

Diabetes and the Kidney

Dr Sue Jones

Consultant Diabetologist & Honorary Senior Clinical Lecturer



**Diabetes Research &
Wellness Foundation**

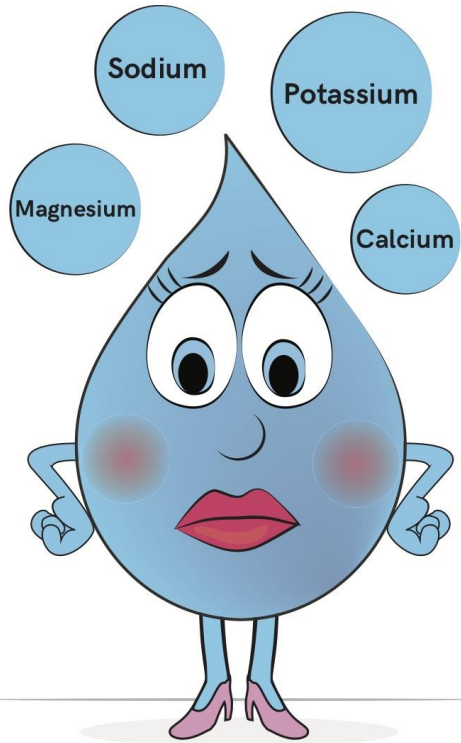


**Newcastle
University**

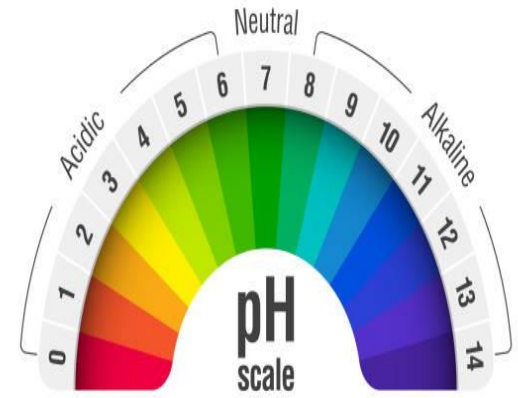
Plan of Session

