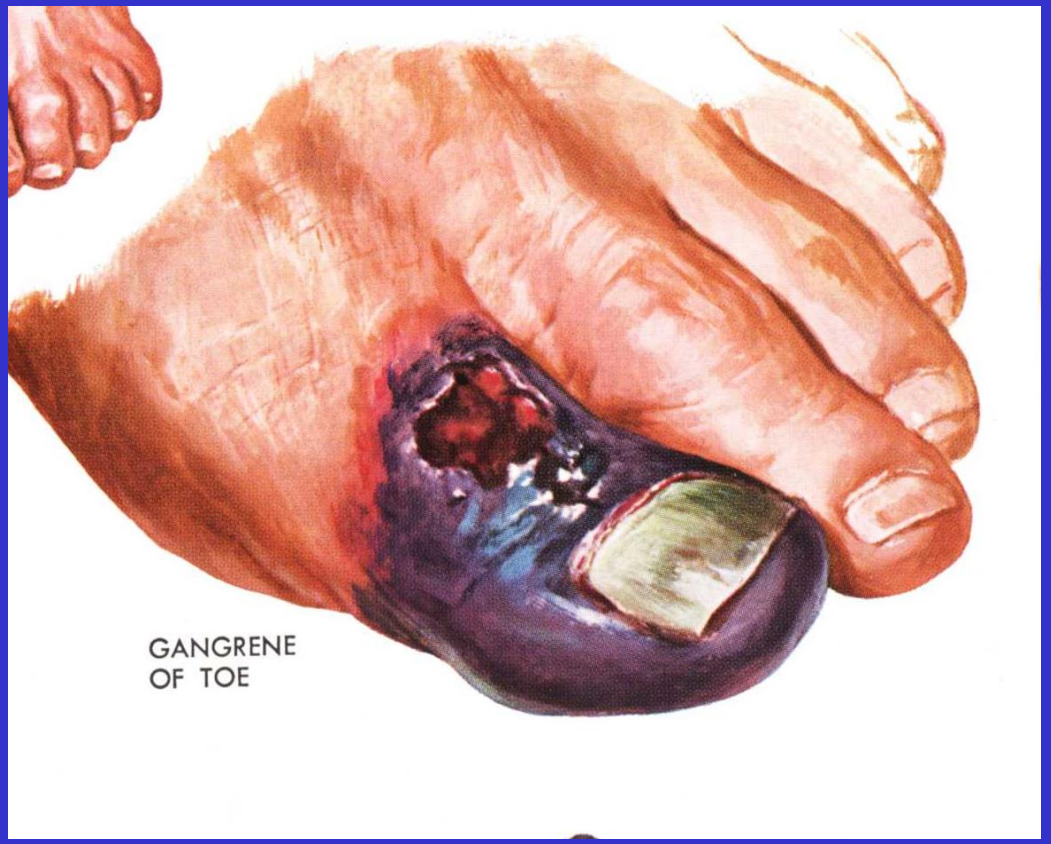
BROWN-BLACK MALARIAL DYE IN KUPFER CELLS

ENDOGENIC PIGMENTATIONS

HEMOGLOBINOUS DISCOLORATIONS

IRON SULPHIDE





GANGRENE OF FOOT AND TOE. BLACK COLOR OF NECROTIC TISSUE CAUSED BY IRON SULPHIDE THAT RESULTS FROM THE IRON IN HEMOGLOBIN

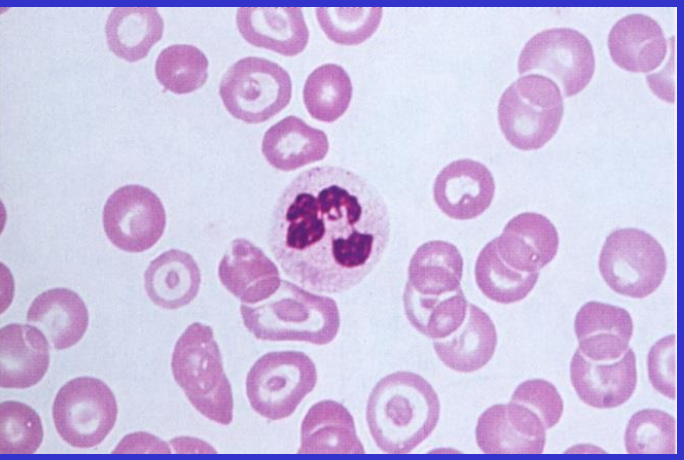
PIGMENTARY DEGENERATIONS

ENDOGENIC PIGMENTATIONS

HEMOGLOBINOUS DISCOLORATIONS

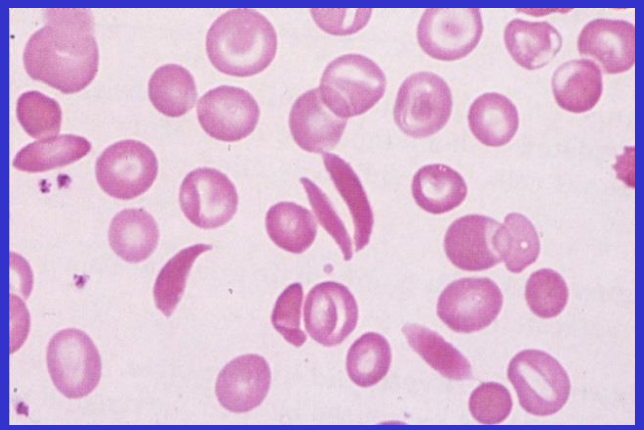
BILIRUBIN

HEMOLYTIC JAUNDICE (*ICTERUS*)

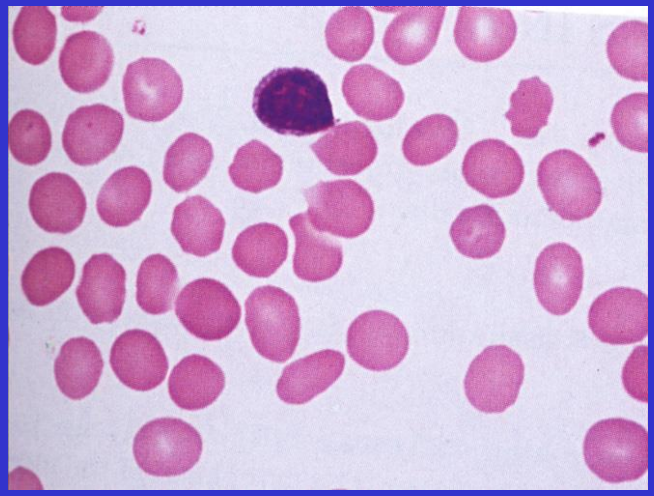


THALASSEMIA:

(IMPAIRED Hb SYNTHESIS – Hb IN CENTRE OF RBC; ERYTHROCYTES ARE SMALL AND PALE)



