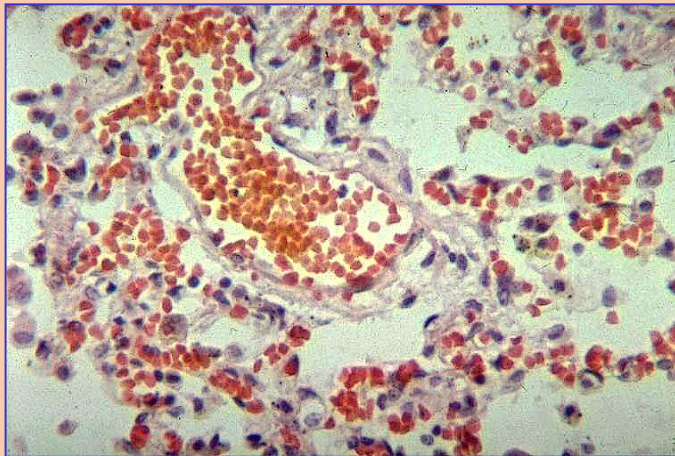


STAGNATION, EDEMA, SHOCK



Attila Zalatnai

Hyperemia (local excess of blood)

Active

- loss of sympathetic activity
- vasoactive compounds

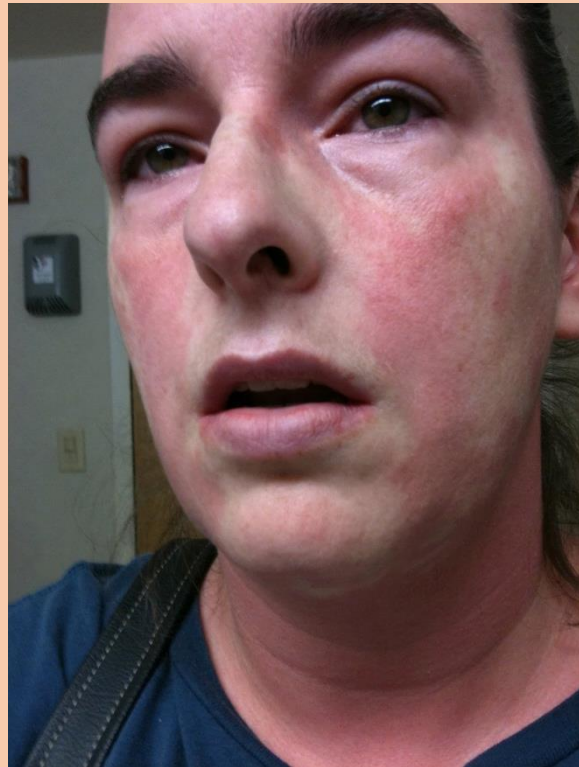
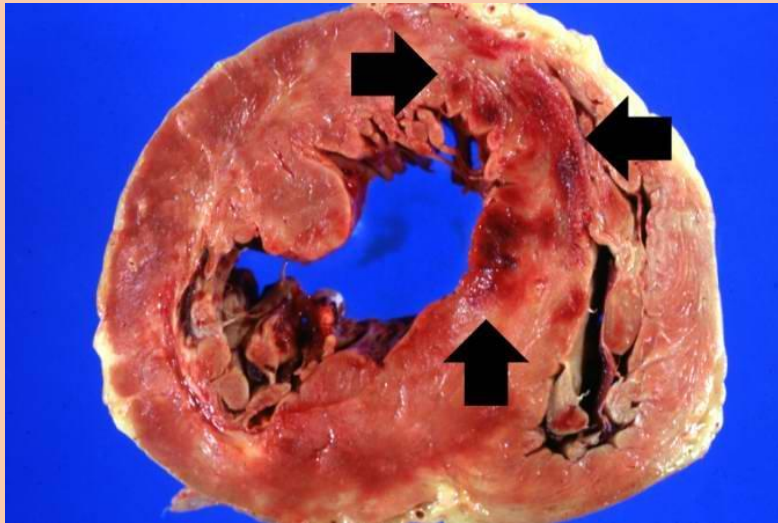
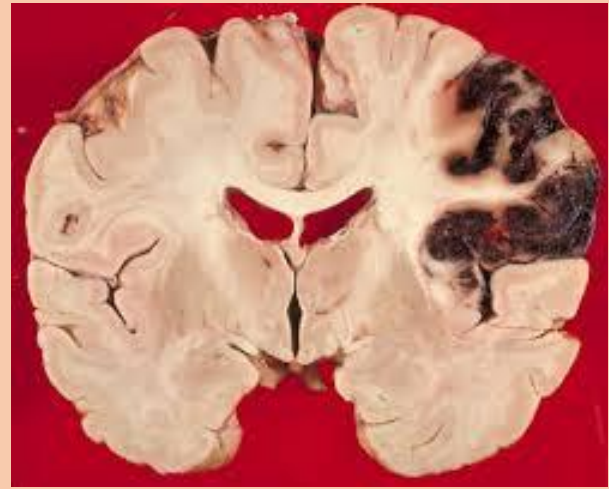