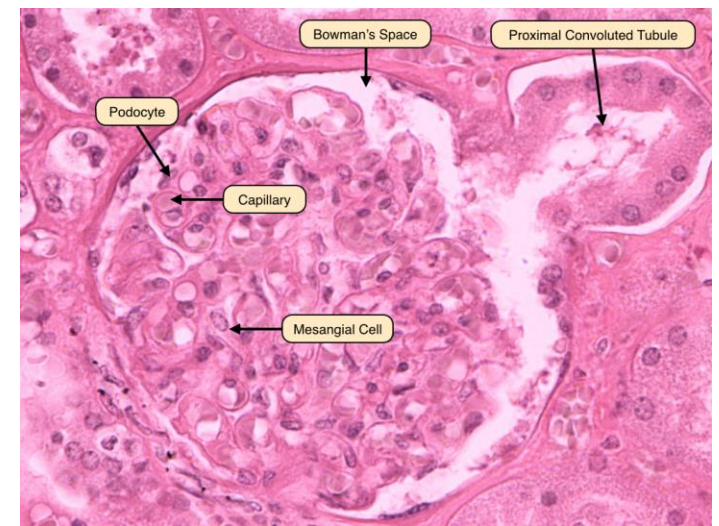
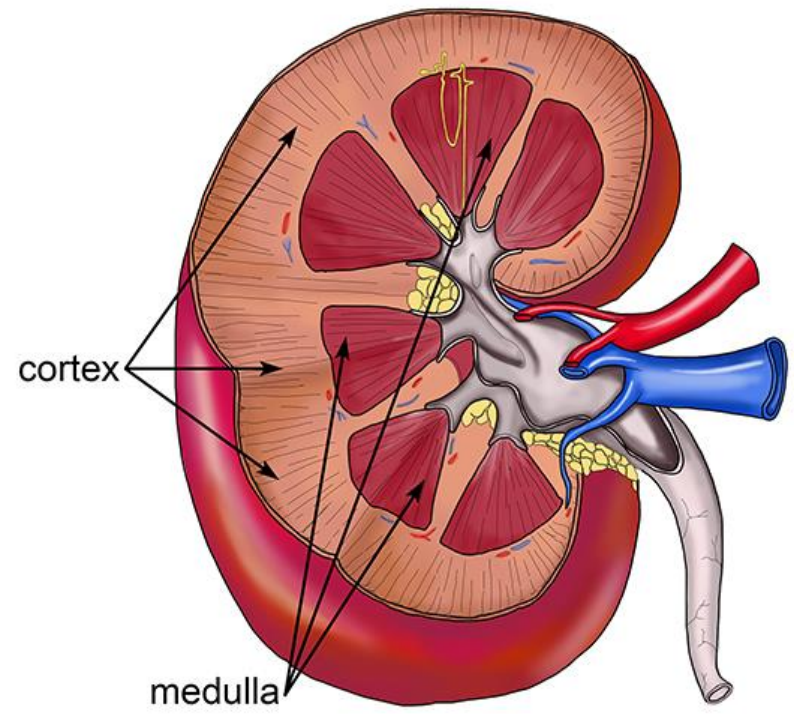
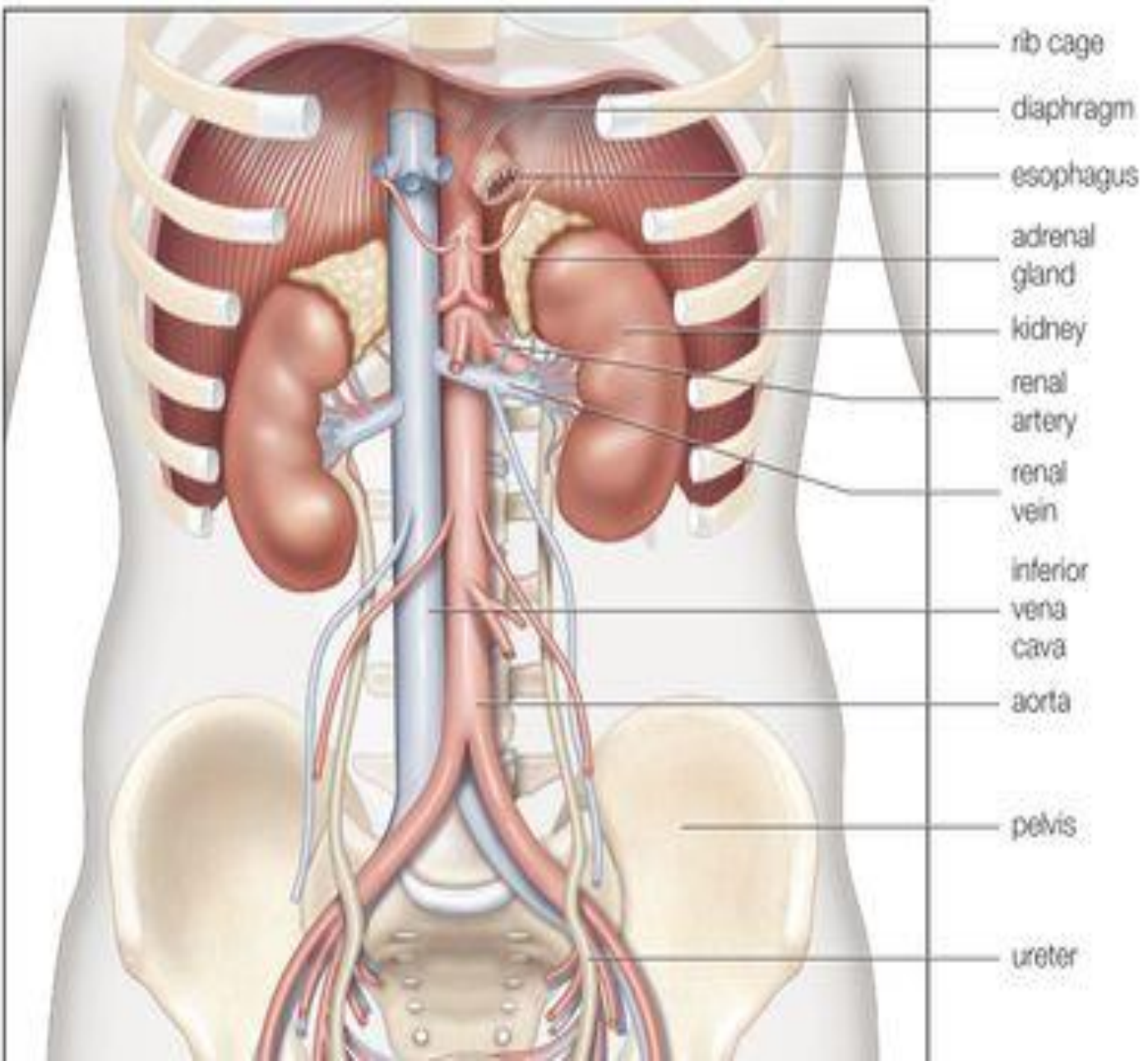
- What do kidneys do for us?
- What is GFR and CKD?
- What is microalbuminuria & proteinuria?
- What causes kidney problems in diabetes?
- How to treat kidney problems in diabetes?



