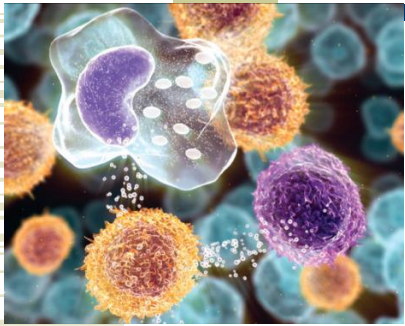
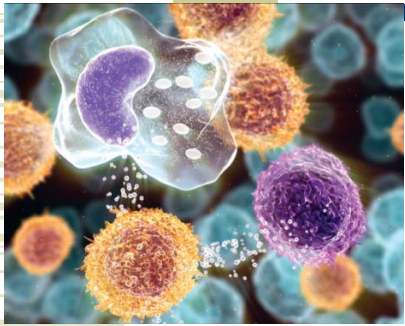




Inflammation

Susan J. Leclair, Ph.D., CLS (NCA)

Chancellor Professor Emerita
University of Massachusetts



Inflammation

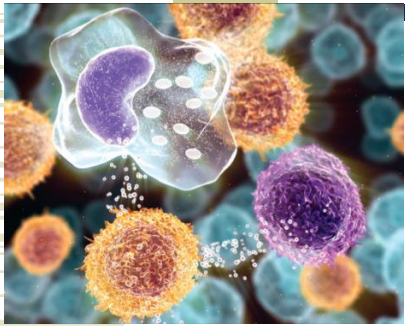
I promised/threatened some Latin so
the topic today is in four parts

