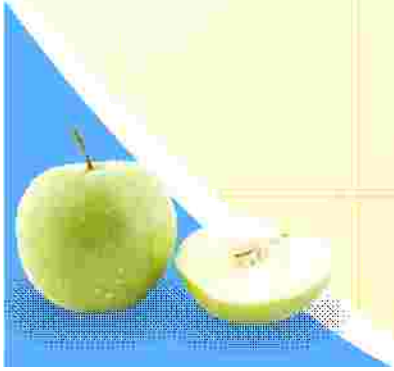
Diabetic Nephropathy

L/O/G/O

www.themegallery.com

Content



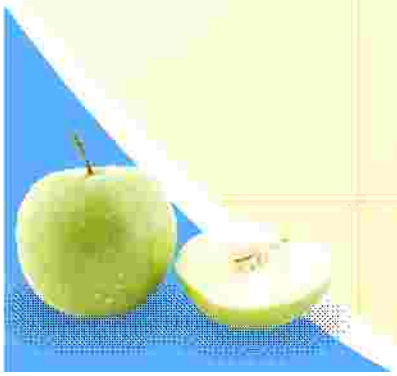
Definition of Chronic kidney disease

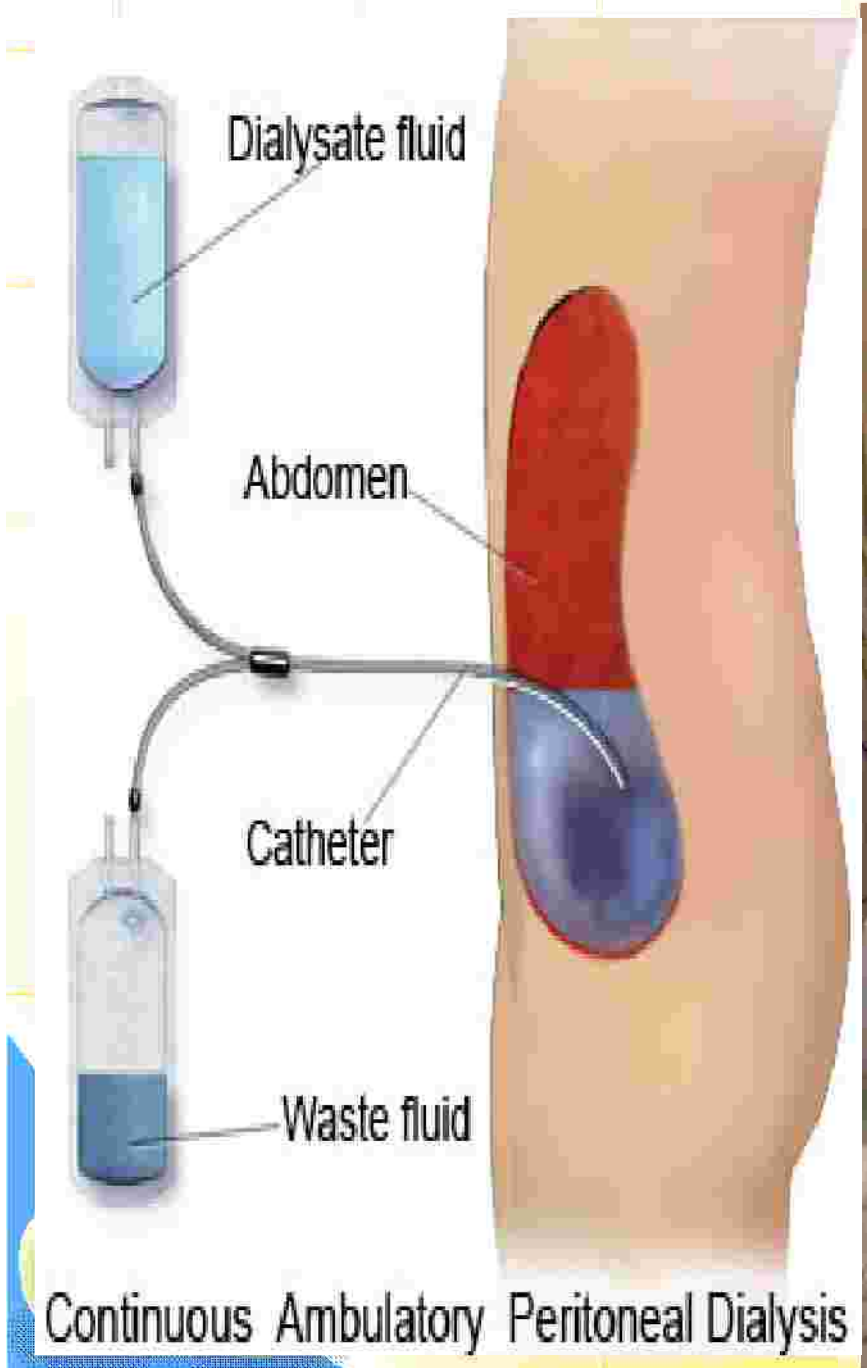
- GFR or CrCl < 60 ml/min
- ?????????????????????????????????????? ????? GFR ???? ???? Proteinuria,hematuria
- ??????????????????????????????????????

