

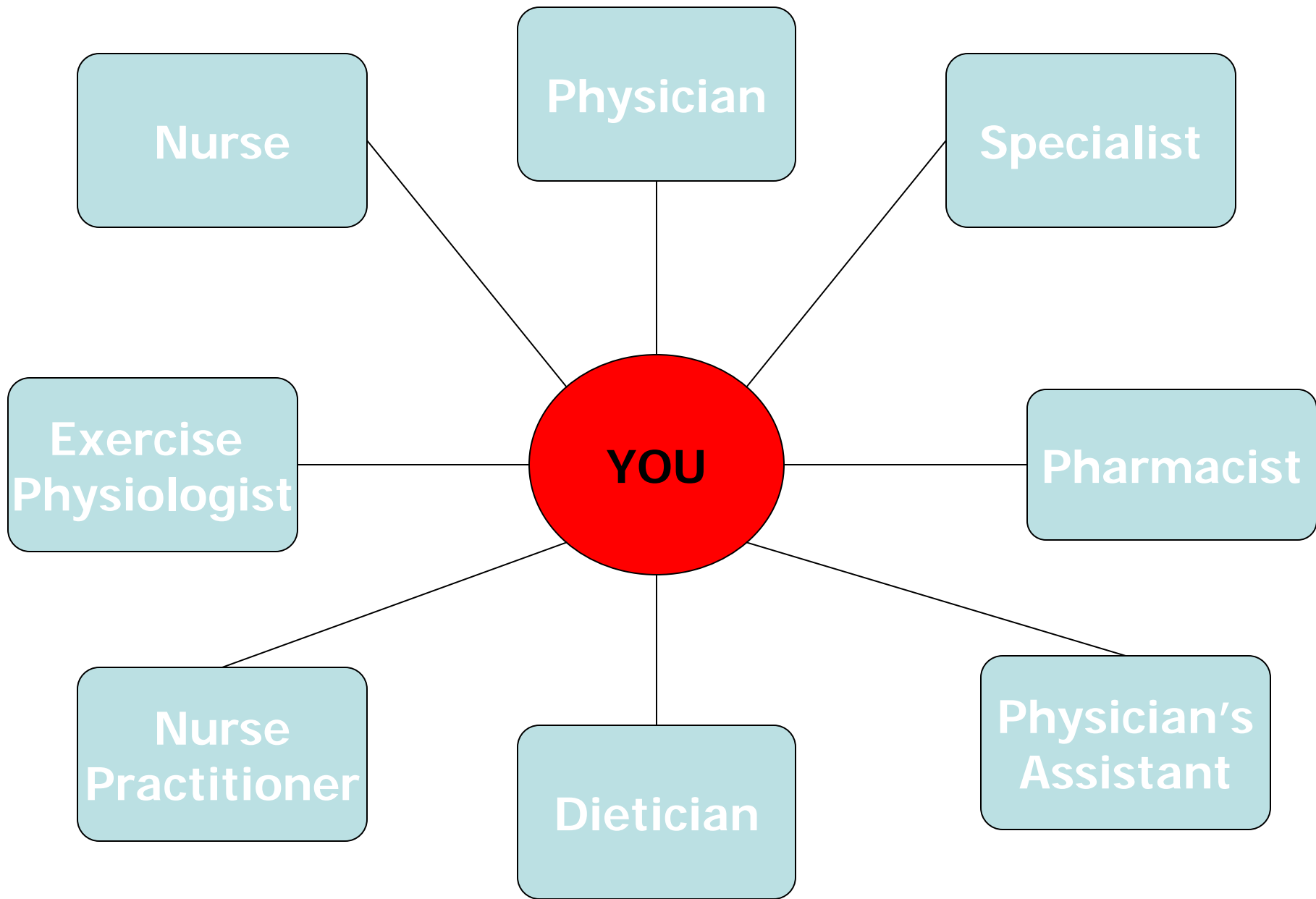
# Medication Therapy for Heart Disease

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# Objectives

- Review Conditions that affect the Heart
  - High Blood Pressure, Hyperlipidemia and Diabetes
- Review Medications for Heart Diseases
  - How they work
  - Common Adverse Effects
- Define the role of Generics and Medication Adherence in Medication therapy
- Conclusions and Questions



