

* Regulation and Control of Glomerular filtration

We have 2 types of Control:

1) Intrinsic Control (Autoregulation)

* Under normal conditions

* Maintains a nearly constant GFR

2 types

Myogenic

* Responds to the change in pressure in renal blood vessels

How?

Contraction of a blood vessel that occurs when pressure is elevated }
So Vasodilation → Reduce pressure

Tubuloglomerular feedback

links the rate of GFR to the conc. of salts that can be sensed by macula densa

Example

2) Extrinsic Control:

a) Under stress

- Norepinephrine: Released by the Sympathetic NS
 - epinephrine: by adrenal medulla
 - Afferent arterioles → Constrict → filtration is partially inhibited.
- Vasodilation

* Sympathetic NS → Stimulates Renal angiotensin mechanism

* Renin Release

- * Sympathetic nerve activation \rightarrow direct stimulation of JG cells using β_1 Receptors.
- * Renal artery Hypotension \rightarrow Reduce stretch of JG cells
- * Decrease Sodium delivery \rightarrow stimulates JG cells \rightarrow activating Macula densa.

This mechanism is triggered when JG cells are activated.

How does it work?

1) Convert angiotensin \rightarrow angiotensin I

\downarrow (using ACE)

angiotensin II

Causes mean arterial pressure to rise

Stimulates the adrenal cortex to release Aldosterone.

So as result Both glomerular + systemic pressure increase

We have other factors Affect Glomerular filtration.

1) Prostaglandins (PGI_2 + PGF_2)

- \rightarrow These are Vasodilators \rightarrow Are produced in response to Sympathetic stimulation + Angiotensin II.
- * they prevent renal damage if resistance increase

2) Nitric Oxide

Vasodilator \rightarrow Produced by vascular endothelium

3) Adenosin

Vasoconstrictor

4) Endothelin

Vasoconstrictor \rightarrow Produced by tubule cells.