!! ?????????????? ??????????????????? 3 ???? !!

End stage renal disease (ESRD)

- CrCl < 10-15 ml/min
- ??????????????????????????????????
- ????????????????? Hemodialysis ???? CAPD
- ??????????????????? Kidney transplantation





Continuous Ambulatory Peritoneal Dialysis

Criteria for diagnosis DM

1.	FPG ≥126 mg/dl (7.0 mmol/l). Fasting is defined as no caloric intake for at least 8 h.*
	OR
2.	Symptoms of hyperglycemia and a casual (random) plasma glucose ≥200 mg/dl (11.1 mmol/l). Casual (random) is defined as any time of day without regard to time since last meal. The classic symptoms of hyperglycemia include polyuria, polydipsia, and unexplained weight loss.
	OR
3.	2-h plasma glucose ≥200 mg/dl (11.1 mmol/l) during an OGTT. The test should be performed as described by the World Health Organization using a glucose load containing the equivalent of 75-g anhydrous glucose dissolved in water.*

*In the absence of unequivocal hyperglycemia, these criteria should be confirmed by repeat testing on a different day (5).

Specific Criteria for DM

- FPG ≥ 126 on two separate occasions
- Symptoms of hyperglycemia and a casual plasma glucose ≥ 200
- 2hr plasma glucose ≥ 200 during OGTT

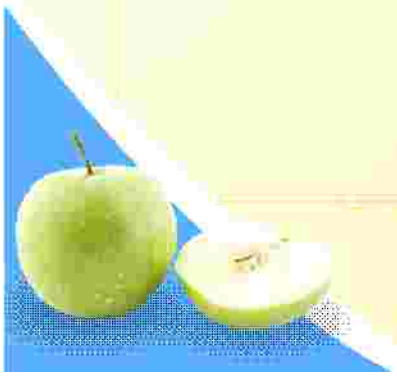
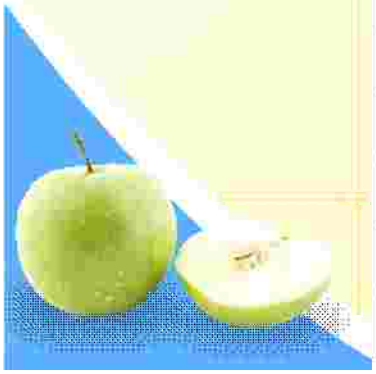