DREPANOCYTIC ANAEMIA



OVALOCYTIC ANAEMIA

PIGMENTARY DEGENERATIONS

ENDOGENIC PIGMENTATIONS

HEMOGLOBINOUS DISCOLORATIONS

BILIRUBIN

1. PARENCHYMATOUS JAUNDICE

DAMAGE OF LIVER CELLS

2. MECHANICAL JAUNDICE

HINDERING OR STOPPING OF BILE FLOW TO THE DUODENUM

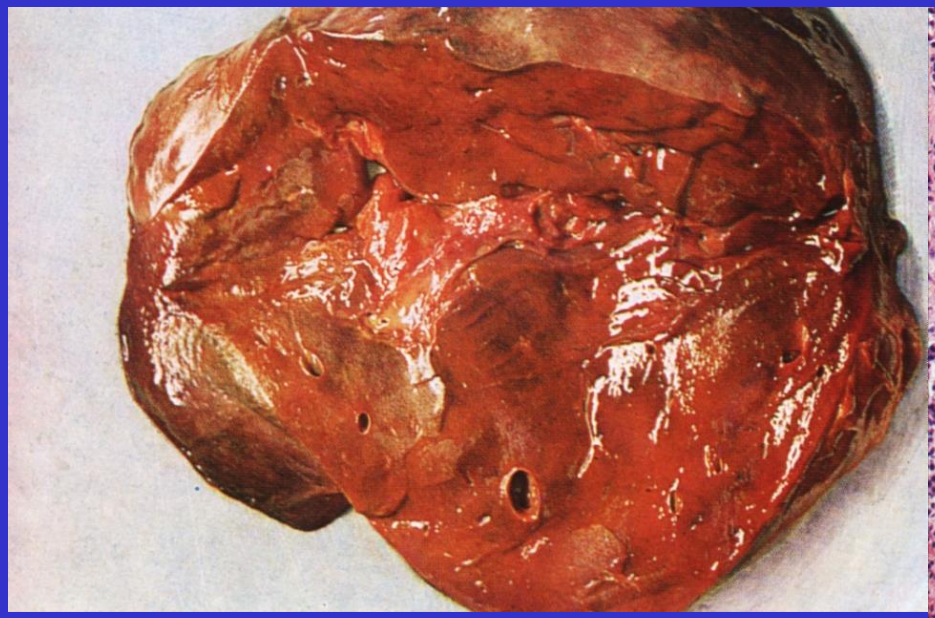
PIGMENTARY DEGENERATIONS

ENDOGENIC PIGMENTATIONS

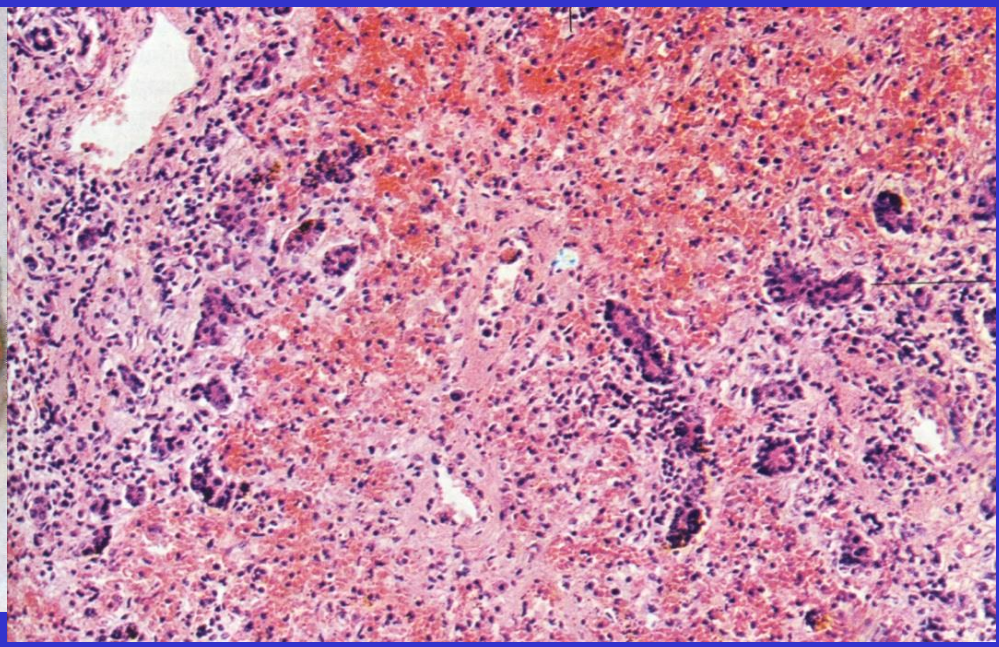
HEMOGLOBINOUS DISCOLORATIONS
BILIRUBIN

1. PARENCHYMATOUS JAUNDICE

DAMAGE OF LIVER CELLS



ATROPHY OF LIVER

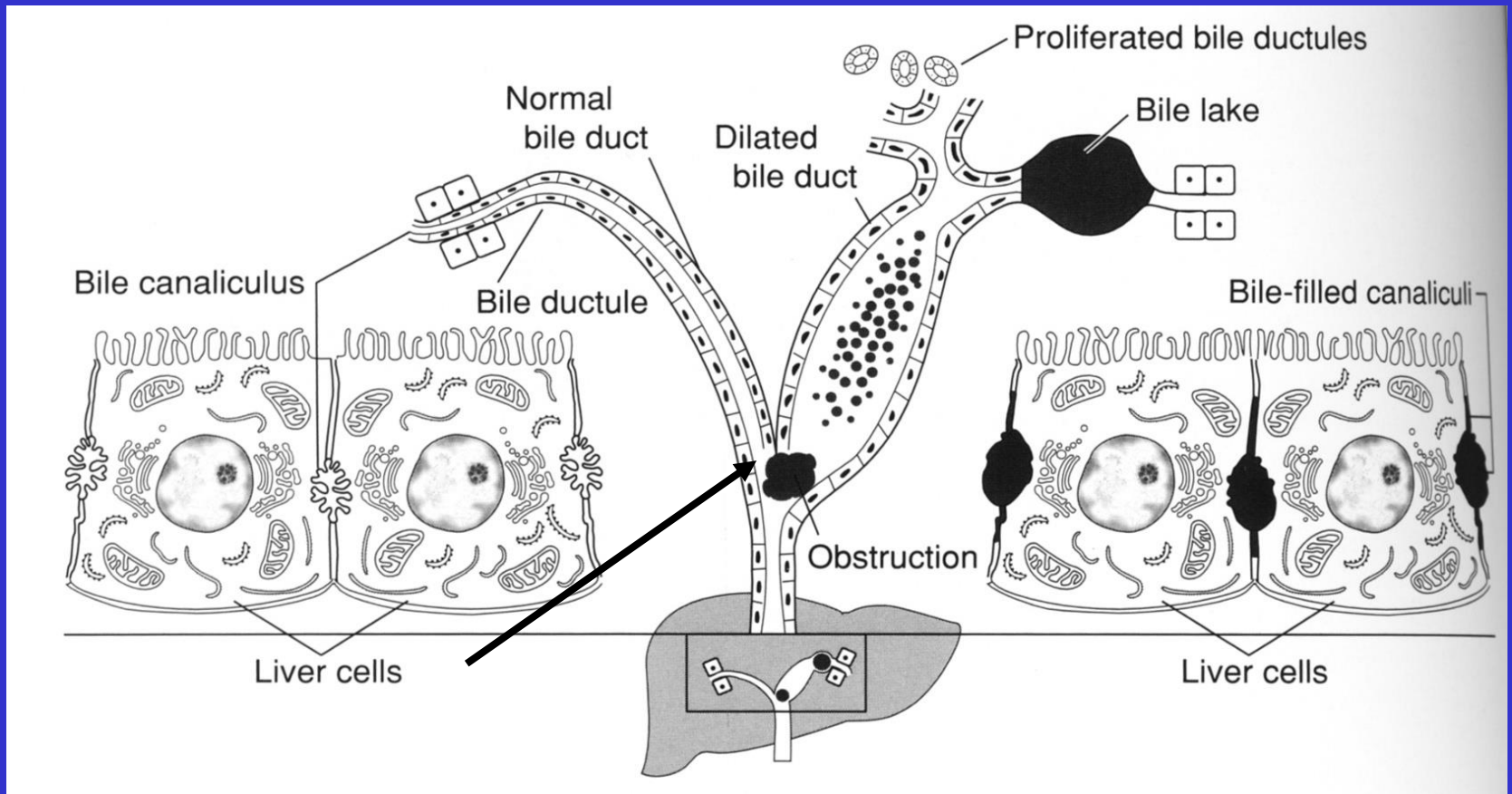


DIFFUSE NECROSIS OF LIVER

PIGMENTARY DEGENERATIONS

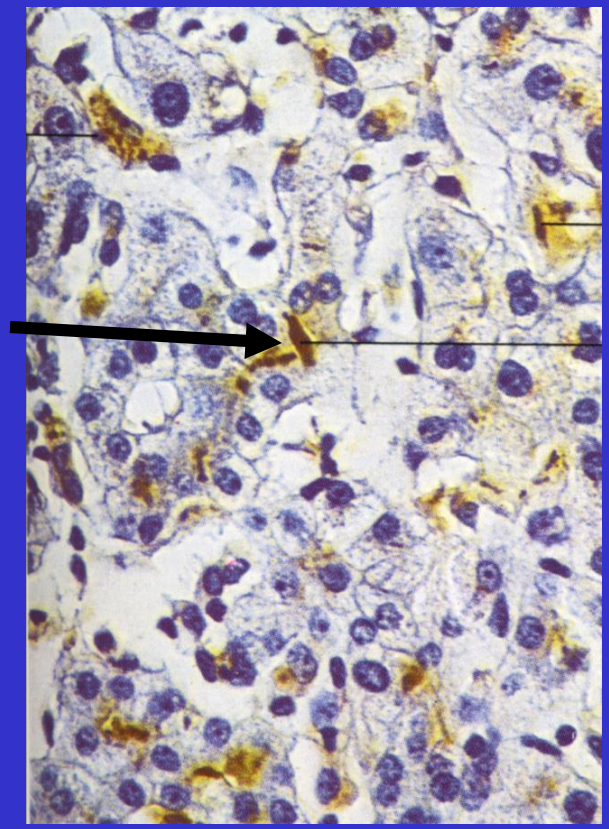
ENDOGENIC PIGMENTATIONS
HEMOGLOBINOUS DISCOLORATIONS
BILIRUBIN
2. MECHANICAL JAUNDICE