vasodilatation

- inflammations (rubor, calor)
- exercise
- meal
- psychological effects (blushing)
- hormones (postmenopause)
- carcinoid flush
- reperfusion
- medicinal drugs (Na-nitrite, blue tablet)

Passive (congestion)

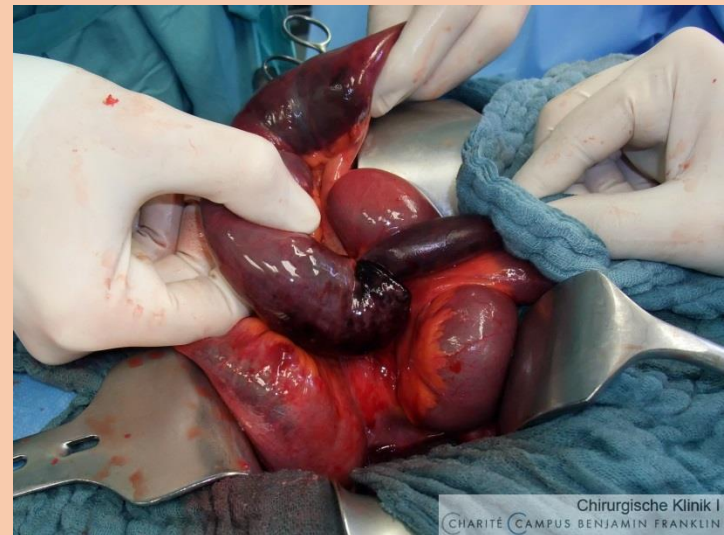
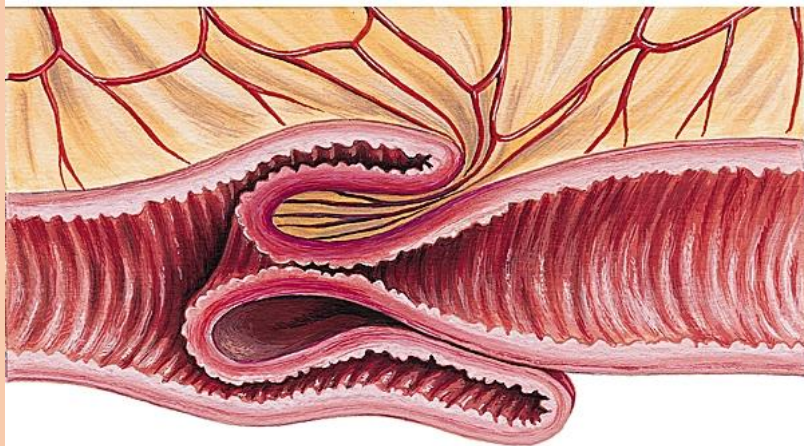
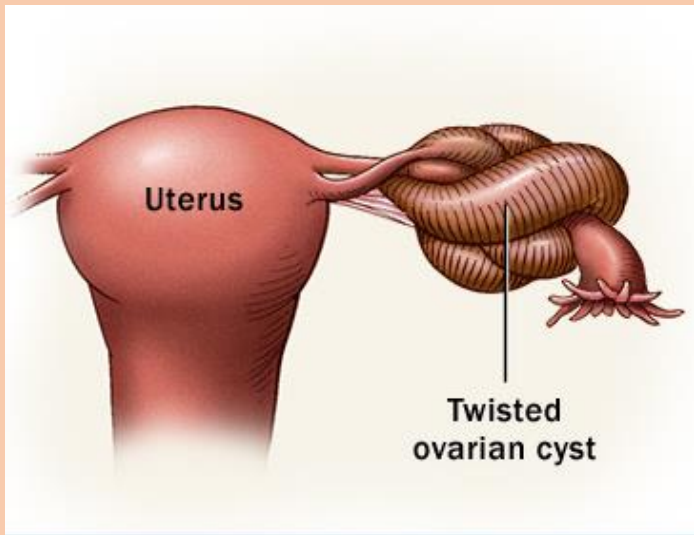
- venous block
 - a.) local
 - venous thrombus
 - venous compression
 - torsion
 - invagination
 - vena cava superior syndr.
 - b.) systemic
 - right sided heart failure
 - (chronic cor pulmonale)