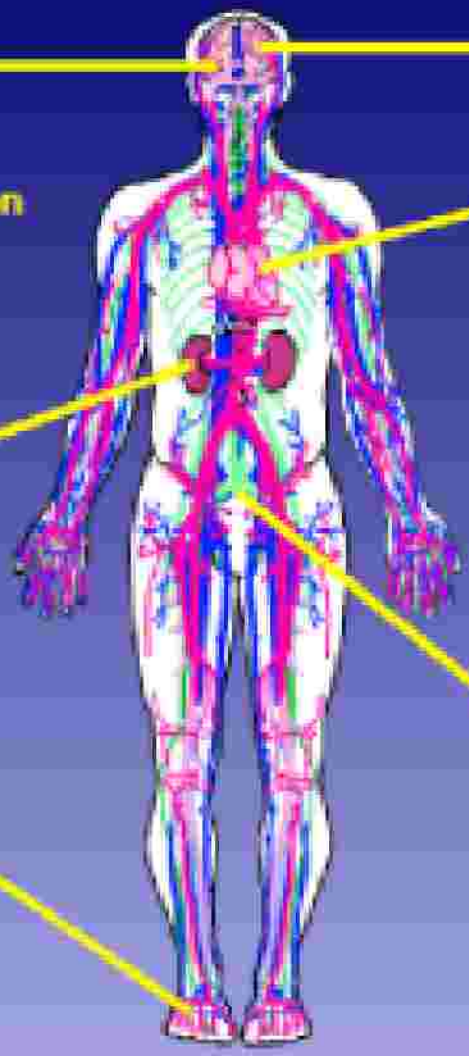
Table 338-7 Chronic Complications of Diabetes Mellitus
Microvascular
Eye disease
Retinopathy (nonproliferative/proliferative)
Macular edema
Neuropathy
Sensory and motor (mono- and polyneuropathy)
Autonomic
Nephropathy
Macrovascular
Coronary artery disease
Peripheral arterial disease
Cerebrovascular disease
Other
Gastrointestinal (gastroparesis, diarrhea)
Genitourinary (uropathy/sexual dysfunction)
Dermatologic
Infectious
Cataracts
Glaucoma
Periodontal disease

20-40% ??? DM patient



Diabetes

Complications of Chronic Hyperglycemia



Retinopathy

- Macular edema
- Capillary nonperfusion
- Angiopenesis
- Hemorrhage
- Glaucoma

Nephropathy

- Damaged glomeruli
- Hyperfiltration
- Renal damage

Peripheral neuropathy

- Nerve damage
- Ulceration
- Necrosis

Stroke

Heart disease

- Atherosclerosis
- Endothelial dysfunction
- Hypertension
- Dyslipidemia
- Procoagulant state
- Antifibrinolitic state
- Vascular inflammation

Autonomic neuropathy

- Nerve damage
- Gastreintestinal dysfunction
- Genitourinary dysfunction

American Diabetes Association Position Statements. Diabetes Care 2004; 27

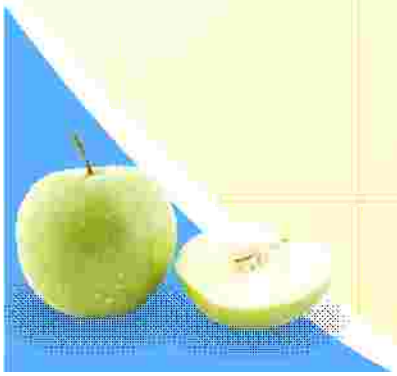
Diabetic Nephropathy (DN)