REDUCTION OR COMPLETE BLOCK OF FLOW OF BILE TO DUODENUM

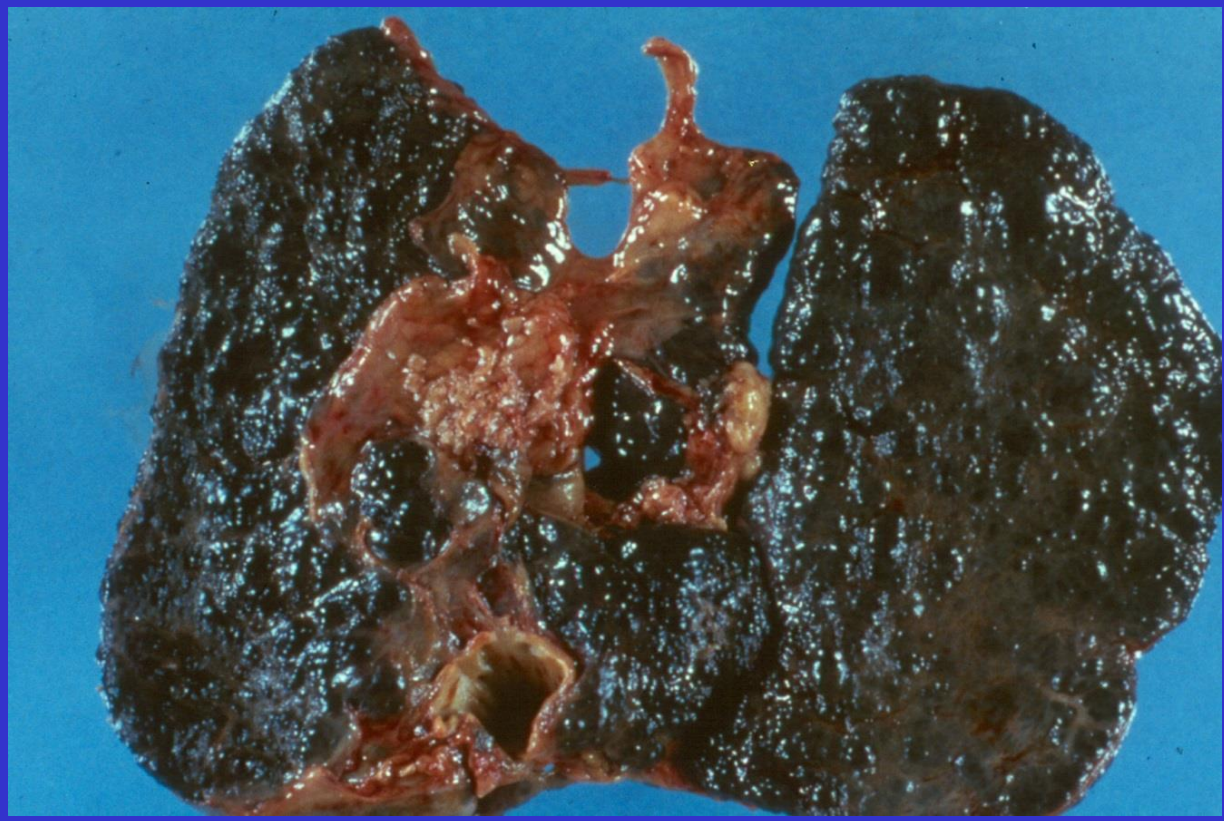


PIGMENTARY DEGENERATIONS

ENDOGENIC PIGMENTATIONS
HEMOGLOBINOUS DISCOLORATIONS
BILIRUBIN
2. MECHANICAL JAUNDICE



CHOLESTASIS IN LIVER

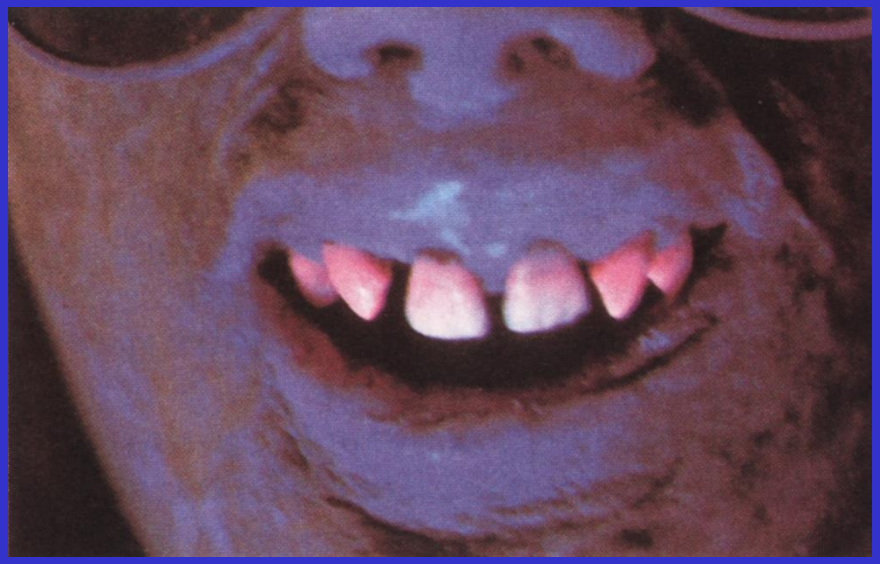


BILIARY CIRRHOSIS OF LIVER

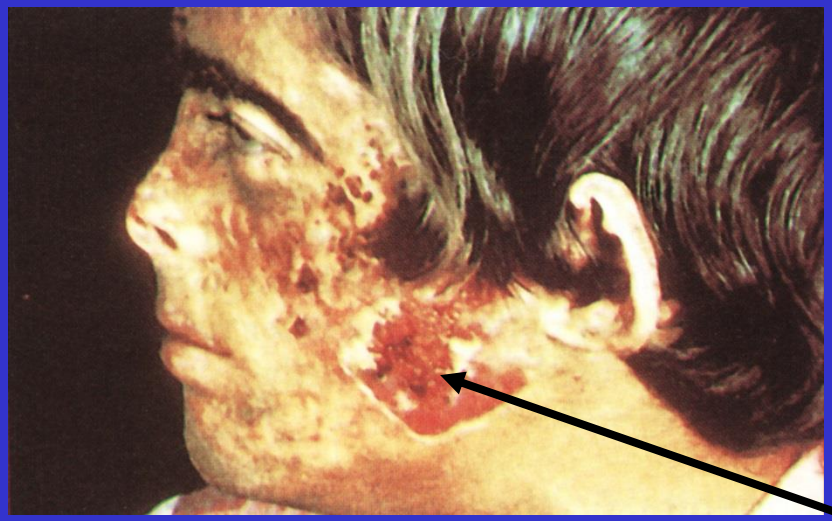
PORPHYRIAS

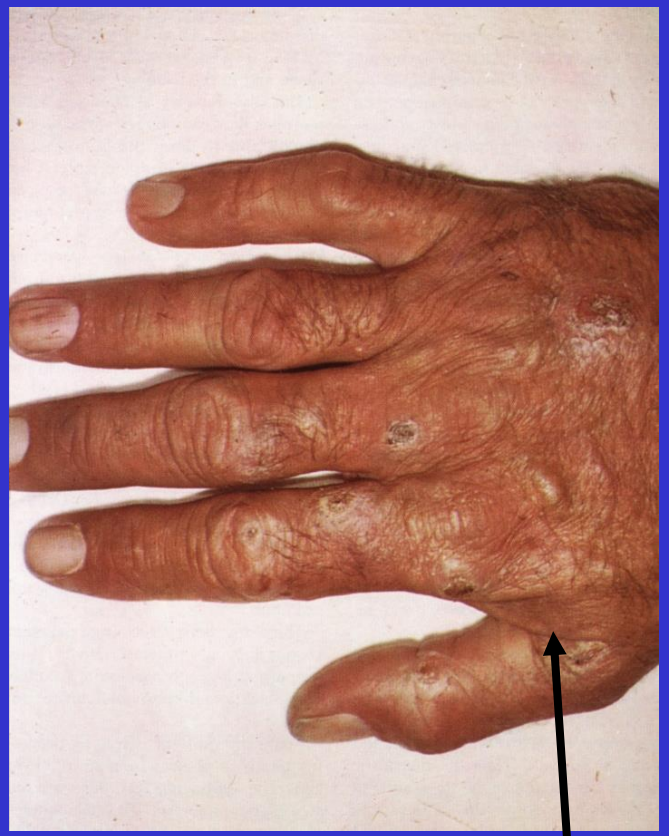
- group of diseases in which substances called porphyrins build up, negatively affecting the skin or nervous system, and sometimes other organs
- chest pain, abdominal pain, vomiting, constipation, confusion, fever, high blood pressure and high heart rate

