# Role of Internists in the Management of CKD

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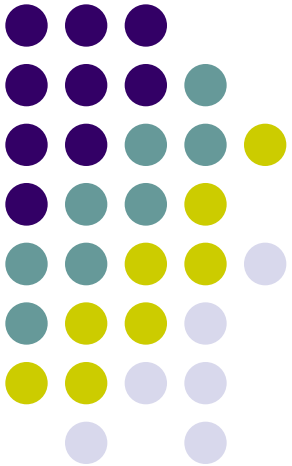
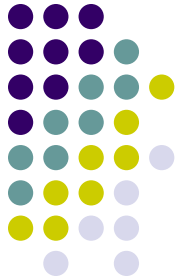




“ But I know all about love already.
I know precious little about kidneys”

-Aldous Huxley, *in Antic Hay*


KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. Kidney International Supplements, Volume 3, Issue 1, January 2013.

# Definition of CKD

- CKD is defined as abnormalities of kidney structure or function, present for > 3 months.

| Criteria for CKD (either of the following present for >3 months) | |
|---|---|
| Markers of kidney damage (one or more) | Albuminuria (AER ≥30 mg/24 hours; ACR ≥30 mg/g [≥3 mg/mmol])<br>Urine sediment abnormalities<br>Electrolyte and other abnormalities due to tubular disorders<br>Abnormalities detected by histology<br>Structural abnormalities detected by imaging<br>History of kidney transplantation |
| Decreased GFR | GFR <60 ml/min/1.73 $m^2$ (GFR categories G3a-G5) |

Abbreviations: CKD, chronic kidney disease; GFR, glomerular filtration rate.

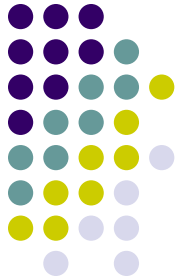
## Prognosis of CKD by GFR and albuminuria category

**Prognosis of CKD by GFR and Albuminuria Categories: KDIGO 2012**

| GFR categories (ml/min/ 1.73 m$^2$) Description and range | | | | Persistent albuminuria categories Description and range | | |
|---|---|---|---|---|---|---|
| | | | | **A1** Normal to mildly increased | **A2** Moderately increased | **A3** Severely increased |
| | | | | <30 mg/g <3 mg/mmol | 30-300 mg/g 3-30 mg/mmol | >300 mg/g >30 mg/mmol |
| | G1 | Normal or high | ≥90 | | | |
| | G2 | Mildly decreased | 60-89 | | | |
| | G3a | Mildly to moderately decreased | 45-59 | | | |
| | G3b | Moderately to severely decreased | 30-44 | | | |
| | G4 | Severely decreased | 15-29 | | | |
| | G5 | Kidney failure | <15 | | | |

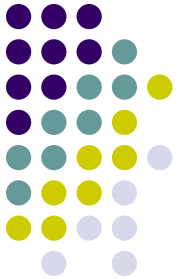
**Green: low risk (if no other markers of kidney disease, no CKD); Yellow: moderately increased risk; Orange: high risk; Red, very high risk.**

# Principle of CKD management



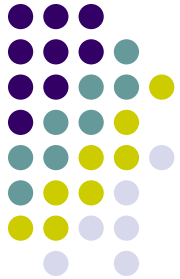
- Prevention or slowing the CKD progression
- Management of pathologic manifestations of CKD
- Timely planning of renal replacement therapy

# Factors causing progression of CKD



- Systemic hypertension
- Uncontrolled diabetes
- Nephrotoxins (NSAID, IV contrast etc)
- Decreased perfusion
- Proteinuria
- Hyperlipidaemia
- Hyperphosphataemia
- Smoking
- Underlying disease process

# When to start antihypertensive?



- In both diabetic and non-diabetic patients with CKD and urine albumin excretion <30 mg/24 hours, BP is consistently above >140 mm Hg systolic or >90 mm Hg diastolic.
- In both diabetic and non-diabetic patients with CKD and urine albumin excretion >30 mg/24 hours BP is consistently above >130 mm Hg systolic or >80 mm Hg diastolic