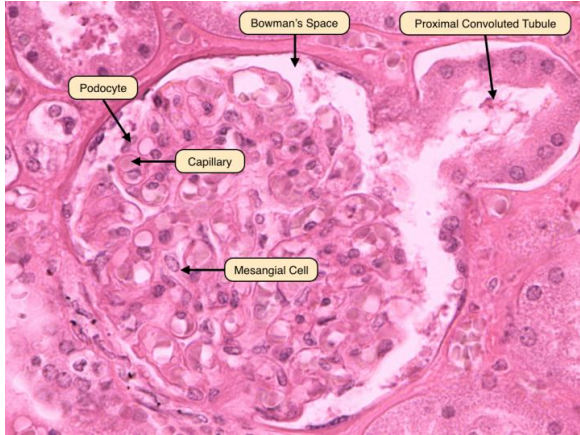


What have the kidneys ever done for us





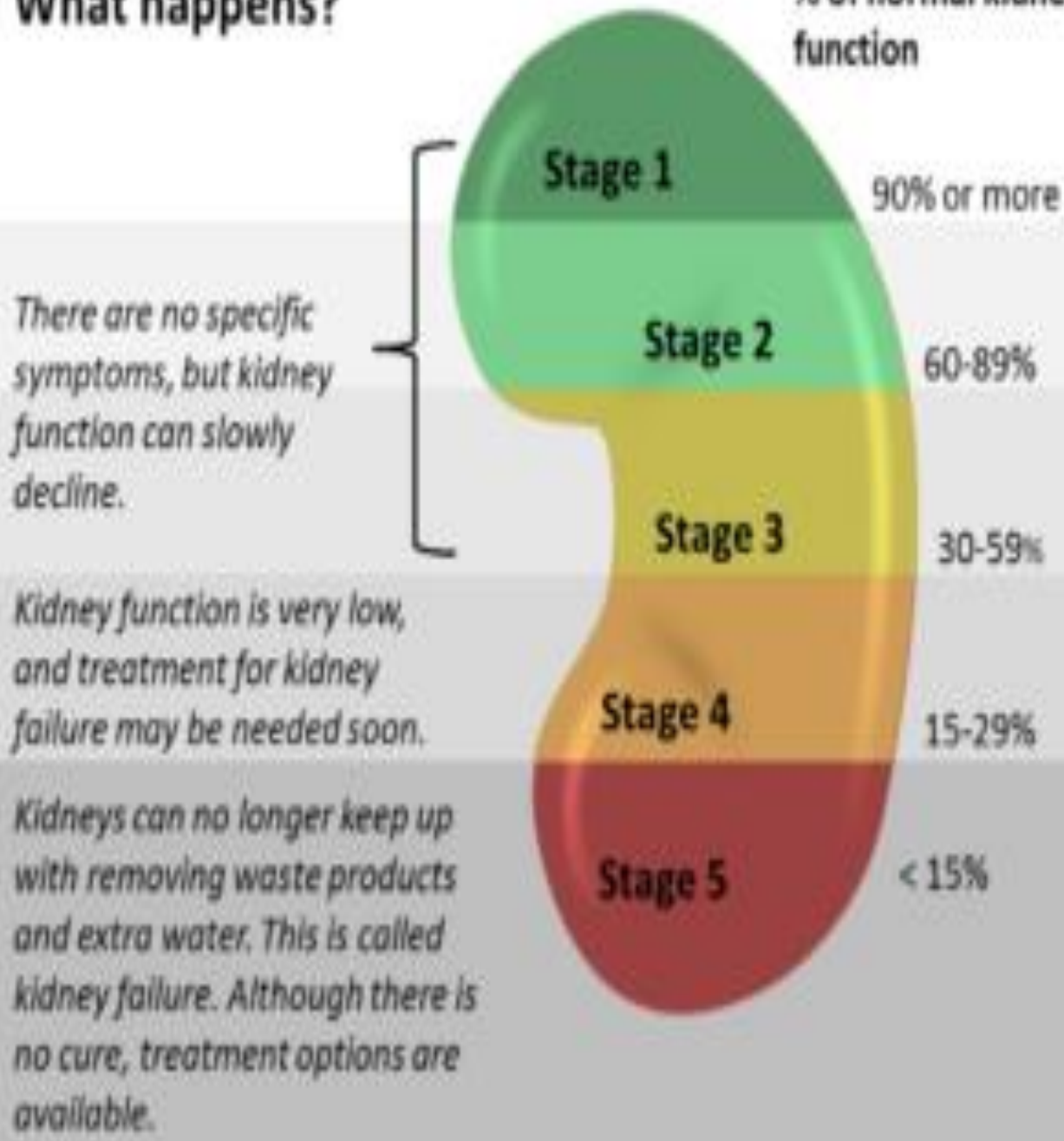
$$\text{eGFR} = 186.3 \times (\text{Creatinine}/88.4)^{-1.154} \times \text{age}^{-0.203} \times (0.742 \text{ if female}) \times (1.21 \text{ if black})$$