PORPHYRIAS



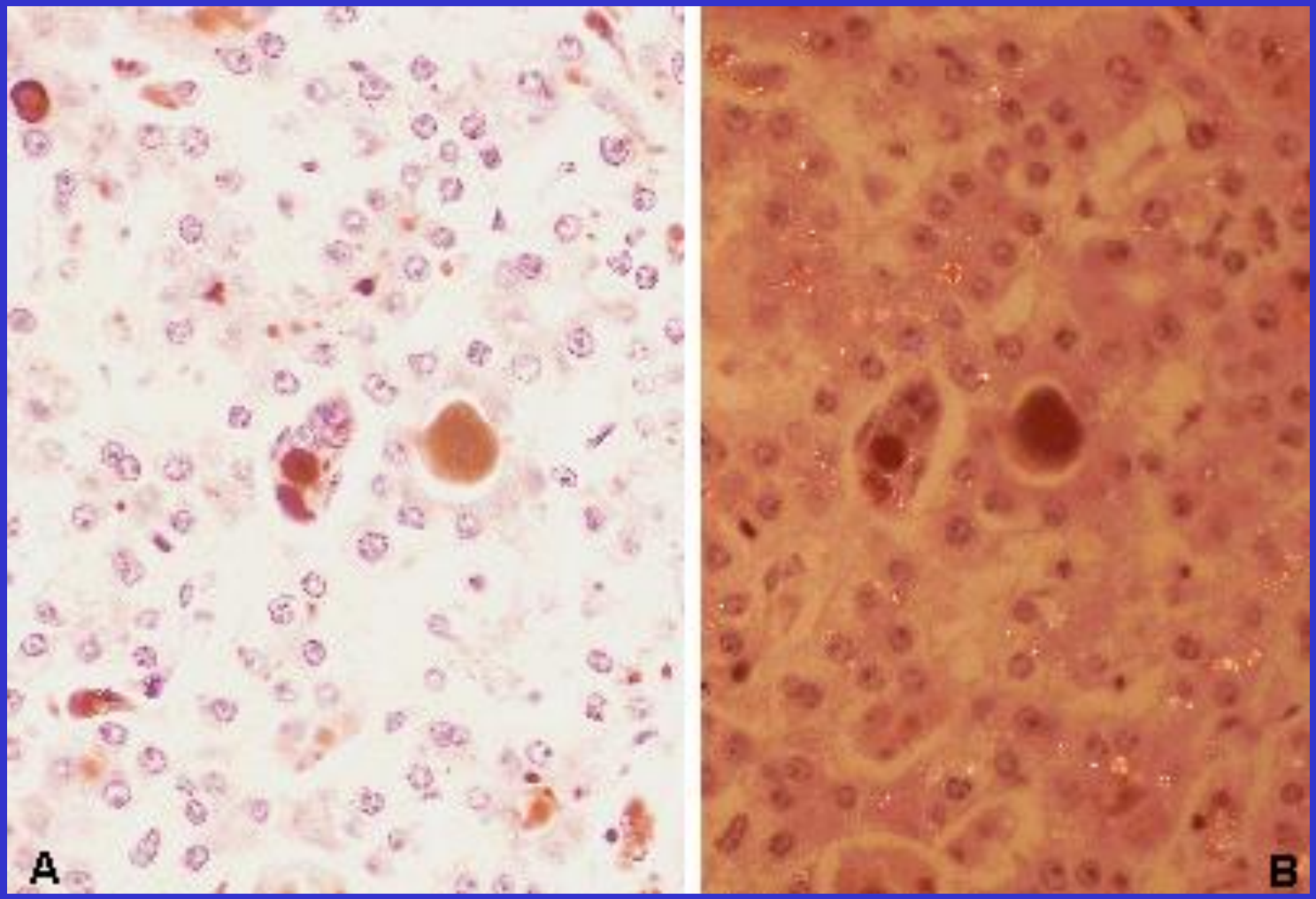
RED PORPHYRIN ILLUMINESCENCE OF TEETH IN ULTRAVIOLET LIGHT (405 nm)





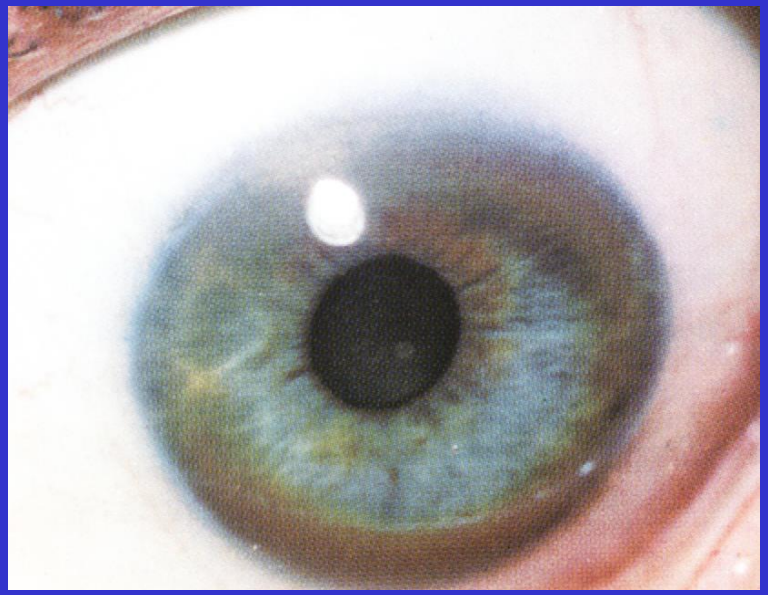
PORPHYRIA CUTANEA TARDA (ENGLISH: PCT)

PORPHYRIAS



PROTOPORPHYRIA ERYTHROPOETICA A. BILE CYLINDERS (CHOLESTASIS) AND BROWNISH DYE IN HEPATOCYTES B. IN POLARIZED LIGHT

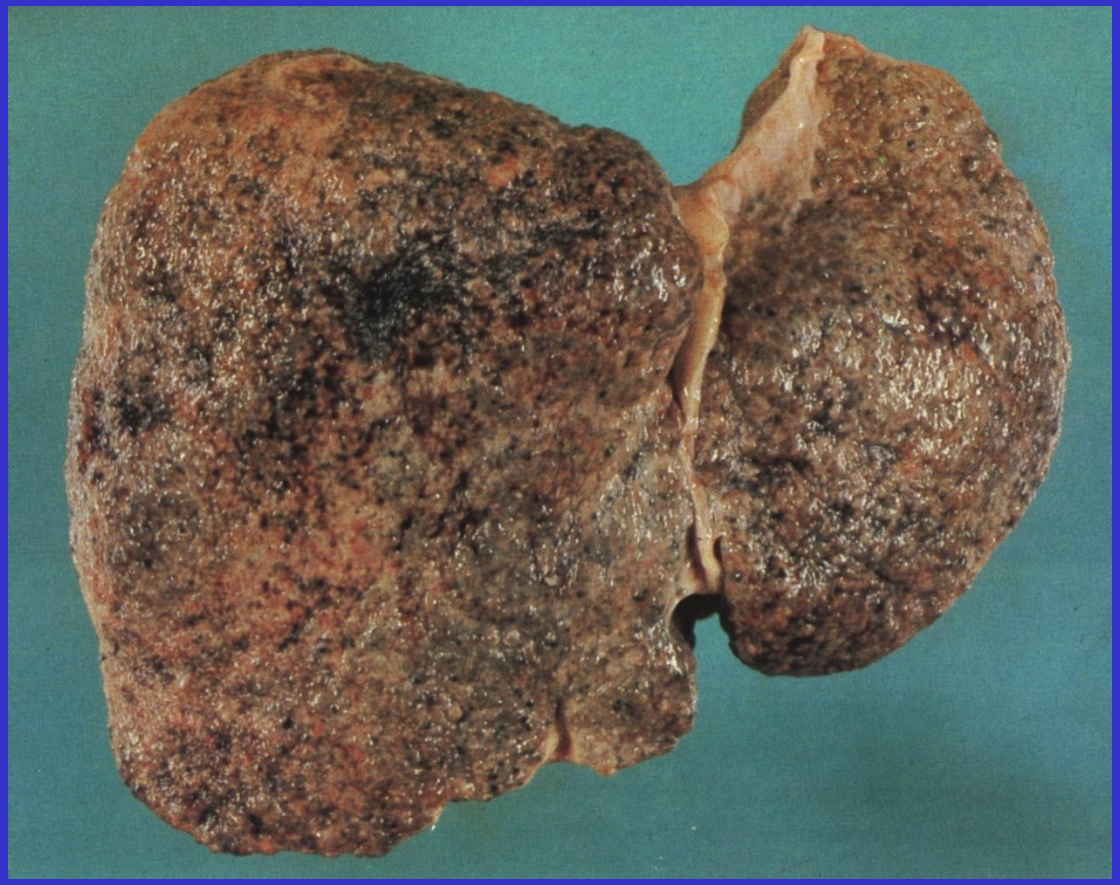
COPPER BALANCE DISORDER



KAYSER-FLEISCHER RING

1. CERULOPLASMIN DEFICIENCY

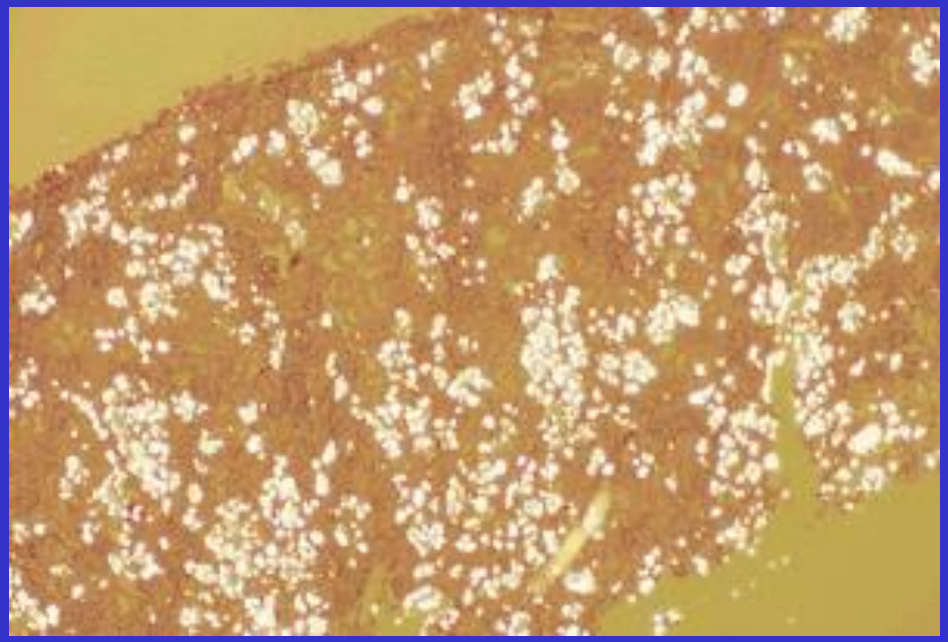
2. GENETICALLY DETERMINED DISEASE
3. Cu IN CORNEA (KAYSER – FLEISCHER RING)
4., Cu DEPOSITS IN HEPATOCYTES