Passive hyperemia (congestion)

local

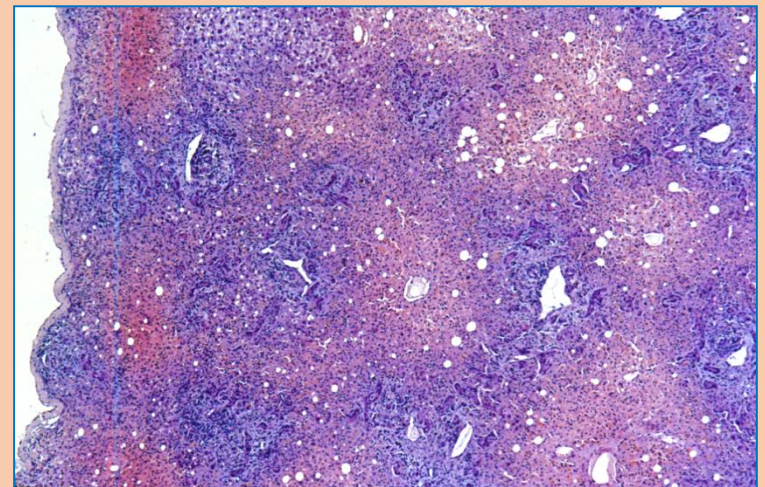
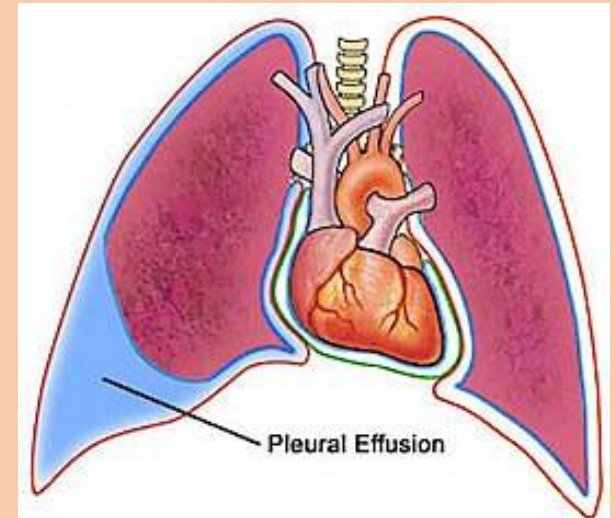




Passive hyperemia (congestion)

systemic – right sided heart failure

- cyanosis
- congestiv gastritis, duodenitis
- bilateral hydrothorax
- hydropericardium / tamponade
- ascites
- hepato-splenomegaly
- „nutmeg liver”
- kidneys: dilated stellate veins, livid pyramids
- anasarca

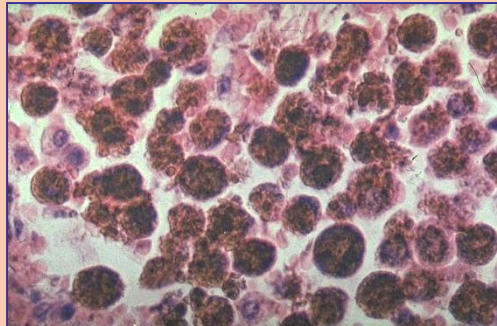
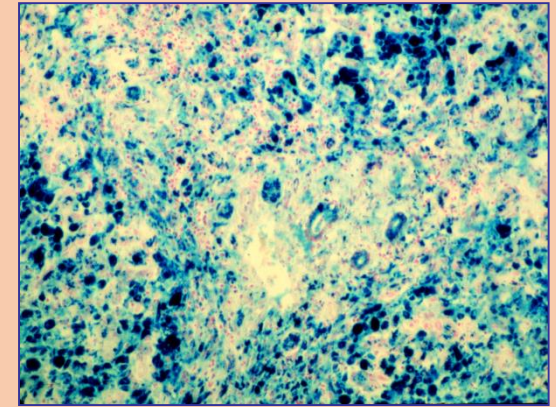
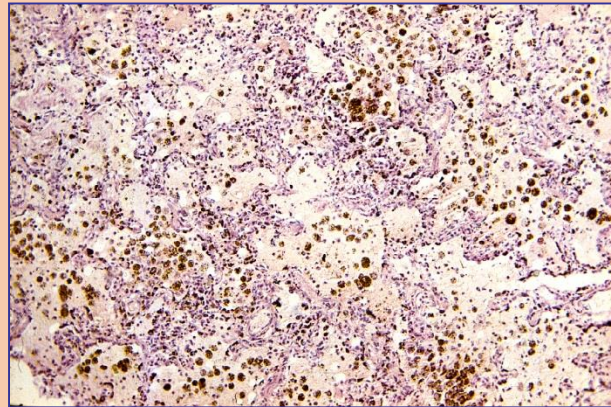