eGFR represents the percentage of your kidney function

What happens?

% of normal kidney function



Stage 3a 45 – 59%

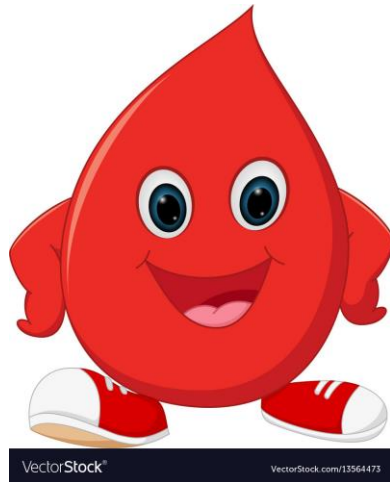
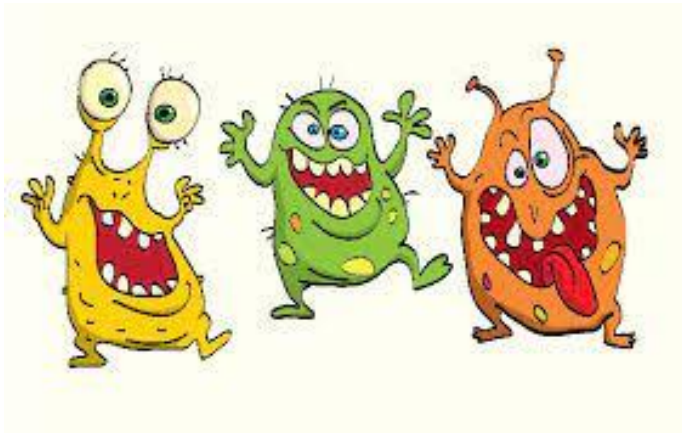
Stage 3b 16 – 44%