PIGMENTED CIRRHOSIS OF THE LIVER

DISTURBANCES IN MINERAL BALANCE

OXALOSIS (CALCIUM OXALATES)



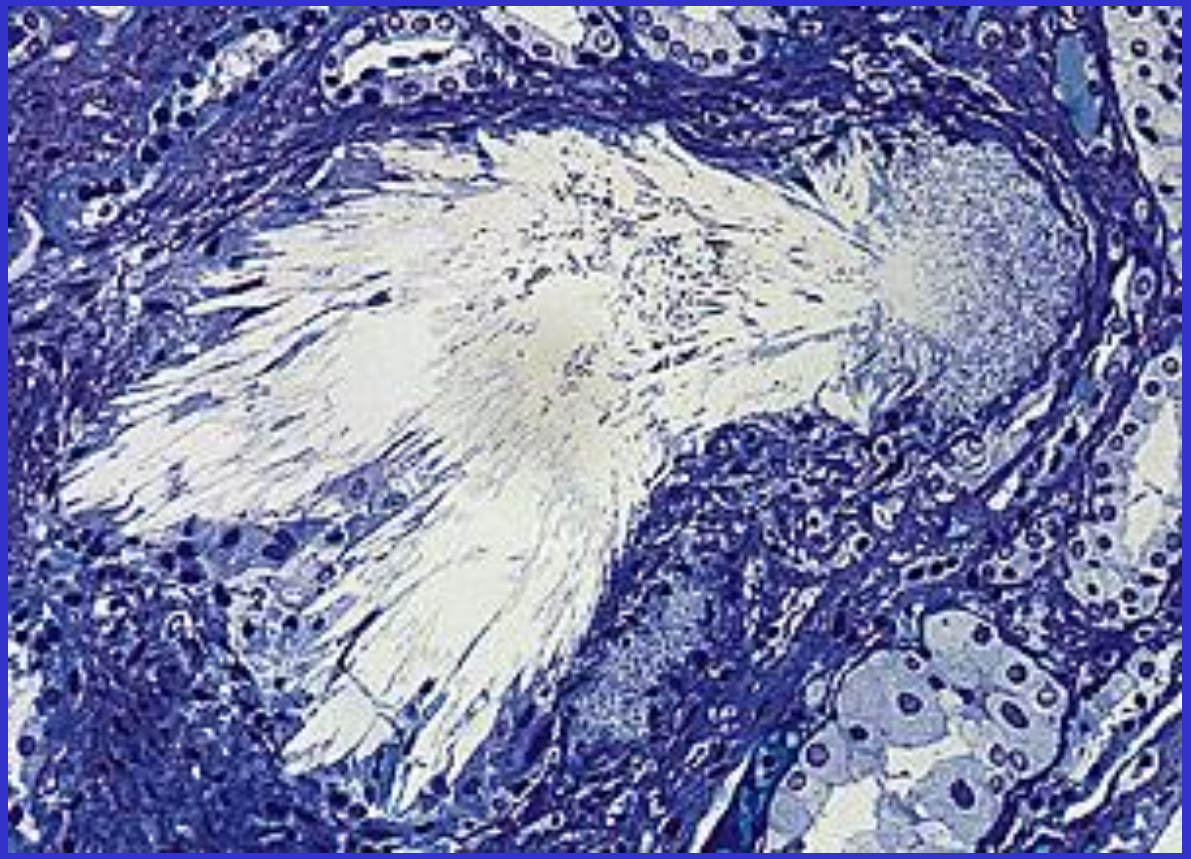
OXALATE CRYSTALS IN LUMEN OF RENAL CANALICULI IN THE COURSE OF ETHYLENE GLYCOL POISONING (SLIDE VIEWED IN POLARIZED LIGHT)

CHARACTERISTIC VIEW OF OXALATE IN A BROOM SHAPE

DISTURBANCES IN MINERAL BALANCE

U R A T E

URIC ACID SALTS PRODUCTION AS A RESULT OF DEAMINATION AND PURINE OXYGENATION



PAIN:

PODAGRA (HALLUX)

CHIRAGRA (HAND)

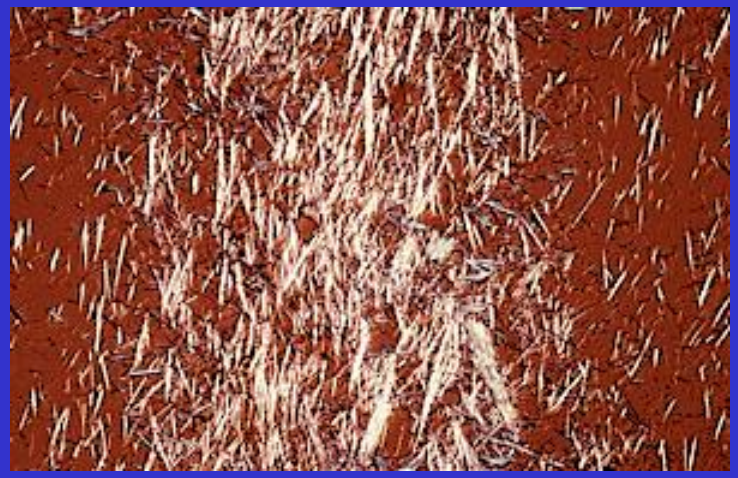
GONAGRA (KNEE)

OMAGRA (SHOULDER)

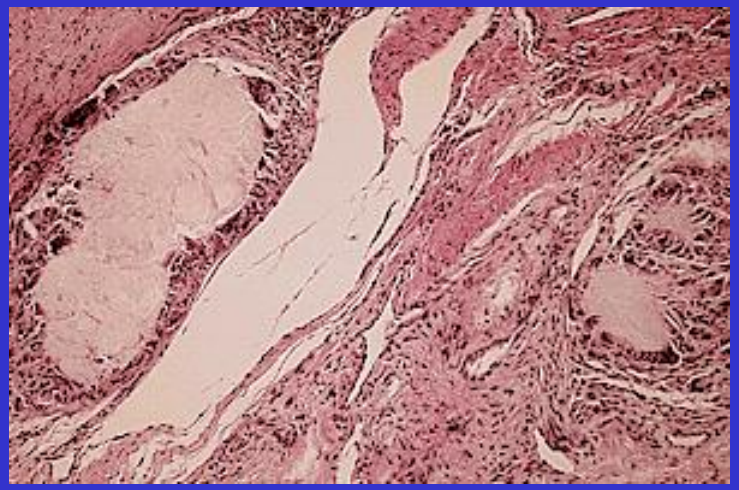
URATE CRYSTALS DESTROYING RENAL CANALICULI WITH ACCOMPANYING INFLAMMATION

DISTURBANCES IN MINERAL BALANCE

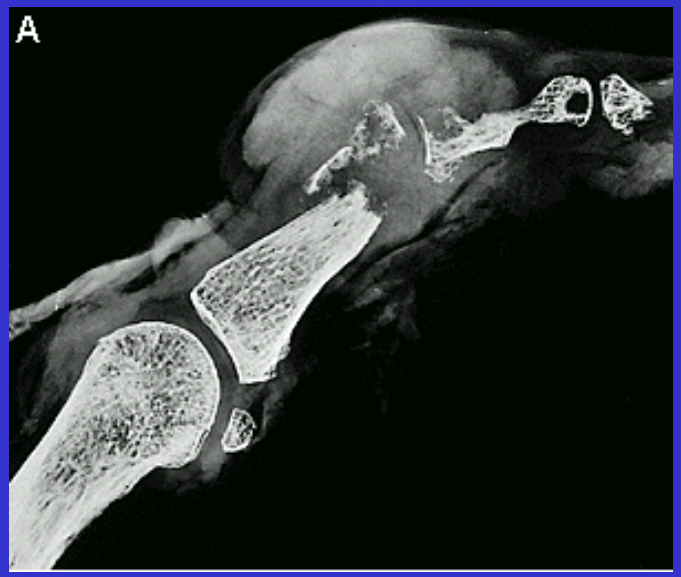
DIATHESIS URICA (GOUT)



