

## What our kidneys do?

In our body we have two kidneys with collecting system. Each kidney contains approximately 10 lakh functioning units known as nephrons- composed of glomerulus (filtering unit) and its tubule (where active and passive exchange take place). Ureters traverse urine from kidneys to urinary bladder. Bladder store urine till we find appropriate circumstances to voluntarily contract bladder muscle to pass urine out of body via urethra.

Kidneys are removing metabolic waste from our body by filtration and active exchange. By doing this they remove wastes mainly urea, creatinine and uric acid while maintaining optimum level of fluid, electrolytes (Sodium and Potassium) and acid-base. They also help in synthesis of blood formation by generating erythropoietin. By activating Vit D3 it helps in bone metabolism hence balance Calcium, Phosphorus and Parathyroid hormone levels.

- **Salt Control**- Our kidney BALANCE Sodium and Potassium levels. Please note the word BALANCE...it's not decrease/ increase the levels! If their levels in blood are more, kidneys excrete more...if levels are low, kidneys retain them to avoid their loss and levels reach to normal again! Total intake, excretion and balance of multiple hormones together are responsible for this balance. In kidney disease salt accumulation enhanced fluid accumulation and responsible for increased blood pressure and later swelling over face and feet with respiratory problems.
- **Fluid Control**- Similarly like the salt, kidneys are responsible for fluid BALANCE in our body...balancing intake with excretion and with the help of multiple hormones. In most of the kidney disease fluid accumulation is responsible for increased blood pressure and later swelling over face and feet with respiratory problems. Here fluid restriction and medicine enhances water loss are needed. In few kidney diseases kidney throw out more water out of body even when it's needed in our body...these diseases require more water intake!
- **Acid Base Balance**- Food converted to bodily parts via multiple metabolic (anabolic and catabolic) processes...metabolic waste including acids generated during this process has to go out of our body! Most of soluble nitrogenous wastes thrown out of body via urine. Also kidneys retain bases as bicarbonate which helps in neutralizing generated acids. In kidney diseases accumulation of acids cause respiratory distress.
- **Metabolic waste removal**- Most of the soluble nitrogenous wastes are Urea, Creatinine and Uric acid, excreted out of the body in the form of urine. Kidney diseases decrease their excretion and cause accumulation of these waste products/

toxins in patients body and responsible for generalized weakness, decreased appetite, nausea and vomiting.

- **Preserve Protein / Nutrients-** Kidney act as a filter but not only removed unwanted waste, it preserve needed products like proteins (albumin and few important binding proteins) by active re-absorption. In kidney diseases protein leak cause hypoalbuminemia (low blood protein) which leads to swelling of face and feet.
- **RBC Production-** Erythropoietin is a needed substance secreted from kidneys which is required to synthesize red blood cells from bone marrow (with “raw material”- iron and B12) hence in advanced stages of Chronic Kidney Disease (CKD) this is the reason of Anemia.
- **Bone Formation-** Vit-D required for calcium and phosphorus balance. Kidney secret 1-alpha hydroxylase which is required for the final activation of Vit-D hence Calcium and Phosphorus balance get disturbed. Low calcium and high phosphorous stimulate Parathyroid Hormone secretion which enhance bone resorption and patients complain of bone pain and backache in CKD advanced stages.