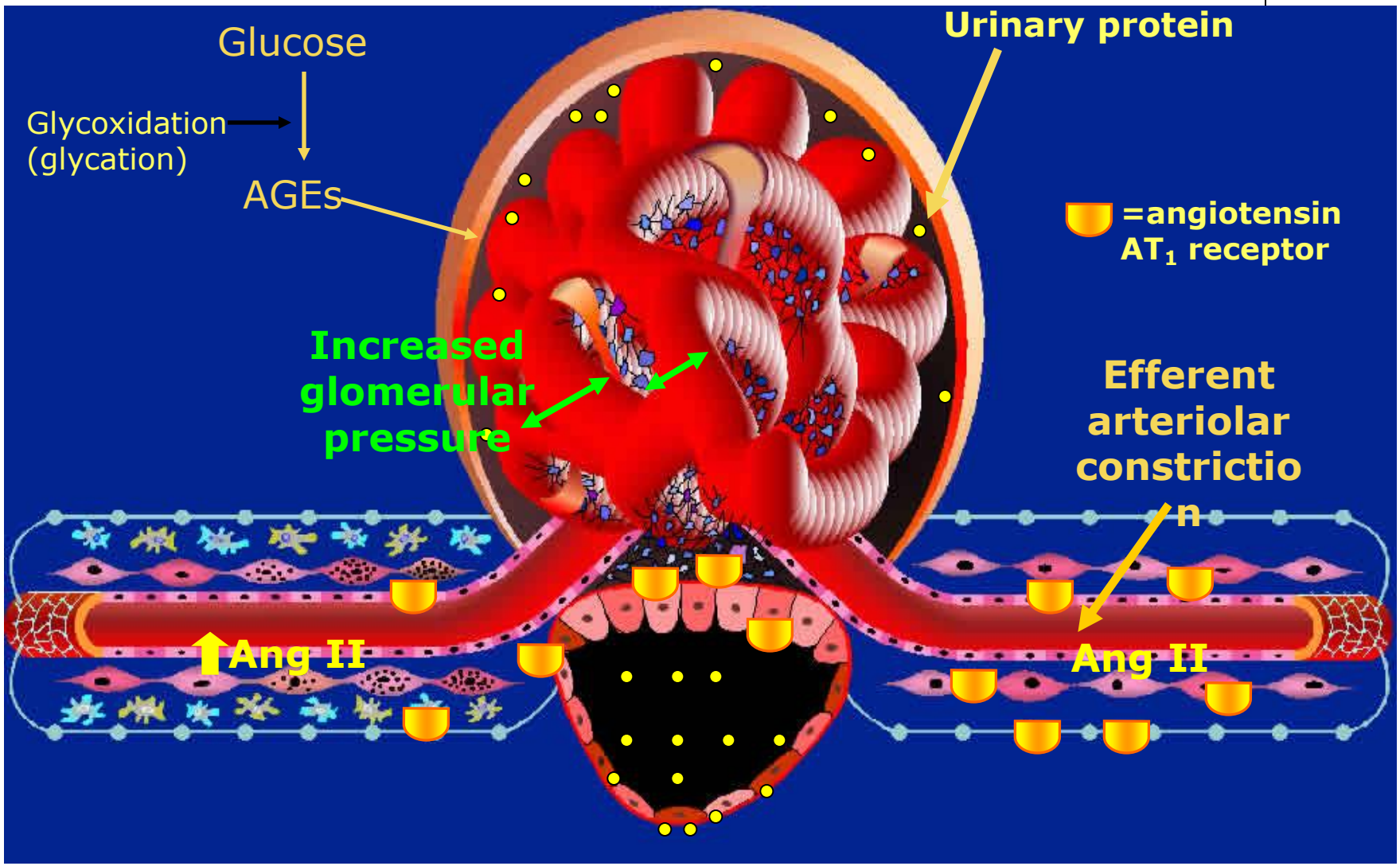
# Choice of antihypertensives

- An ACEI or ARB should be used to lower BP in diabetic patients with CKD, if 24 hour urine albumin excretion is 30-300 mg
- An ACEI or ARB should be used to lower BP in both diabetic and non-diabetic patients with CKD, if 24 hour urine albumin excretion is >300 mg
- ACEI or ARB are *not recommended* in normotensive, normoalbuminuric patients with DM for primary prevention