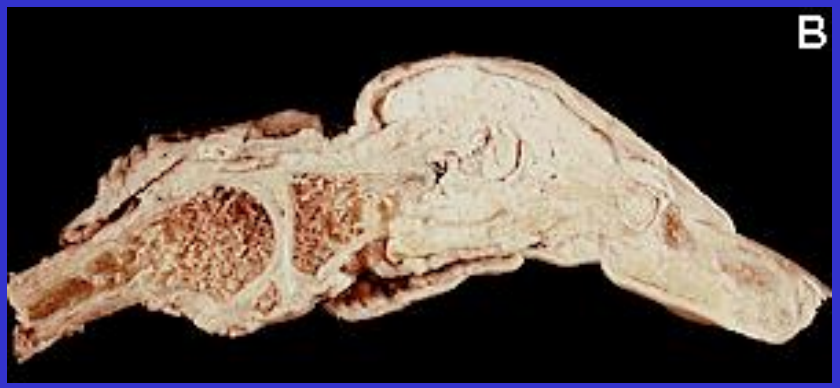
URIC ACID CRYSTALS IN CARTILAGINOUS TISSUE



MICROSCOPIC PICTURE (TOPHUS)



TOPHUS OF LITTLE FINGER
A. X-RAY PICTURE,
B. MACROSCOPIC PICTURE



DISTURBANCES IN MINERAL BALANCE

C A L C I U M

ABSORBED IN THE INTESTINES, EXCRETED BY KIDNEYS, LIVER, PANCREAS, STOMACH. STORED MOSTLY IN BONES

FACTORS CONTROLLING CALCIUM BALANCE:

VITAMIN D

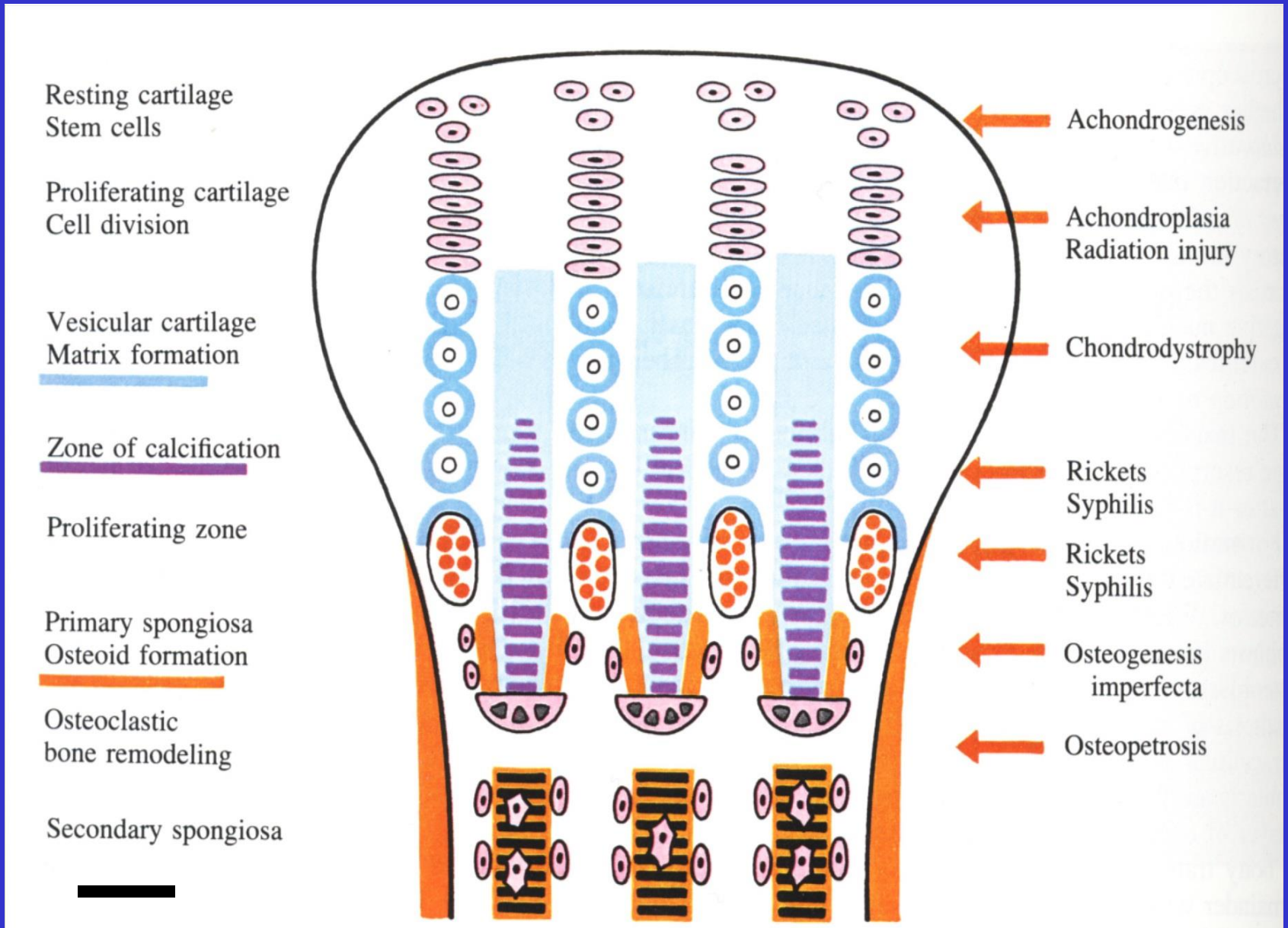
PARATHORMONE

STEROID HORMONES

CALCITONIN

DISTURBANCES IN MINERAL BALANCE

DISTURBANCES IN CALCIUM BALANCE: ENDOCHONDRAL OSSIFICATION AND ITS DISORDERS



RICKETS

- Defect in matrix mineralization due to Vitamin D disturbance (deficiency, abnormal metabolism or calcium deficiency)
- Causes accumulation of unmineralized bone matrix
- Rickets: children with irregular, broadened, cup shaped epiphyseal growth plates around knee and wrist

DISTURBANCES IN MINERAL BALANCE

RACHITIS - RICKETS

VITAMIN D DEFICIENCY

STIGMATA RACHITIS

CRANIOTABES (soft, thinned skull bones)

CAPUT QUADRATUM

ROSARIUM RACHITICUM (rachitic rosary)

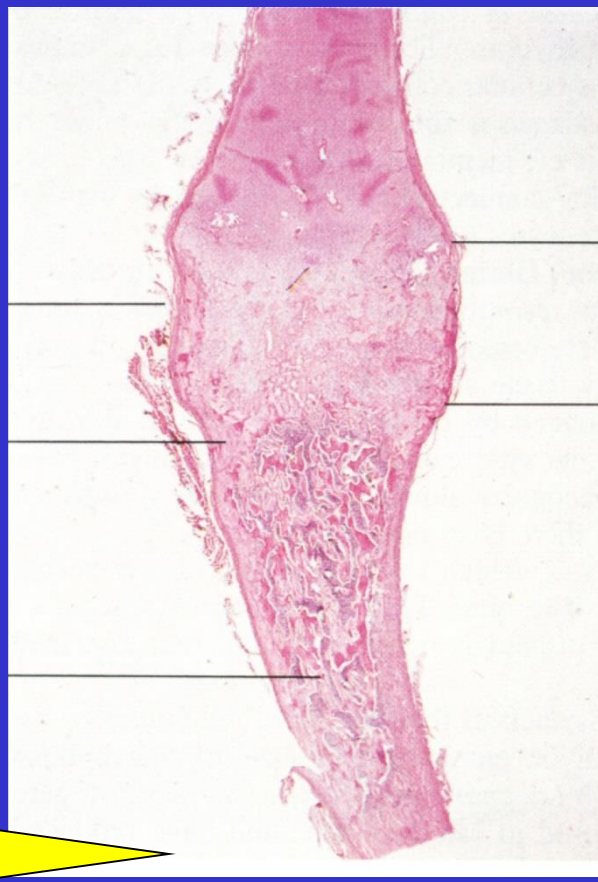
PECTUS GALINACEUS ET PECTUS INFUNDIBULARIS

SCOLIOSIS, KYPHOSIS, LORDOSIS, GIBBUS

PELVIS PLANUS (flattened pelvis)

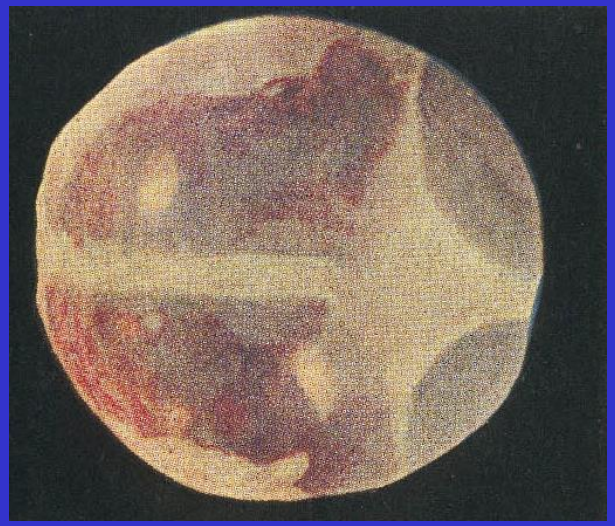
GENUA VARA ET GENUA VALGA

Hypocalcemia, a low level of calcium in the blood can result in tetany – uncontrolled muscle spasms

