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#MADEEASY

REGULATION OF GFR

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What is mechanism of GFR Regulation?

Intra-renal

- *Maintenance of constant GFR under normal conditions.*
- *Works when Mean Arterial Pressure (MAP) is 80-180 mm Hg.*
- *Maintaining GFR is like maintaining flow of water coming with normal pressure through a water purification system- kidney.*

It has two main mechanisms :

- *Myogenic Response*
- *Tubuloglomerular Feedback*

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Can you please tell me more about it?

MYOGENIC RESPONSE:

- *Increase in arterial pressure leads to stretch in afferent arteriole wall which in turn leads to contraction of vascular smooth muscle.*
- *Vasoconstriction maintains constant GFR.*
- *Increase in flow of water just before entering the purification system would mean that the input pipes have to be squeezed so less water enters so proper purification can be maintained and vice versa.*

TUBULOGLOMERULAR FEEDBACK:

- *Decrease in arterial pressure leads to decreased NaCl in Macula densa cells.*
- *Leads to decrease in afferent arteriolar resistance hence, vasodilation of afferent arteriole.*
- *Leads to increase in renin hence, vasoconstriction of efferent arteriole.*
- *Constant GFR maintained.*
- *Decreased flow leads to ringing of an alarm and the input pipes are made larger while output pipes from the purification system are squeezed so that proper purification can be maintained and vice versa.*

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What are the Extra Renal mechanisms for GFR Regulation?

Extra-renal

- *Maintenance of blood volume and pressure.*
- *Works when Mean Arterial Pressure (MAP) is <80 mm Hg.*
- *This comes into play when the pressure of incoming water is less.*

It has two main mechanisms :

- *Neural*
- *Hormonal*

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Please elaborate on those mechanism types?

NEURAL (Sympathetic):

- *Innervate afferent & efferent arteriole.*
- *Excessive stimulation causes vasoconstriction, thus decreasing GFR.*
- *Imagine the pipes being controlled by electric cables, when excessively stimulated they will constrict the pipes and make the purification slower.*

HORMONAL: (Direct effect)

- *Angiotensin II: Produced as a result of renin angiotensin aldosterone system, causes vasoconstriction of efferent arteriole, and prevents decrease in GFR.*
- *Endothelin, Epinephrine & Norepinephrine: cause vasoconstriction of both afferent & efferent vessels, decrease GFR.*
- *Vasodilators (Nitric oxide): increase in GFR.*