Rubor

Tumor

Dolor

Calor



5 cardinal signs of Inflammation

First Century Romans

Rubor

redness

Calor

heat

Dolor

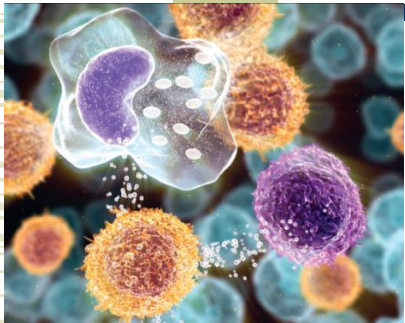
pain

Tumor

swelling

Second Century Greeks

Loss of function



Inflammation

Normal

Necessary

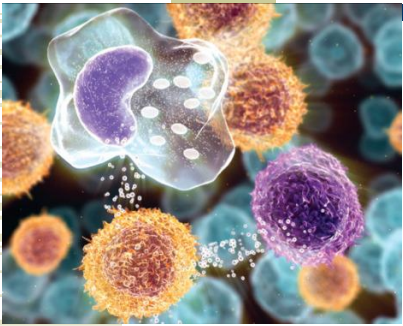
Non-specific reaction

Primarily localized

but can be systemic

Combination of cells and chemical mediators

Inflammation



✧ Causes

✧ Mechanical

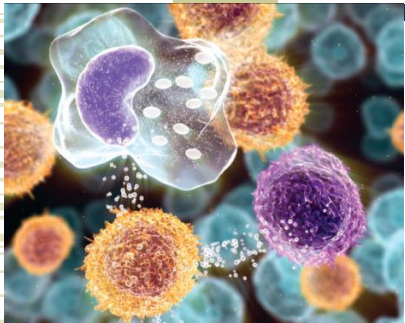
- ◆ Crushing ~ abrasion ~ pressure

✧ Chemical

- ◆ Alkalai ~ acids ~ enzymes

✧ Radiation

- ◆ Heat ~ cold
- ◆ Alpha ~ beta ~ gamma particles ~
- ◆ ultraviolet/infra red



Inflammation

Causes

✧ Infectious

- ◆ Bacteria – fungi – viruses

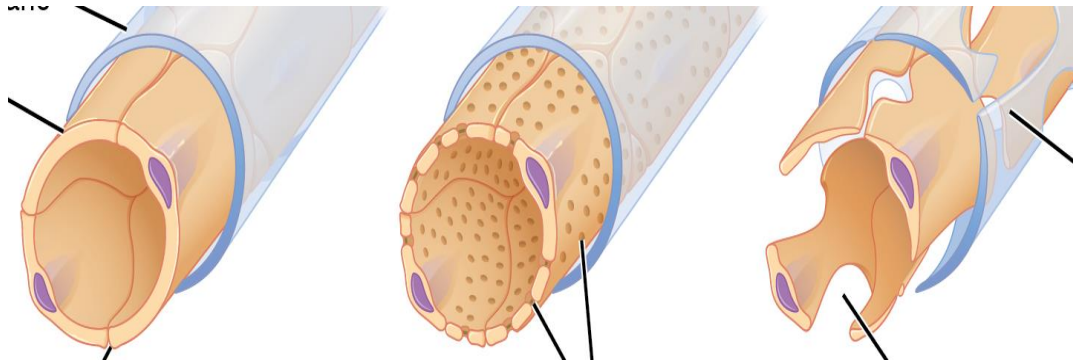
✧ Immunologic

- ◆ Allergic – autoimmune

✧ Ischemia

- ◆ Damage to tissue due to disruption in blood flow or oxygenation
- ◆ Can include inflammation abutting necrosis

Inflammation: Vascular Response

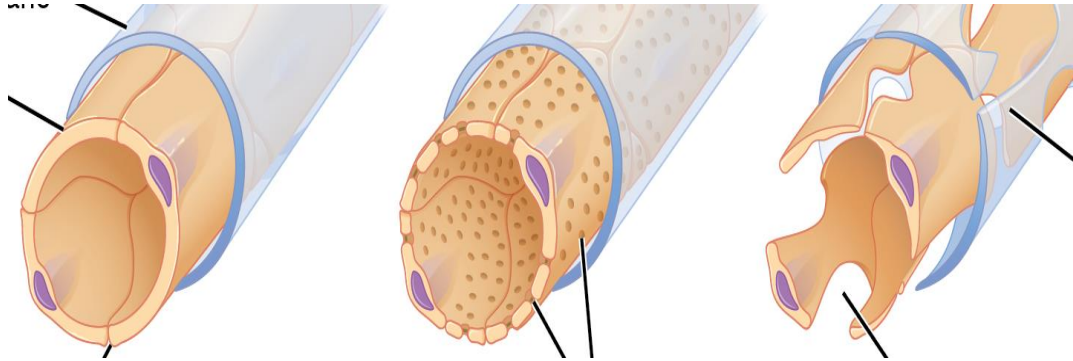


Reflex nerve impulses first cause the vessels to contract. Mediators from damaged tissues are released