# Choice of antihypertensives

- Insufficient evidence to combine ACEI and ARB
- This specific reno-protective effect extends beyond that associated with antihypertensive effects alone
- Main aim is to reduce intra-glomerular pressure, adaptive hyperfiltration, and reduction of glomerular and tubulo-interstitial fibrosis

# Pathologic Processes Leading to Glomerular Injury and Proteinuria



# Protein intake in CKD

- KDIGO recommends avoidance of high protein intake (>1.3 gm/kg) in adults
- Both diabetic and non-diabetic adults with CKD and GFR<30 ml/min/1.73 m2, protein intake should be about 0.8 gm/kg/day

# Salt intake

- KDIGO recommends lowering sodium intake to < 2gram/ day (corresponding to 5 gram of sodium chloride), unless contraindicated

# Glycaemic control

- Target HbA1C should be 7%
- Increased risk of hypoglycaemia
- Reduction of insulin dose
- Glipizide, gliclazide, pioglitazone, linagliptin- no dose adjustment needed
- Metformin use: reevaluated when GFR<45, and should be stopped when GFR <30

# Hyperuricaemia

- Insufficient evidence to support or refute the use of drugs to lower uric acid in symptomatic or asymptomatic hyperuricaemia, in order to delay progression of CKD

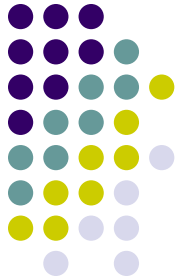
# Anaemia in CKD

- Defined as Hb <13 mg/dL in males and <12 mg/dL in females
- Hb should be checked annually whwn GFR is 30-59 ml/min and twice in every year if GFR <30 ml/min
- Iron status or other inflammatory states should be addressed before initiating erythropoietin

# Anaemia in CKD

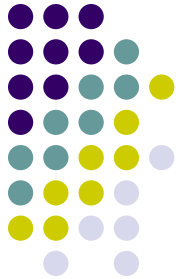
- ESA should not be started if Hb >10 mg/dL
- Decision of starting ESA therapy should be made after considering rate of fall of Hb level, symptoms of anemia, prior response to iron therapy, risks related to ESA, and risks of blood transfusion.

# CKD and metabolic bone disease



- When GFR is <45 ml/min, serum calcium, phosphate, alkaline phosphatase and PTH should be measured
- In people with GFR <45 ml/min, serum phosphate should be maintained in the normal range by prescribing oral phosphate binder

# CKD and metabolic bone disease

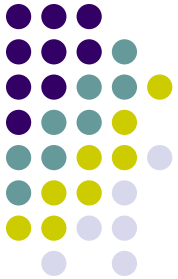


- Vitamin D supplements should not be routinely prescribed in the absence of suspected or documented deficiency
- Bisphosphonates should not be prescribed when GFR <30 ml/min

# Acidosis

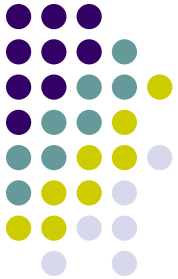
- Oral bicarbonate supplementation should be started when serum $HCO_3$ is <22 mmol/L

# CKD and cardiovascular disease



- Patients with CKD are at increased risk of developing cardiovascular disease
- Aggressive risk factor modification needed
- Level of care should not be prejudiced by their underlying CKD
- When GFR is <60 ml/min, serum troponin level should be interpreted with caution

# Drug therapy in CKD

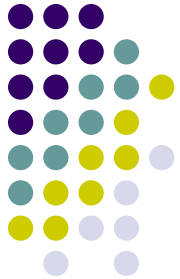


- GFR must be taken into account for drug dosing
- In patients with GFR <60 ml/min with intercurrent illness that increase the risk of AKI, temporary discontinuation of potentially nephrotoxic and renally excreted drug is needed (ACEI, ARB, spironolactone, NSAID, lithium, digoxin etc)

# Contrast agents in CKD

- High osmolar agents should be avoided
- Lowest possible dose should be used
- Adequate hydration should be ensured
- GFR should be measured 48-96 hours after the procedure
- Gadolinium based contrast agents should not be used if GFR is <15 ml/min, to avoid the development of nephrogenic systemic fibrosis