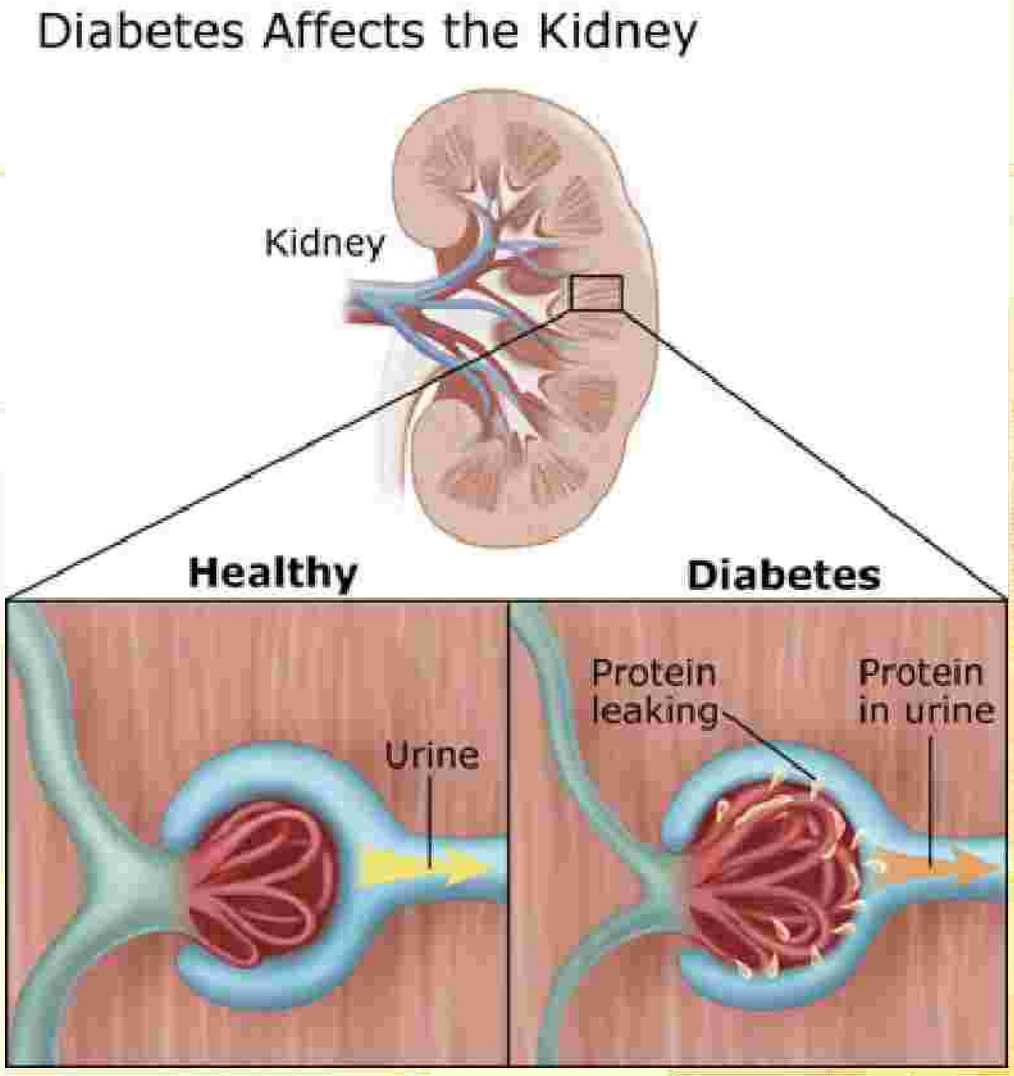
- ??????????????????

  1. ?????? albuminuria ??????????????????????????

  2. Hypertension

  3. ?????????????????? (decrease GFR)



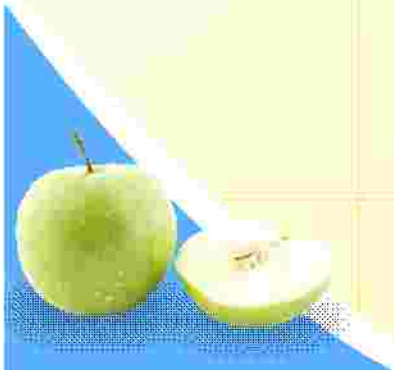


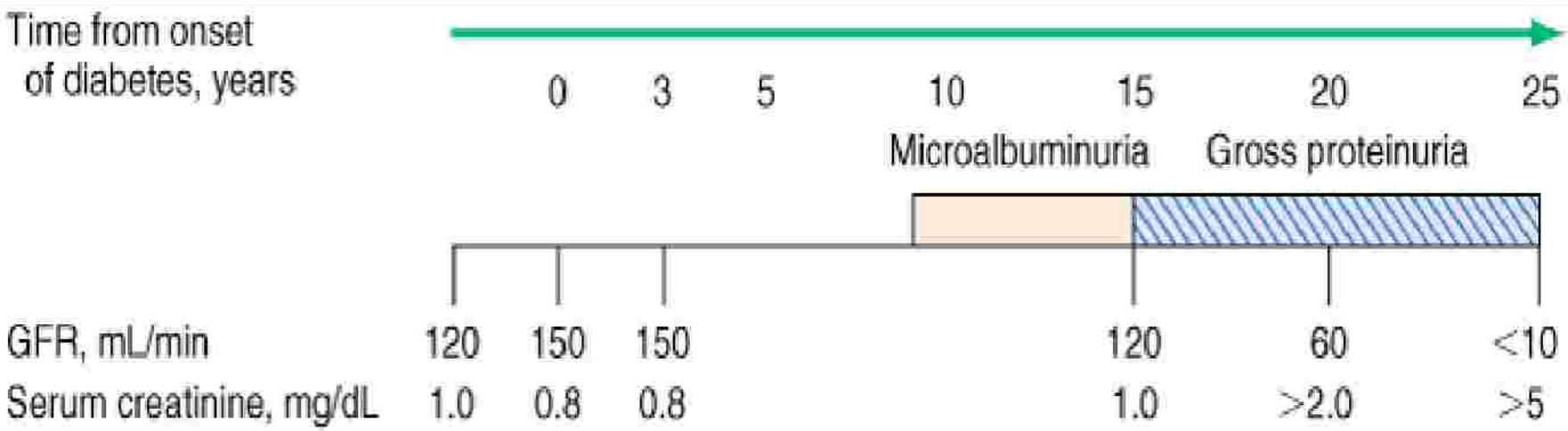
- **Glomerular hyperfiltration or hyperperfusion**
- **increase glomerular capillary pressure**