Microalbuminuria & Proteinuria



LEU						
120 s						
	-	15 ±	70 +	125 ++	500 +++	Leu/μL
NIT						
80 s						
	-	+	+	+	+	+
URO						
60 s						
	0.2(3.5)	1(17)	2(35)	4(70)	8(140)	12(200)
PRO						
60 s						
	-	15(0.15) ±	30(0.3) +	100(1.0) ++	300(3.0) +++	2000(20) ++++
pH						
60 s						
	5.0	6.0	6.5	7.0	7.5	8.0
BLO						
60 s						
	-	±	+	++	+++	5-10
SG						
45 s						
	1.000	1.005	1.010	1.015	1.020	1.025
KET						
40 s						
	-	5(0.5) ±	15(1.5) +	40(4.0) ++	80(8.0) +++	160(16) ++++
BIL						
30 s						
	-	1(17) +	2(35) ++	4(70) +++		
GLU						
30 s						
	-	100(5) ±	250(15) +	500(30) ++	1000(60) +++	>2000(110) ++++





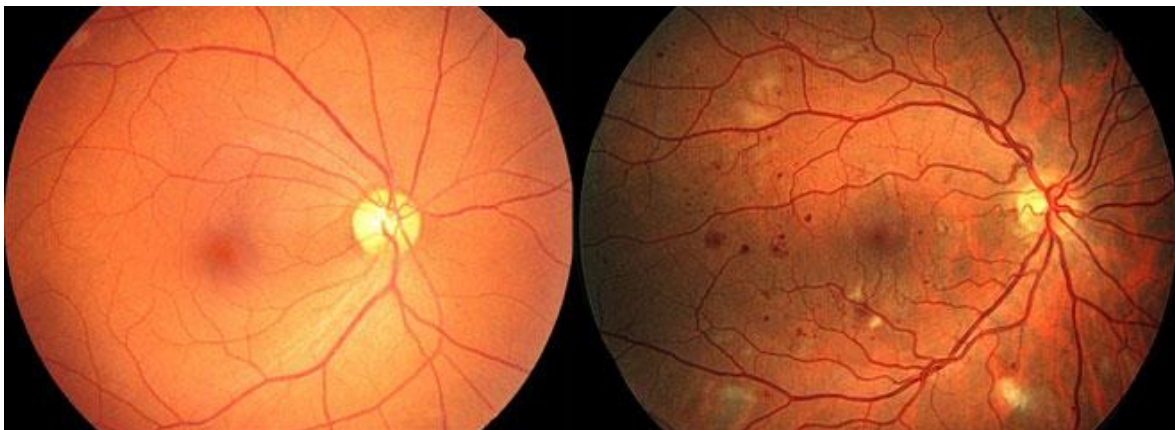
Prognosis of CKD by GFR and Albuminuria Categories

				Albuminuria categories		
				Description and range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmol	30-299 mg/g 3-29 mg/mmol	≥300 mg/g ≥30 mg/mmol
GFR categories (ml/min/1.73 m ²) Description and range	G1	Normal or high	≥90			
	G2	Mildly decreased	60-90			
	G3a	Mildly to moderately decreased	45-59			
	G3b	Moderately to severely decreased	30-44			
	G4	Severely decreased	15-29			
	G5	Kidney failure	<15			