Consequences of chronic congestion

- organ enlargement (hepatomegaly, splenomegaly)
- induration (spleen, liver, lung, skin)
- atrophy (skin)
- necrosis (bowel, testicle)
- edema



brown Induration of lungs



„heart failure cells”



**postthrombotic
syndrome**



crural ulcer

EDEMA

Accumulated, extravasal fluid with low protein content (transudate)

- in the interstitial tissues
- freely in body cavities

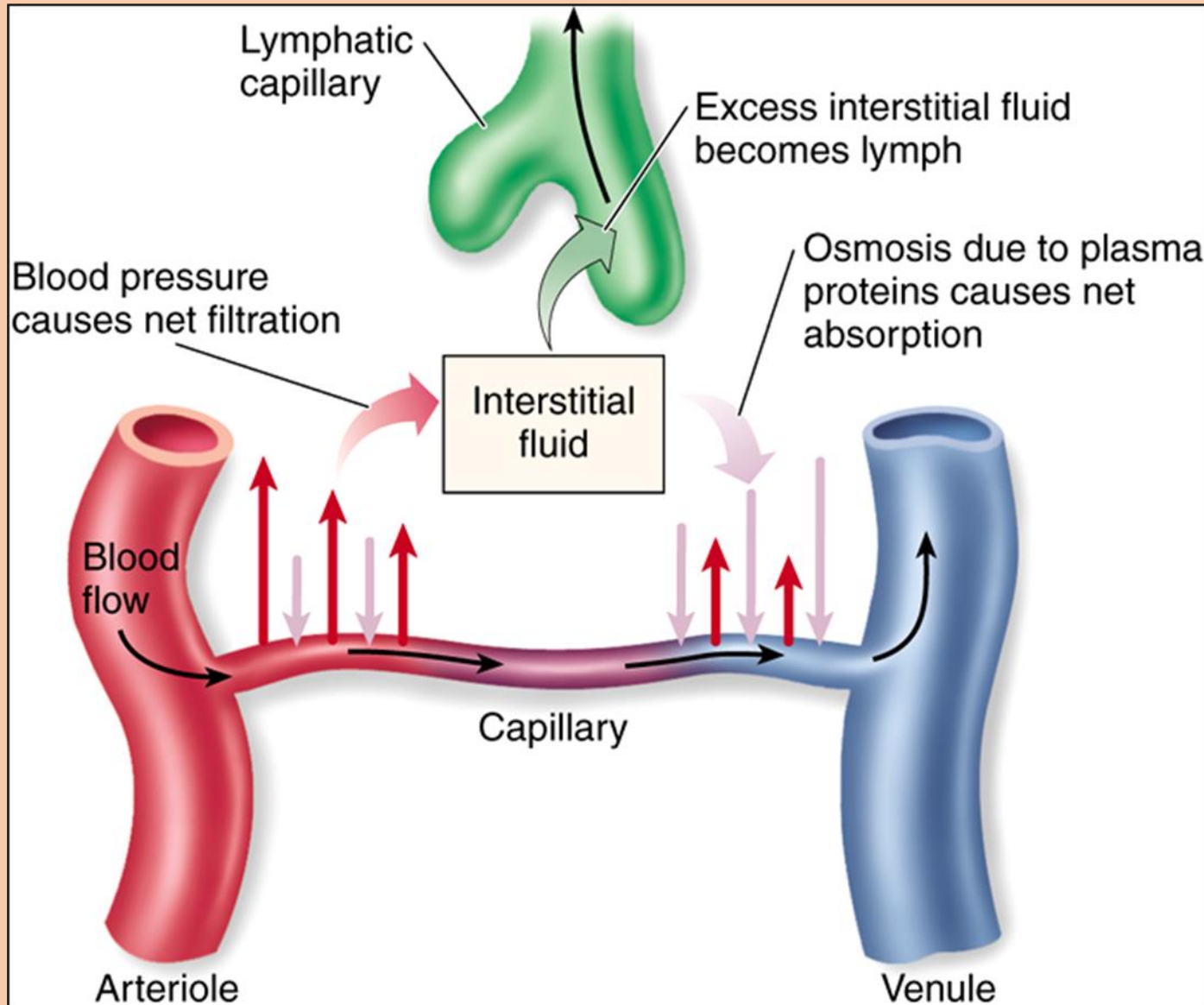
Special gravity: < 1.012

Background: disturbed balance in the microcircular unit