Urine microalbuminuria

Category	Spot collection (μg/mg creatinine)	24-h collection (mg/24 h)	Timed collection (μg/min)
Normal	<30	<30	<20
Microalbuminuria	30–299	30–299	20–199
Clinical albuminuria	≥300	≥300	≥200

Because of variability in urinary albumin excretion, two of three specimens collected within a 3- to 6-month period should be abnormal before considering a patient to have crossed one of these diagnostic thresholds. Exercise within 24 h, infection, fever, congestive heart failure, marked hyperglycemia, marked hypertension, pyuria, and hematuria may elevate urinary albumin excretion over baseline values.





Source: Fauci AS, Kasper DL, Braunwald E, Hauser SL, Longo DL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine*, 17th Edition: http://www.accessmedicine.com

?????????? ?? ??? ?? (HbA1C)

?????????????????????????????????????? ?

ปัจจัยเสี่ยงต่อการเกิดโรคไตจากเบาหวาน ได้แก่[2]

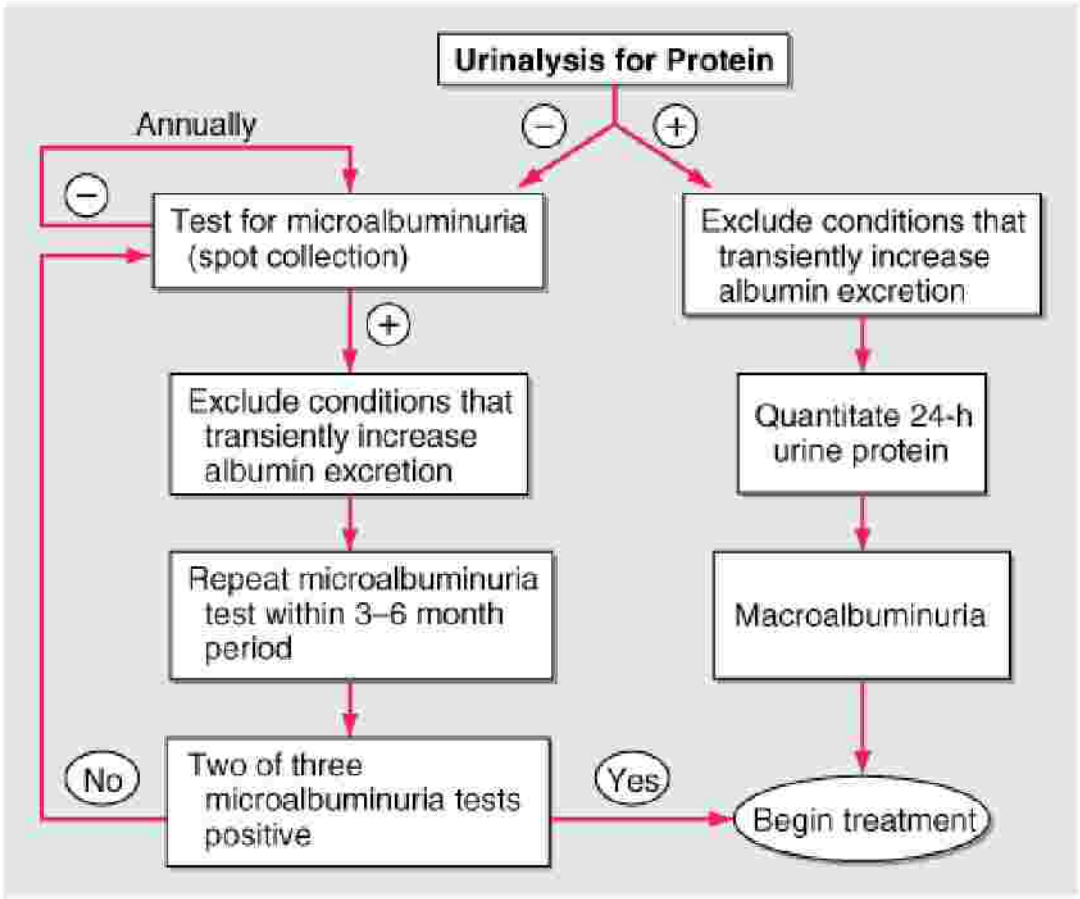
1. ระยะเวลาของการเป็นเบาหวานมานาน
2. มีประวัติครอบครัวของโรคไตจากเบาหวานหรือไตวายเรื้อรังระยะสุดท้ายหรือความดันโลหิตสูง
3. การควบคุมระดับน้ำตาลได้ไม่ดี
4. การควบคุมระดับความดันโลหิตสูงได้ไม่ดี
5. ภาวะไขมันในเลือดสูง
6. มีโปรตีนชนิดอัลบูมินรั่วออกทางปัสสาวะมากกว่าปกติ
7. การสูบบุหรี่