Action
Vasodilation

Mediators
charged collagen,
prostaglandins E_2 , D_2 , I_2

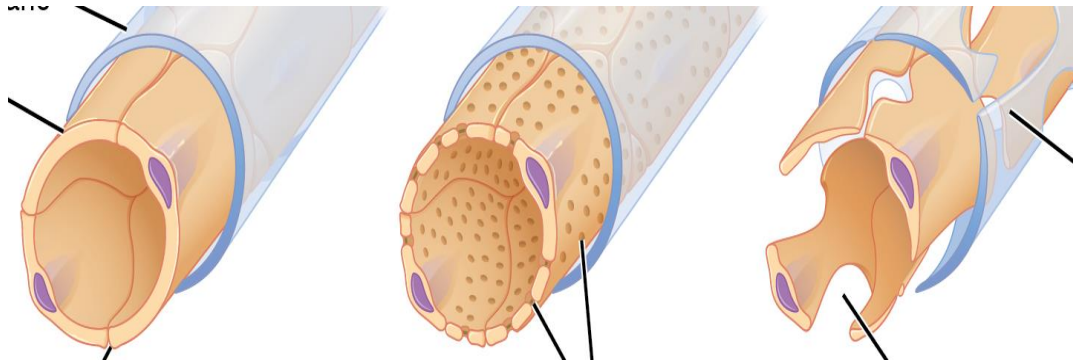
Inflammation: Vascular Response



Action
Permeability

Mediators
histamine, serotonin, C_{3a}
leukotrienes C_4 , D_4 , E_4

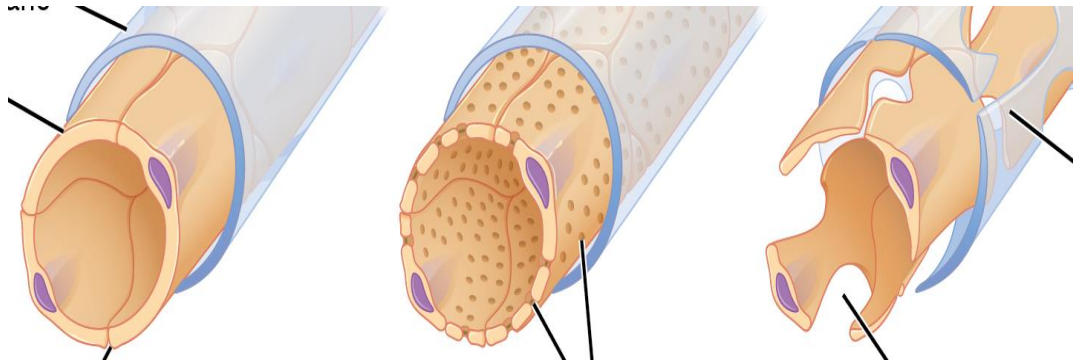
Inflammation: Vascular Response



Increased amounts of red cells collect due to localized vasodilation and distal vasoconstriction.

RUBOR
REDNESS

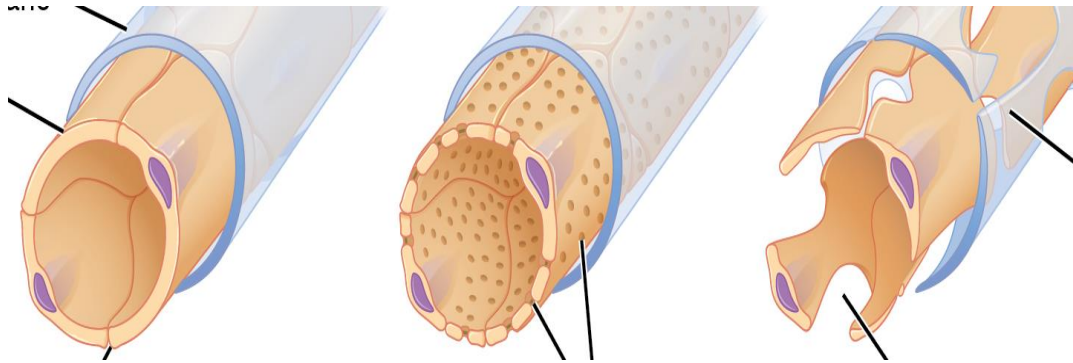
Inflammation: Vascular Response



Plasma passes through enlarged opening between cells to collect in tissue causing pooling of fluids

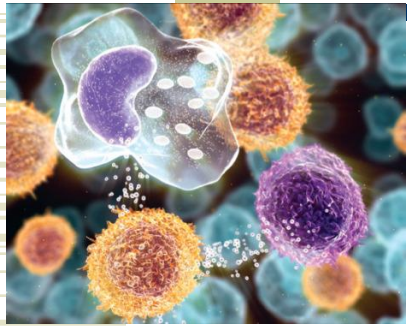
**TUMOR
SWELLING**

Inflammation: Vascular Response



Blood cells collect in the vessels due to vasoconstriction and pressure builds up causing an increase in temperature