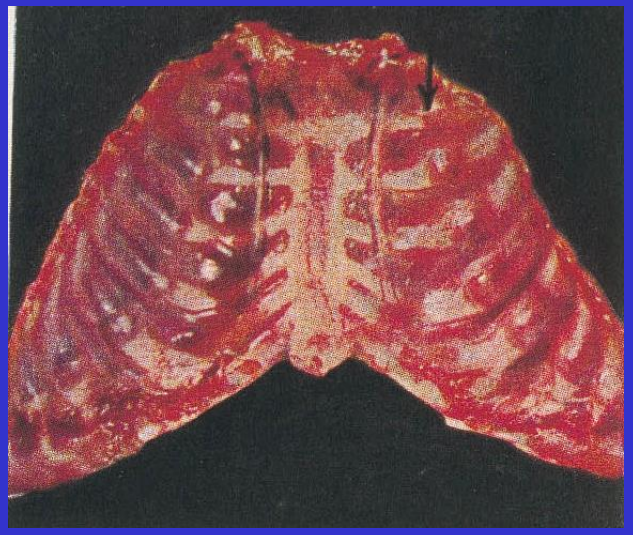


DISTURBANCES IN MINERAL BALANCE

RICKETS - RACHITIS

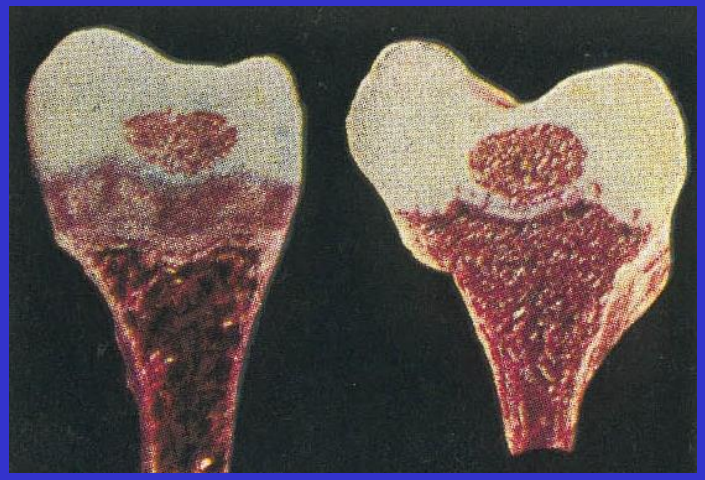


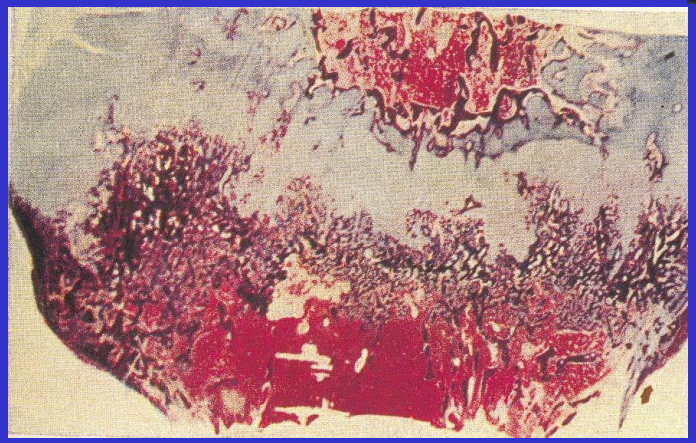
FONTANELLES AND SUTURES
DELAYED CLOSURE



RACHITIC ROSARY

SCOLIOSIS AND
FLATTENED
PELVIS



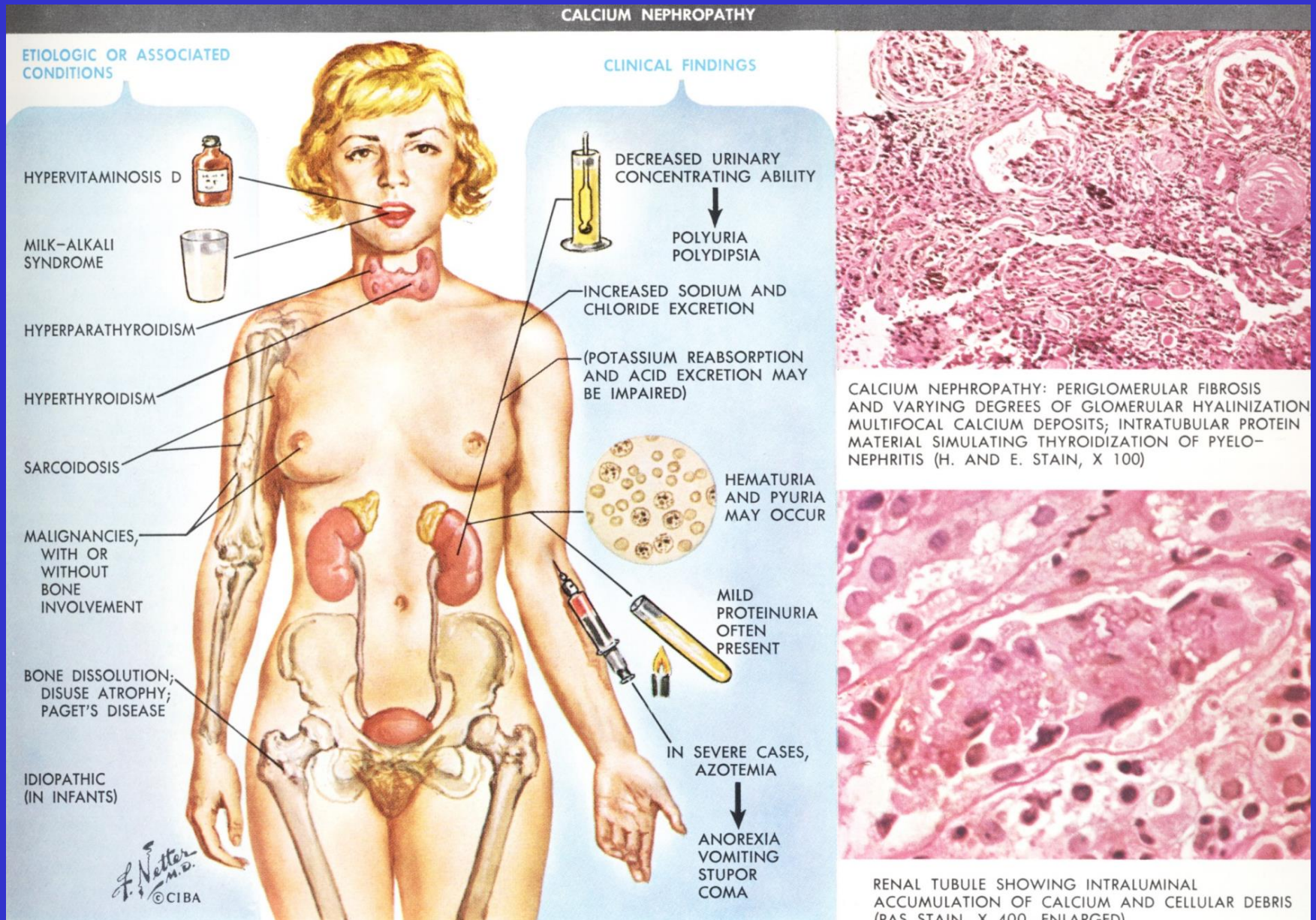


WIDENING OF STATURAL ZONE AND FORMATION OF
RACHITIC BRACELETS

STIGMATA RACHITIS

HYPERCALCEMIA – CALCIUM NEPHROPATHY

CAUSED BY THE OVERDOSAGE OF VITAMIN D, DISTURBANCES IN EXCRETION (KIDNEY MALADY), PRIMARY HYPERPARATHYROIDISM



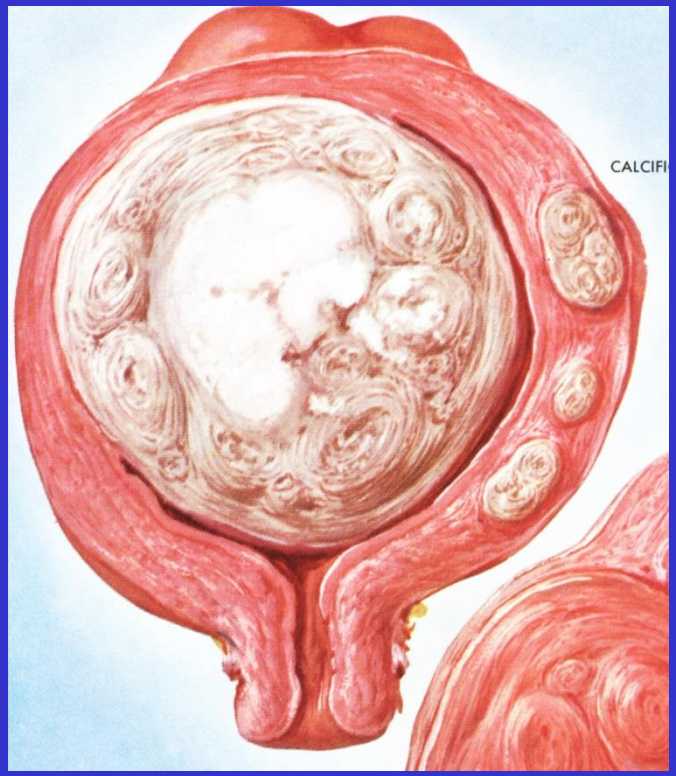
CALCIUM NEPHROPATHY: PERIGLOMERULAR FIBROSIS AND VARYING DEGREES OF GLOMERULAR HYALINIZATION MULTIFOCAL CALCIUM DEPOSITS; INTRATUBULAR PROTEIN MATERIAL SIMULATING THYROIDIZATION OF PYELO–NEPHRITIS (H. AND E. STAIN, X 100)