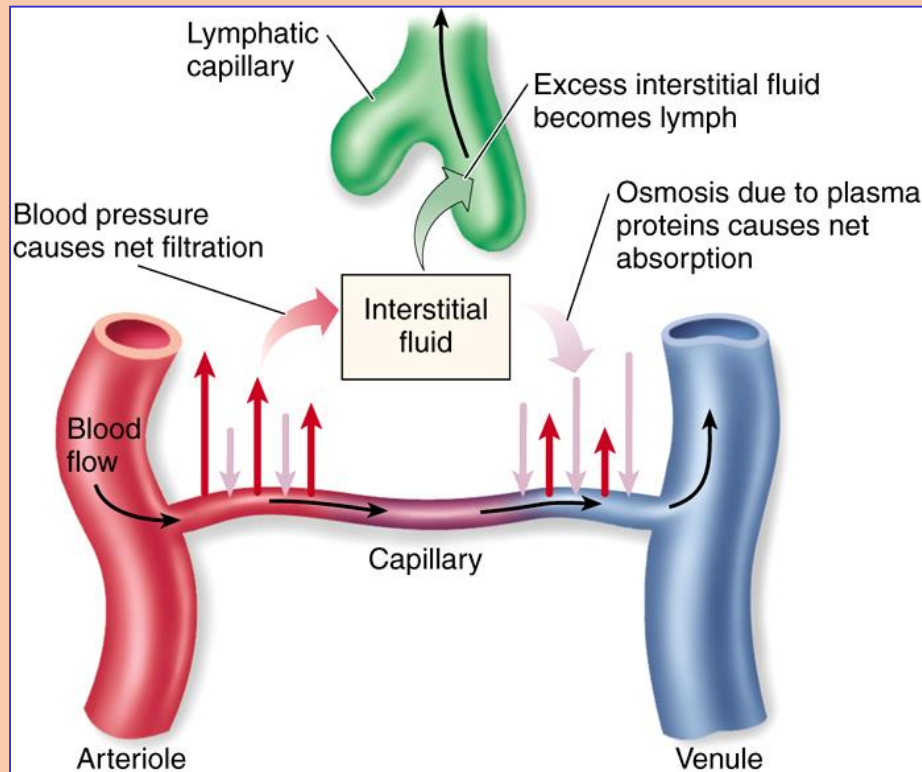
Determinants:

- intravasal hydrostatic pressure
- colloidosmotic pressure in the vessels
- tissue colloidosmotic pressure
- lymphatic circulation

MICROCIRCULATION UNIT



EDEMA FORMATION



- **decreased colloid osmotic pressure in the blood**
- **increased capillary permeability**
- **increased hydrostatic pressure in the venous part**
- **lymphatic insufficiency**
- **sodium and water retention**

EDEMA

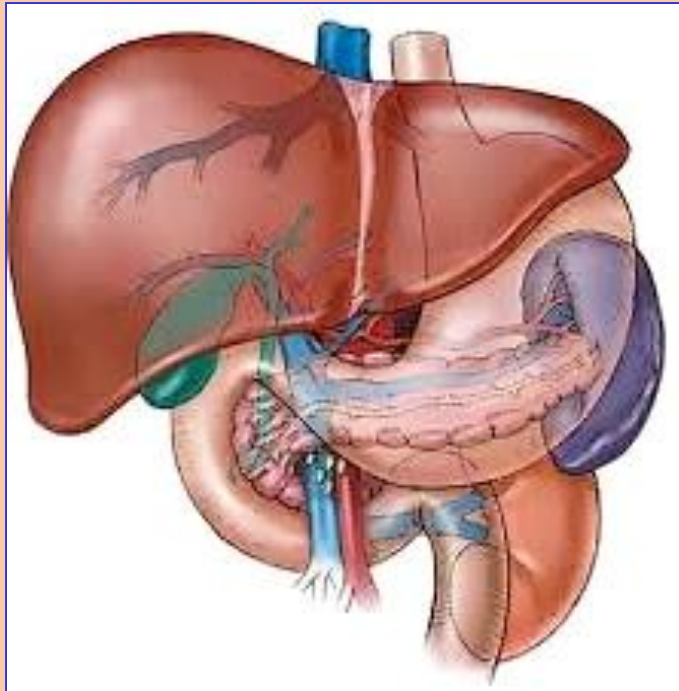
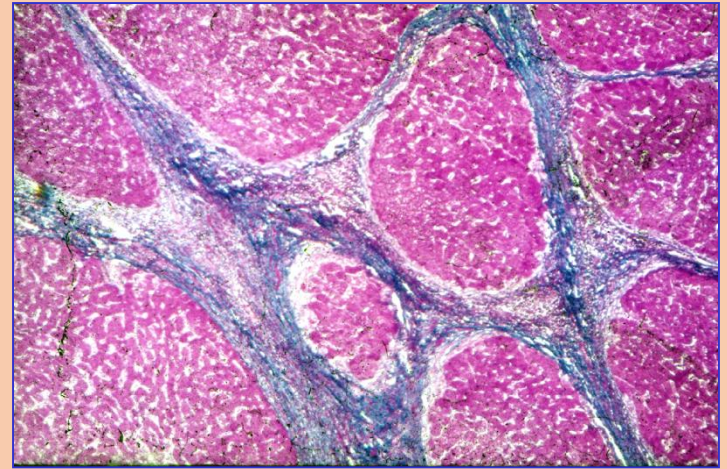
localized