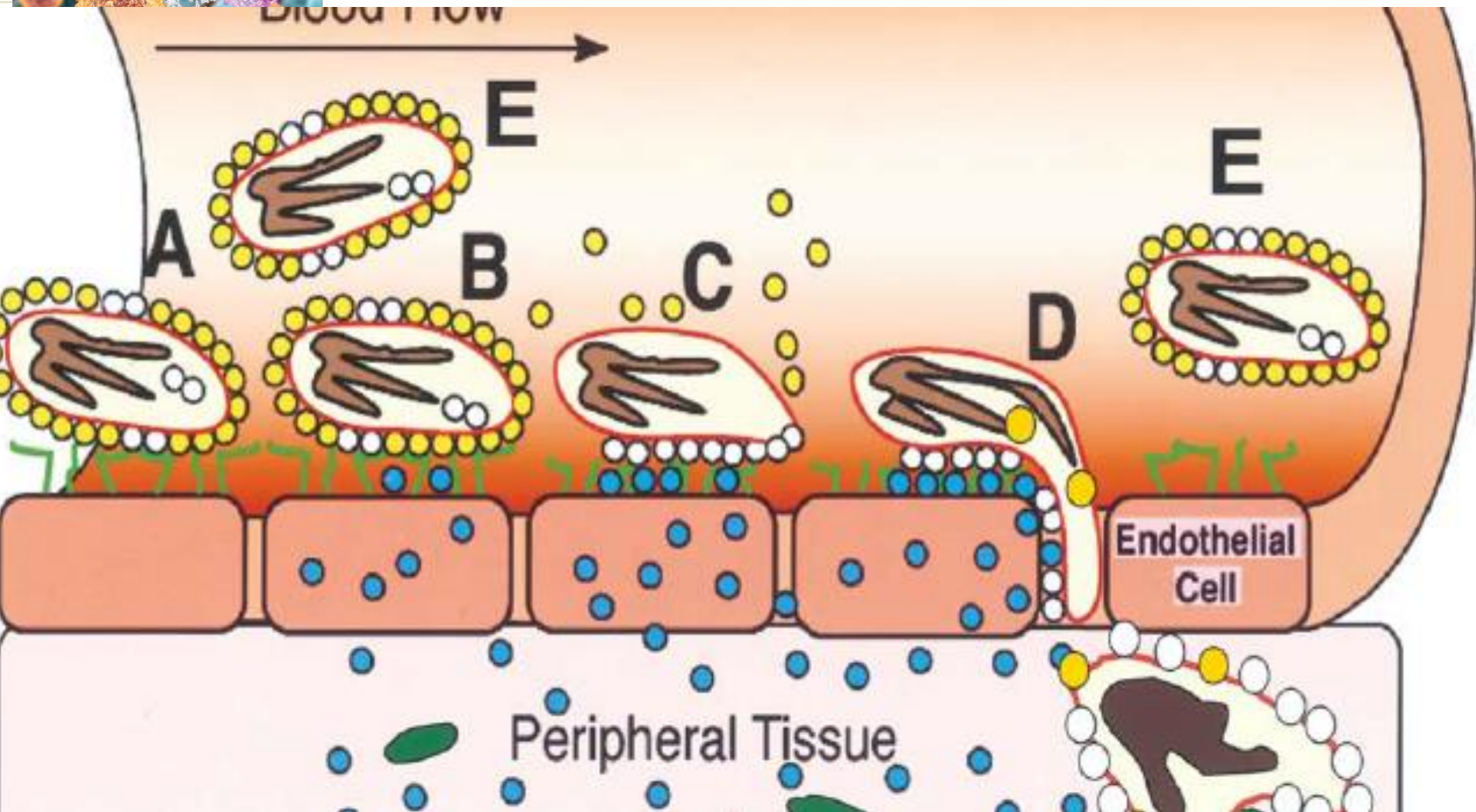
CALOR
HEAT

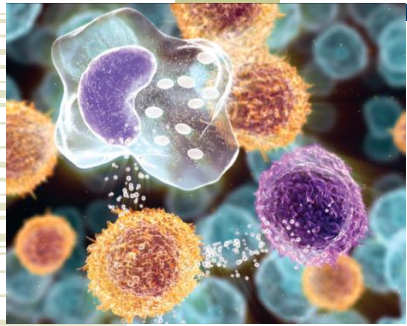


Inflammation

- ❖ Monocytes and granulocytes get into the tissue and removed dead and damaged cells, pieces of debris, etc.
- ❖ The area has to be cleared before healing can start.