???? ??? ??????????????????

1. ??????????????????????????????????
2. ??????????????????????????????????
3. ??????????????????????????????? dipstick ??????????
   macroalbuminuria ??? Serum Cr ?????????????1 ???? (?????
   trace ???????????????????? Proteinuria ??????? ????????
   ?????????? 2 ?????????? 6 ?????)
4. ???????????? microalbuminuria ??? ???????????????
   dipstick –ve ??
   ????????

??

- **Control FBS 90-130 mg/dL & HgA1C < 7** (?????????? 6 ?????)
- **BP < 130/80 mmHg**
  - ????????????????? **ACEI or ARB**
- **Albuminuria** ??????? **dipstrick** ??? /?????????? **microalbuminuria** ???????????????? **ACEI** ???????????????? ????? ???????????????? **protienuria** ????????????????????
- **Advice** ????????????????????? ,????????????,??????????? ?????????????
- **If Cr =1.5 mg/dL** ??????????????????????????? **CRF**



Source: Fauci AS, Kasper DL, Braunwald E, Hauser SL, Longo DL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine*, 17th Edition: http://www.accessmedicine.com

?????? **urin dipstrick –ve**

?????????????

urine albumin/cr ratio

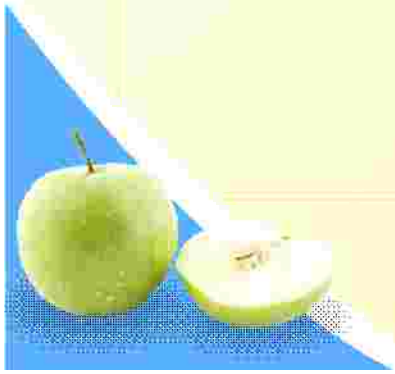
??? **morning void**

???? **30-300** ????????????

microalbuminuria

??????????????????????????????????

- In patients with type 1 diabetes with hypertension and any degree of albuminuria, ACE inhibitors have been shown to delay the progression of nephropathy. (A)
- In patients with type 2 diabetes, hypertension, and microalbuminuria, ACE inhibitors and ARBs have been shown to delay the progression to macroalbuminuria. (A)
- In those with type 2 diabetes, hypertension, macroalbuminuria (>300 mg/day), and renal insufficiency, an ARB should be strongly considered. (A)



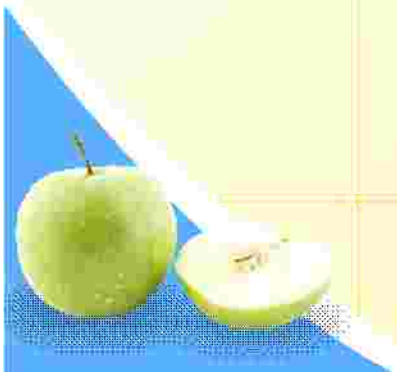
??????????????