- **disturbed venous outflow**
- **disturbed lymphatic circulation**
- **inflammation**
- **allergy**
- **hypoxia**
- **cerebral space-occupying lesions**

generalized

- **hypalbuminemia**
- **right sided heart failure**
- **Rh (ABO) incompatibility, infection**





EDEMA

localized

- **disturbed venous outflow**
- disturbed lymphatic circulation
- inflammation
- allergy
- hypoxia
- cerebral space-occupying lesions

generalized

- hypalbuminemia
- right sided heart failure
- Rh (ABO) incompatibility, infection



superior vena cava syndrome

EDEMA

localized

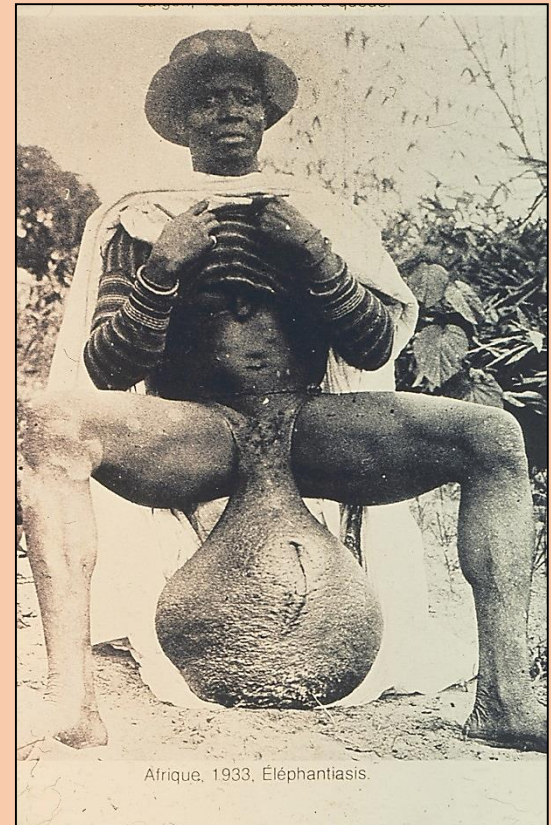
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- **disturbed lymphatic circulation**
- inflammation
- allergy
- hypoxia
- cerebral space-occupying lesions

generalized

- hypalbuminemia
- right sided heart failure
- Rh (ABO) incompatibility, infection



lymphedema



Afrique, 1933. Eléphantiasis.

EDEMA

localized

- disturbed venous outflow
- disturbed lymphatic circulation
- **inflammation**
- allergy
- hypoxia
- cerebral space-occupying lesions



generalized

- hypalbuminemia
- right sided heart failure
- Rh (ABO) incompatibility, infection



EDEMA

localized

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- disturbed lymphatic circulation
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generalized