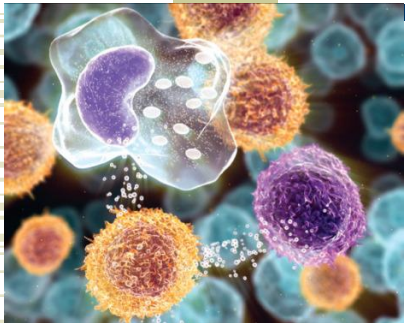
Inflammation





Inflammation

- ❖ If the cause of the damaged is limited, then inflammation is switched off and healing begins.
- ❖ Type of tissue is important. Some of more willing to replaced themselves than others

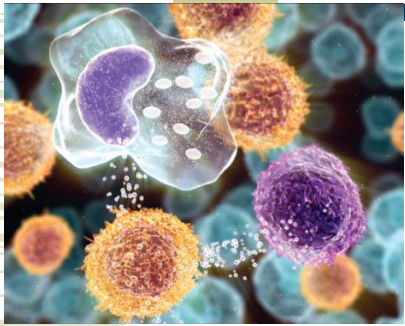


Inflammation

✘ If the cause of the damaged is not limited, then inflammation is never truly switched off and chronic inflammation begins.

✘ Even if the tissue accepts replacement cells, after time it will not and begin to substitute scar tissue.

Inflammation

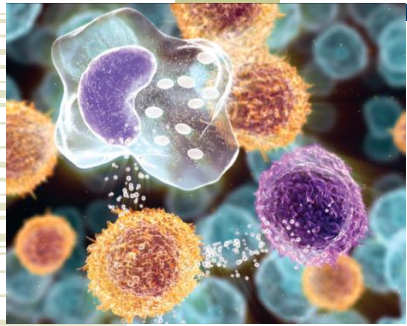


✧ Testing

✧ Pretty poor

✧ Erythrocyte Sedimentation rate

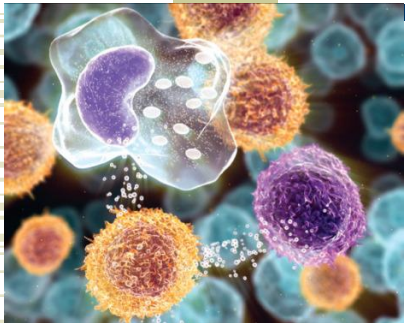
- ◆ invented in the early 50s
- ◆ The idea – according to the inventor – was if everything else fails and you still got nothing, try this to see if there is some underlying inflammation
- ◆ Many use it as a basic “are you sick?”



Inflammation

ESR

- ✧ Single result is most meaningless; trend over time is what you are looking for
 - ◆ Increases mean that you are not controlling the inflammation
 - ◆ Decreases mean that you are controlling it
- ✧ Classic procedure takes 1 hour
 - ◆ No cheating
 - ◆ Automated versions are available

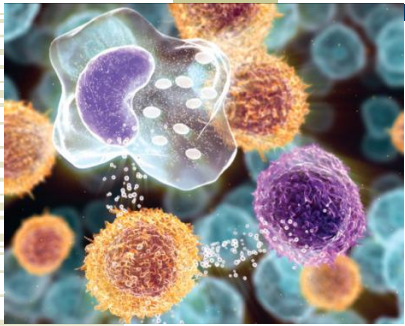


Inflammation

ESR

- ✧ Single result is most meaningless; trend over time is what you are looking for
 - ◆ Increases mean that you are not controlling the inflammation
 - ◆ Decreases mean that you are controlling it
- ✧ Classic procedure takes 1 hour
 - ◆ No cheating
 - ◆ Automated versions are available
 - ◆ No overlap in results from one method to another

Inflammation

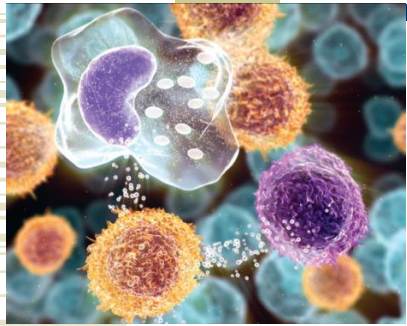


✧ Testing

✧ Pretty poor

✧ CRP (Cross reactive protein)

- ◆ Does well with acute inflammation
- ◆ Not so much for chronic inflammation
- ◆ The HS-CRP is not the same test.



Inflammation

 Fancier testing