RENAL TUBULE SHOWING INTRALUMINAL ACCUMULATION OF CALCIUM AND CELLULAR DEBRIS (PAS STAIN, X 400, ENLARGED)

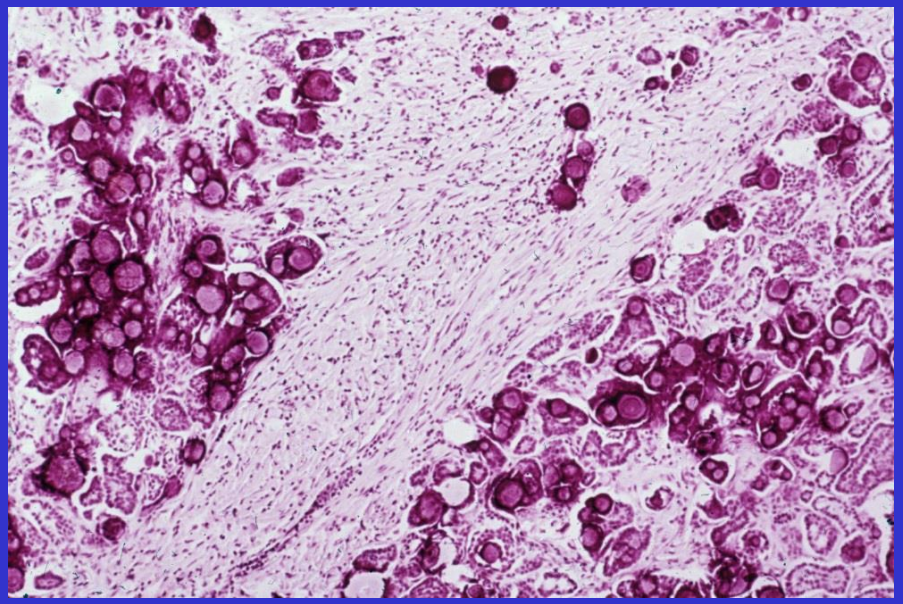
CALCIUM NEPHROPATHY

- Clinical features of macroscopic nephrocalcinosis (the form most commonly seen) may include the following:
- Renal colic, Hematuria, Passage of urinary stones, Urinary tract infection, Polyuria and polydipsia
- Hypertension, Proteinuria
- In Dent disease, loss of low-molecular-weight proteins, hypercalciuria, and nephrolithiasis
- Microscopic pyuria
- Renal failure

DISTURBANCES IN MINERAL BALANCE

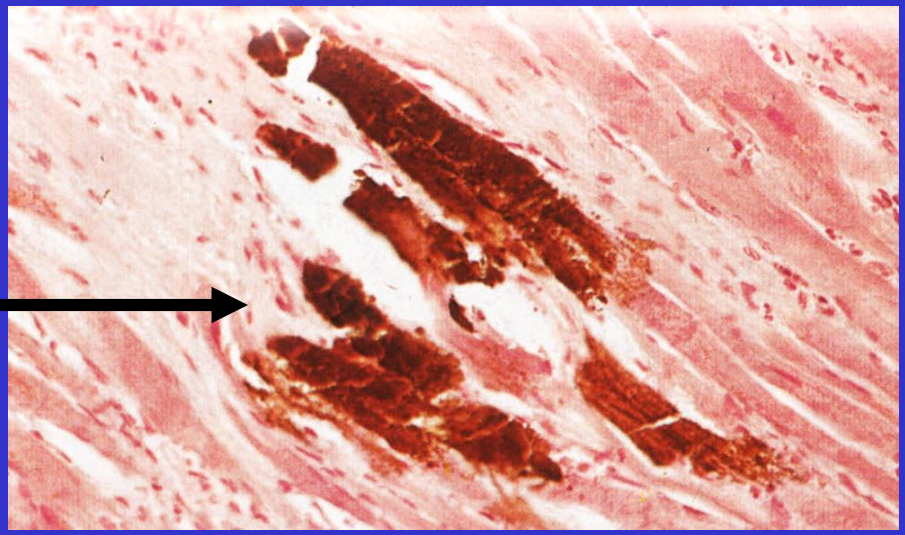


CALCIFICATION IN:
A. UTERINE LEIOMYOMA



IN B. SEROUS OVARIAN CANCER

CALCIFICATION IN CARDIAC MUSCLE



DYSTROPHIC

CALCIFICATION

DISTURBANCES IN MINERAL BALANCE

C A L C U L O S I S - L I T H I A S I S

CHOLELITHIASIS

HEPATOLITHIASIS, CHOLEDOCHOLITHIASIS, CHOLECYSTOLITHIASIS

UROLITHIASIS

NEPHROLITHIASIS, URETEROLITHIASIS, UROCYSTOLITHIASIS, URETHROLITHIASIS

SIALOLITHIASIS

PANCREOLITHIASIS

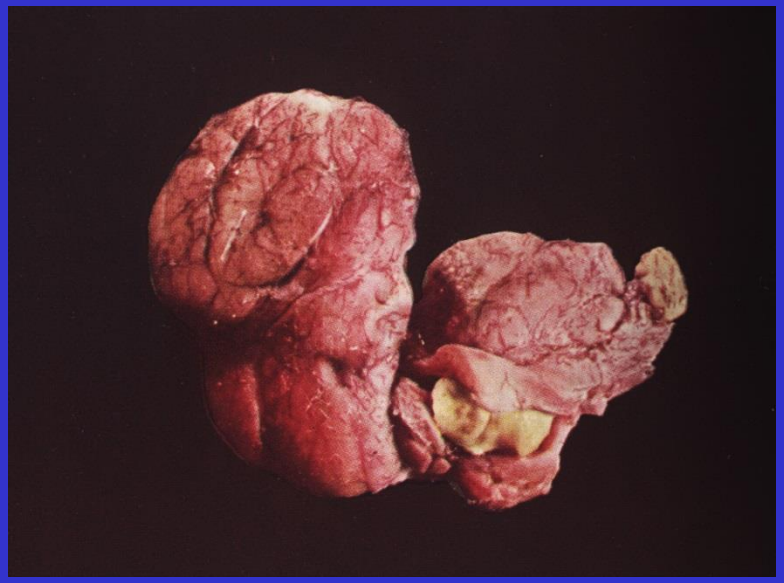
PNEUMOLITHIASIS

ARTERIOLITHS, PHLEBOLITHS

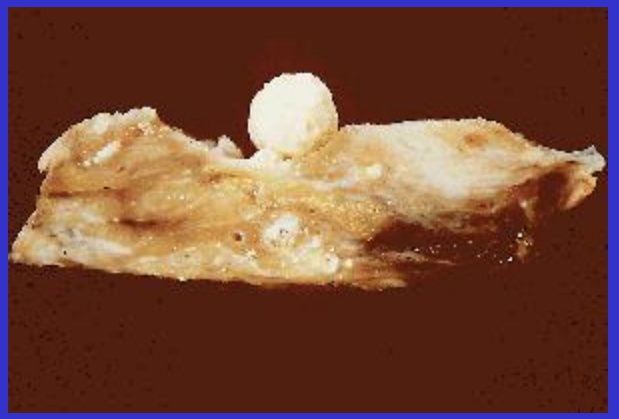
LITHOPEDION (PETRIFIED FETUS)

LITHIASES - CALCULOSIS

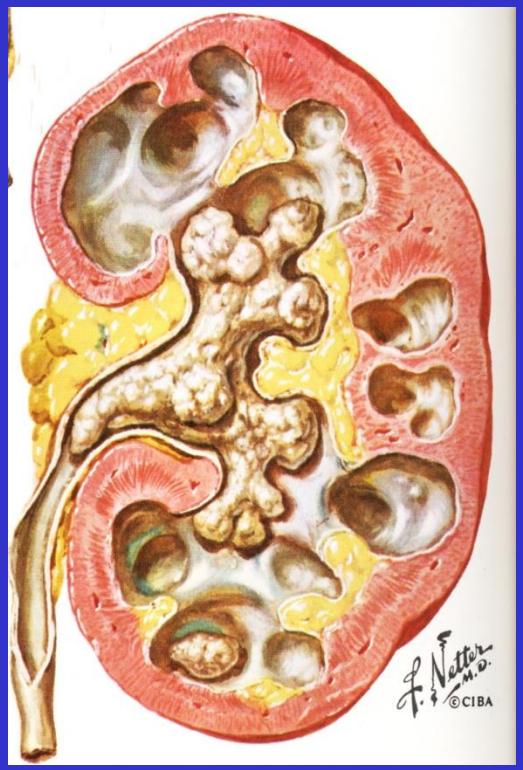
GALL STONES



SIALOLITHIASIS



PANCREOLITHIASIS



NEPHROLITHIASIS

CHOLECYSTOLITHIASIS (STONES)