



# Physiology (vascular remodeling)

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## Vascular remodeling in response to chronic changes in blood flow or blood pressure LAPLACE LAW

$$T = r \times P$$

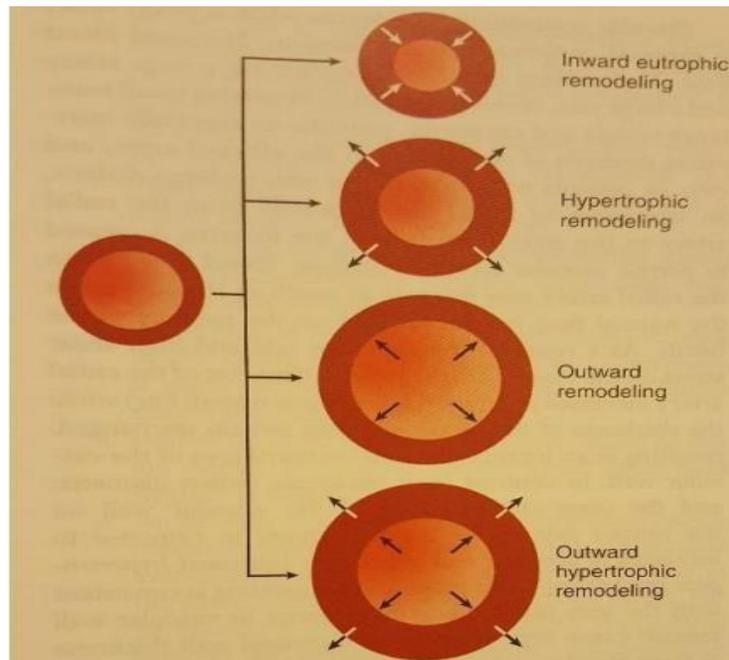
T Vascular wall tension

r radius

P pressure

\*Vascular remodeling is developed in the long term response (chronic change rather than acute)

\*LAPLACE LAW → the tension of the wall related to the radius by the pressure.



How does the remodeling develop ?! (types of remodeling)

### 1. Inward eutrophic remodeling:

-in small arteries

-when there is a high pressure or a high flow there will be a vasoconstriction that will build the thickness of the wall so it will increase the thickness of the wall

- cross section is as the normal vessel
- diameter is reduced (changing)

## 2. Hypertrophic remodeling:

- in medium size arteries
- mainly happen to the athletic people as far as they do exercise regularly for a long time then their blood vessels will be dilated and hypertrophy of the muscles
- cross section changes
- the diameter doesn't change

## 3. Outward remodeling:

- in saphenous veins(arteries transplantation)
- they put saphenous vein instead of coronary artery so they connect the vein from the root of the aorta to the heart (arterial blood in vein) where the stenosis occurs <connect saphenous vein to the aorta bypass stenosis>
- So here the vein is exposed to high pressure so the muscles of the wall develop gradually and will become hypertrophy (mainly as arterial wall)

## 4. Outward hypertrophic remodeling:

- at the venous side of the AV fistula in dialysis
- people with renal diseases who make dialysis(غسيل كلى) they connect artery and vein so
- When patient goes to the machine the blood flows into machine and comes back to the vein so the vein is exposed to high pressure (arterial blood) so it will make remodeling of the vessel wall Artery→Machine→Vein