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EDEMA

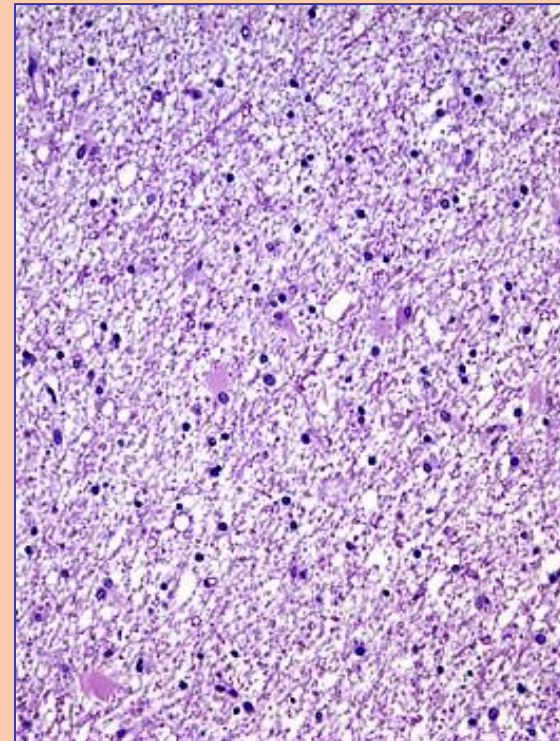
localized

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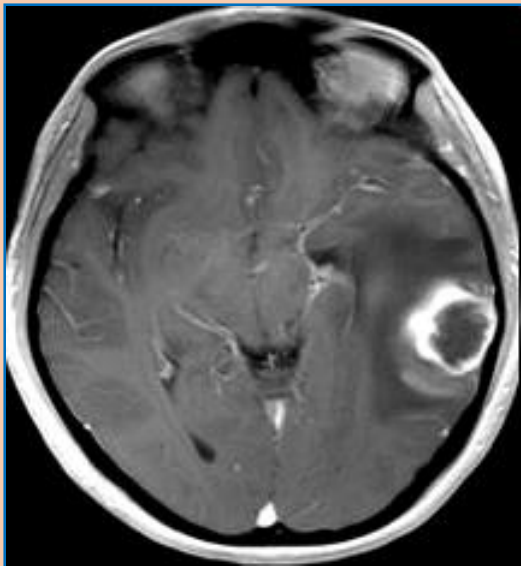
EDEMA

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- inflammation
- allergy
- hypoxia
- **cerebral space-occupying lesions**

generalized

- hypalbuminemia
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- Rh (ABO) incompatibility,



Perifocal edema (vasogenic)

brain tumors (primary, metastatic)

hemorrhage (apoplexia)

emollition

abscess (bacterial, fungal)

EDEMA

localized

- disturbed venous outflow
- disturbed lymphatic circulation
- inflammation
- allergy
- hypoxia



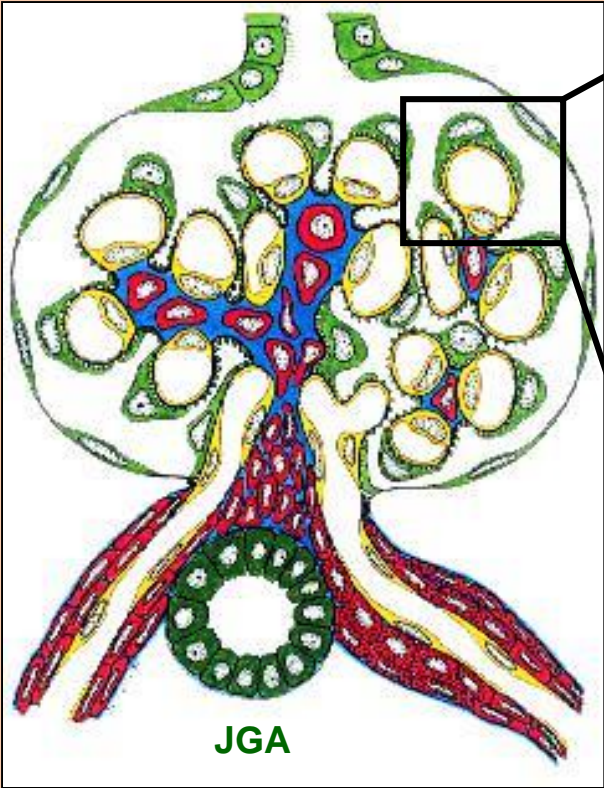
generalized

- hypalbuminemia
- right sided heart failure
- Rh (ABO) incompatibility, infection