# When to refer to a nephrologist



- AKI or abrupt sustained fall in GFR
- GFR <30 ml/min
- Consistent albuminuria (ACR> 300 mg/24 hours)
- Progression of CKD
- Urinary RBC cast, RBC >20/HPF sustained
- CKD with HTN refractory to 4 or more drugs

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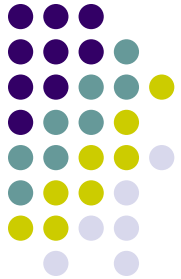

- Persistent abnormality of serum potassium
- Recurrent and extensive nephrolithiasis
- Hereditary kidney disease

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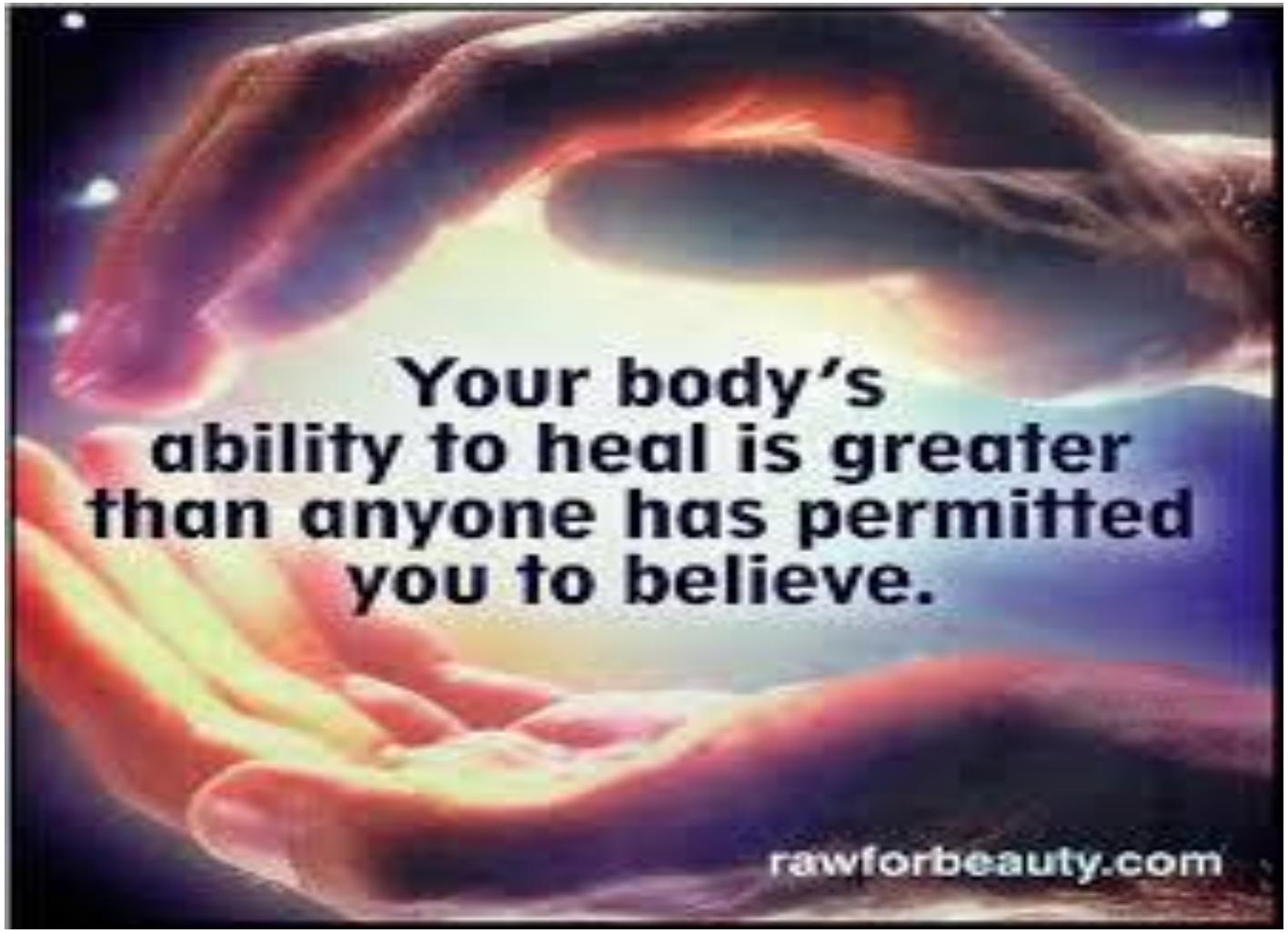
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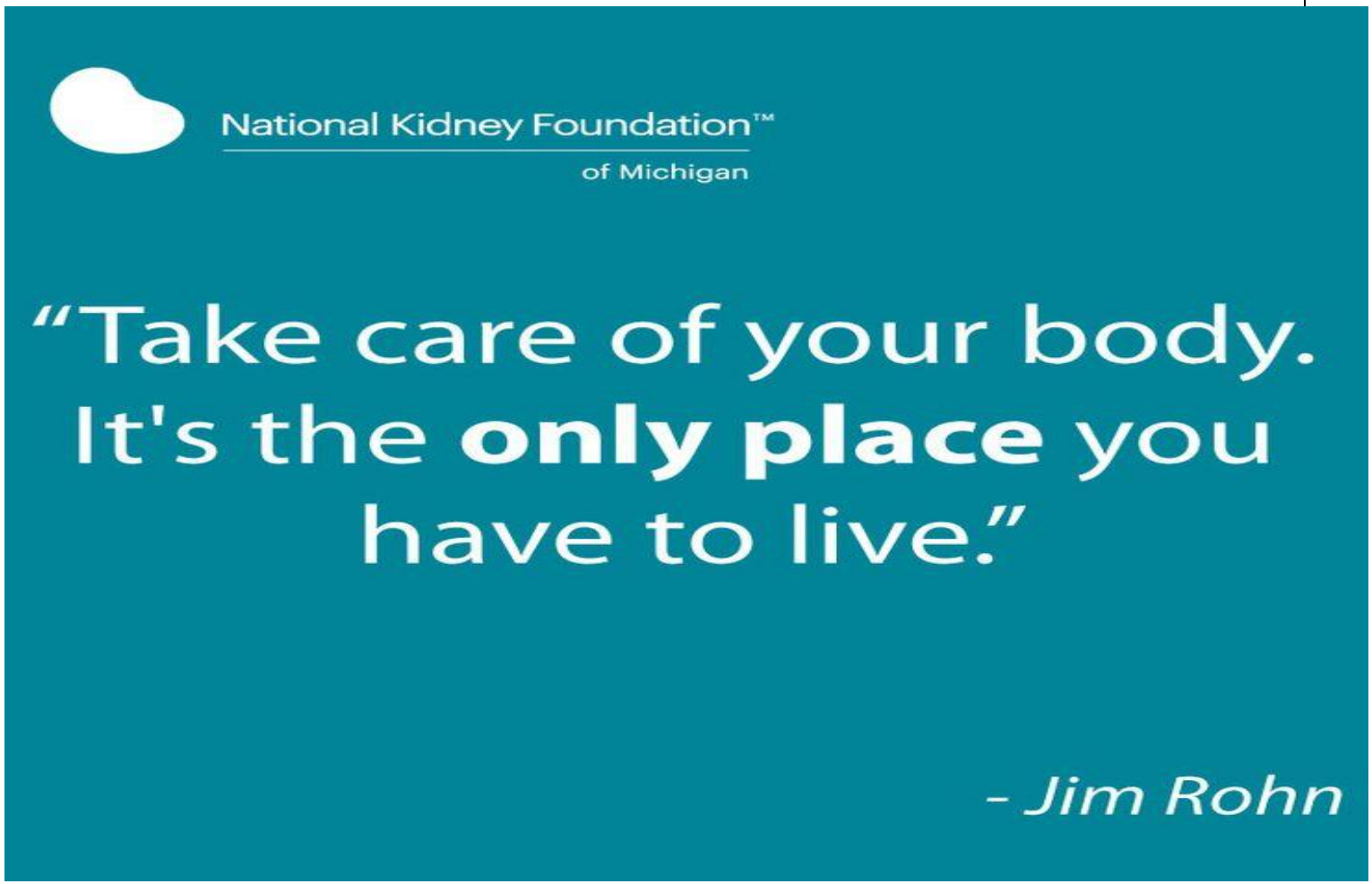
National Kidney Foundation™
of Michigan
"Take care of your body. It's the only place you have to live."
- Jim Rohn

# Thank you