Green: low risk (if no other markers of kidney disease, no CKD); Yellow: moderately increased risk; Orange: high risk; Red, very high risk.
KDIGO 2012

Risk Factors for Diabetic Kidney Disease

Prolonged Poor
Diabetes / BP
Control



Normal Retina

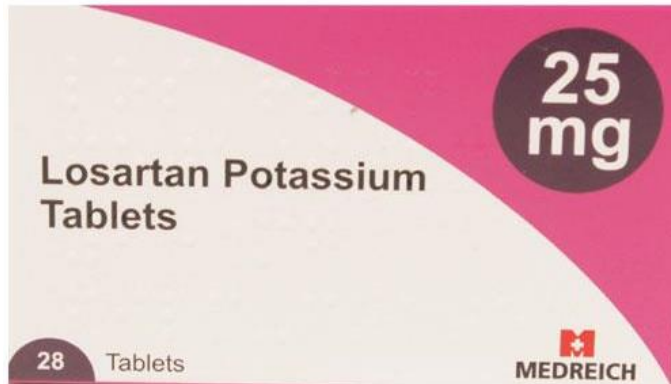
Diabetic Retinopathy

Family History
Male
SE Asian / Black Race

Treatments for Diabetic Kidney Disease



CKD 3b or lower



Major Changes in Diet may be required

HIGH POTASSIUM FOODS

Fruits

Serving size: ½ cup fresh or canned or 1 small piece
1/4c dried fruit



Oranges & Orange Juice



Kiwi



Cantaloupe



Dried Fruits



Pomegranate



Bananas



Mango



Nectarines



Raisins

Vegetables

Serving size: ½ cup cooked or 1 cup raw



Greens
(Beet/ Spinach)



Tomatoes & Tomato Juice



Avocado



Squash
Winter & Summer



White & Sweet
Potatoes



Artichoke



Broccoli



Pumpkin



Bok Choy

Other



Chocolate



Milk & Soy Milk



Raisin Bran



Salt Substitute



Nuts & Seeds



Yogurt



French Fries & Potato Chips



Coconut Water
& Coconut Milk



Additional Clinics with Nephrologist

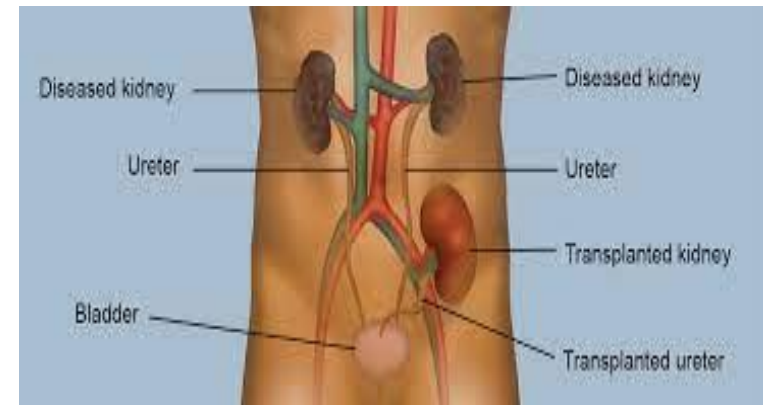
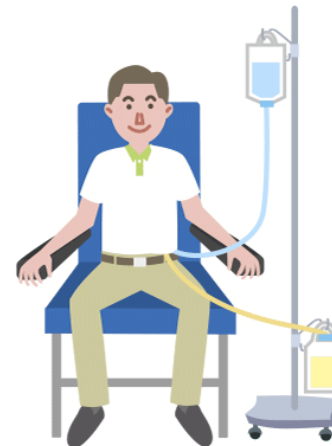
Optimisation of existing kidney function



Hemodialysis



Peritoneal dialysis



Summary

- CKD is a natural part of ageing
- Do annual urine microalbumin test
- Good control of diabetes and blood pressure slows CKD progression
- The majority of people with CKD do not require a nephrologist