ACE inhibitors

- **Enalapril**
- Coversyl
- Tritace

ARBs

- Cozaar / Losatan
- Blopress
- Diovan
- Approvel



??????????????????????????

- ?????????????? ACE inhibitors / ARBs
  - –?? (ACEI),angioedema
  - –Creatinine > 2 mg/dl
  - –Monitor : SCr ?????????????????? 30% ?????????????? 4 ????? ?????????? Serum K > 5.5 mmol/L

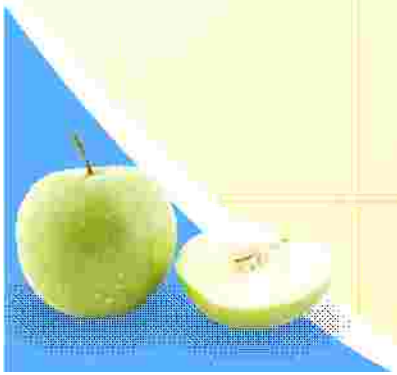
??????????????

Beta-blocker

- **Propanolol**
- **Atenolol**
- Metoprolol

Calcium channel blocker

- Adalat CR or SR
- Amlodipine
- Norvasc
- Madiplot
- Plendil



??????????????????????? (???)

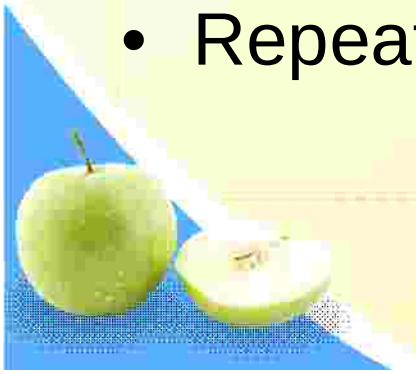
- Prefer **insulin injection** for control blood sugar
- Restriction of protein

  - microalbuminuria only = 0.8g/kg/day

  - macroulbuminuria < 0.8 g/kg/day

?????????????? GFR if < 30mL/min/1.73m2 ????? protien < 0.6 g/kg/day

- Sodium (Na) < 2.3 gm/day
- Repeat body weight ??????



ADA suggestion

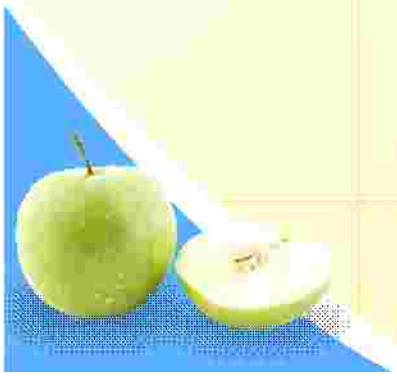
Dietary control

- **Restrict**
  - Fluid
  - Protein
  - Sodium
  - Potassium
  - Phosphate

Adequate **calorie intake**!!!

+ Carbohydrate

+ prevent protein catabolism



Fluid I/O

- **Decrease intake**
  - Water
  - Food
  - Metabolism
- **Increase output**
  - Expiration
  - Insensible loss : 400 cc
  - Urine : diuretic
  - Feces : Induce diarrhea
    Sorbitol

Potassium

???

????

?????

?????

?????

??? ????

????

?????

???

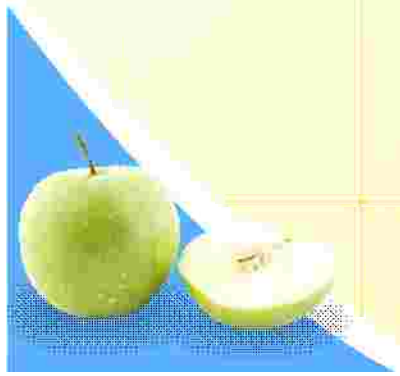
? ???

??????

?????? ,???????,???????

?????????

???????



Phosphate

DON’T

Meat

Chocholate

Milk

Cheese

DO

Phosphate binder

calcium carbonate

aluminum hydroxide

- Corrected Serum Ca 9.0-10.2 mg/dL
- Serum phosphate 2.7 – 4.6 mg/dL