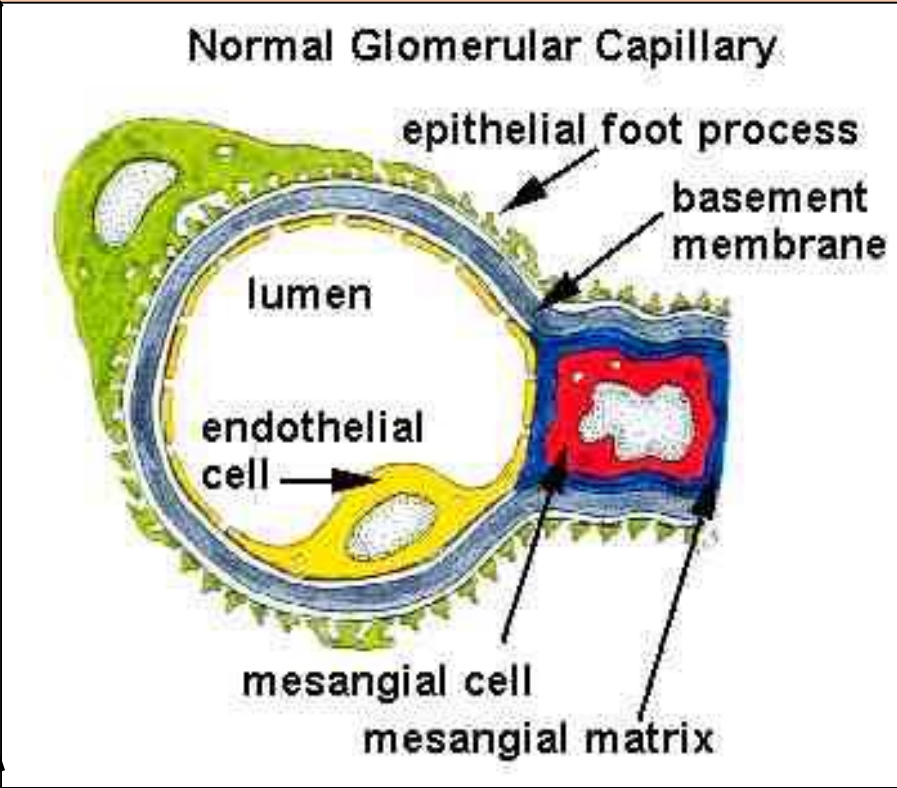


Structure of the glomerulus

urinary pole



vascular pole



EDEMA

localized

- disturbed venous outflow
- disturbed lymphatic circulation
- inflammation
- allergy
- hypoxia

generalized

- hypalbuminemia
- **right sided heart failure**
- Rh (ABO) incompatibility, infection

hydropericardium

bilateral hydrothorax

ascites

anasarca (pitting edema)



EDEMA

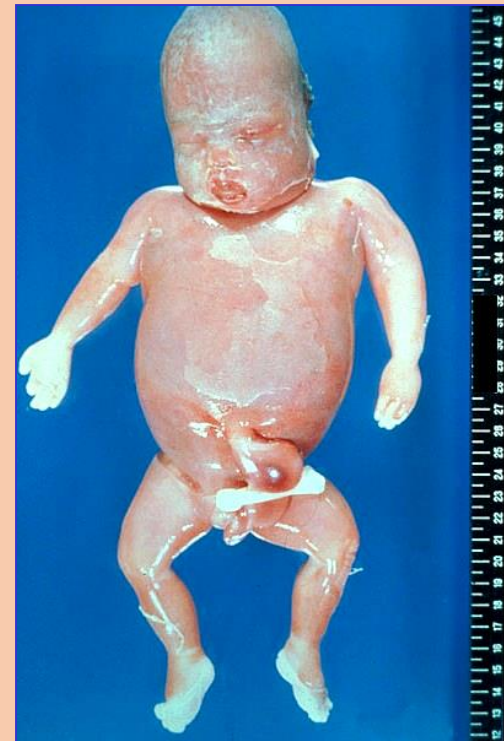
localized

- disturbed venous outflow
- disturbed lymphatic circulation
- inflammation
- allergy
- hypoxia



generalized

- hypalbuminemia
- right sided heart failure
- **Rh (ABO) incompatibility, infection**



fetal hydrops

Shock

- Acute circulatory catastrophe, inadequate blood flow, impaired perfusion, generalized tissue hypoxia, complex organ dysfunctions
- Stereotypic reaction
- Extremely increased sympathetic activity (arteriole + venule constrictions) → capillary stasis, hypoxia, acidosis
- Severe systemic hypotension, oliguria, CNS malfunctions

Hypovolemic (blood loss, fluid loss)

Traumatic

Anaphylactic (blood pooling at the level of capillaries)

Cardiogenic (reduced cardiac output)

Septic (peripheral vasodilatation, endothelial injury, DIC, activation of cytokine cascade....)

Toxic (TSS-1)