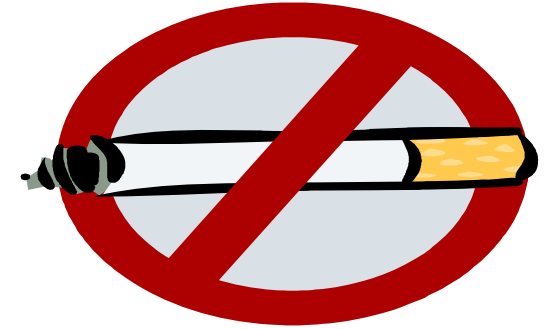
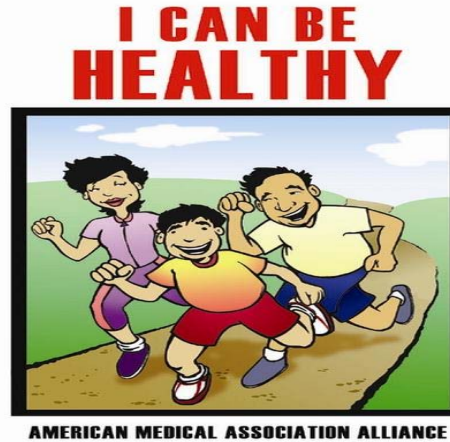


# Know Your Numbers!

- “**Silent Killers**” because there are often no symptoms
- Your numbers are your only warning!



# Lifestyle Changes



- Quit Smoking**
- Decrease Sodium Intake**
- Exercise**
- Drink Alcohol in Moderation**

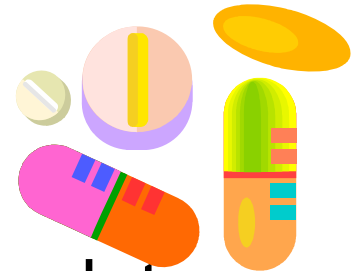


# Medications for Heart Diseases



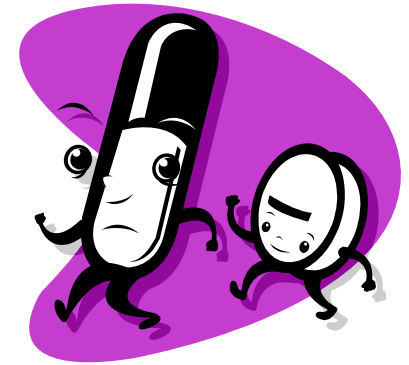
- Lifestyle changes may not be enough
- Medications are not a replacement for lifestyle changes
- Many available drugs help lower blood pressure, cholesterol and blood sugars
- Even have drugs to help stop smoking

# Medications for Heart Diseases



- Many different drug classes
  - Each class has a unique way they work to lower blood pressure, cholesterol or sugars
  - Each class has different side effects, drug interactions and warnings associated with them
  - Certain people benefit from certain classes based on other diseases they may have

# Which drug?



- Decision made between patient and physician
- Factors to consider:
  - Other co-morbid conditions of the patient
    - What other diseases does the patient have?
  - Cost
    - Is it covered by insurance? What copay? Is there a generic available?
  - Side Effects
  - Compliance

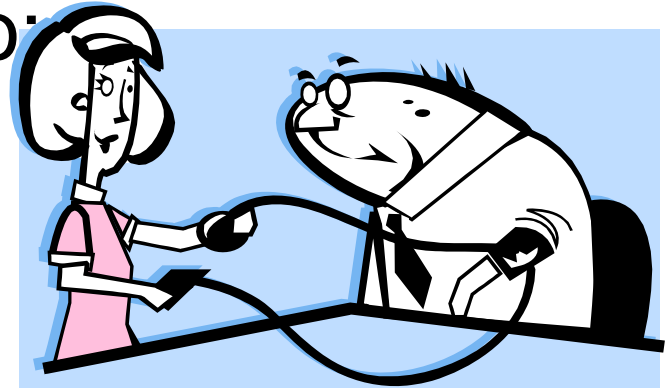


# What is Blood Pressure?

- Blood Pressure is the force of blood against the walls of the arteries
- Blood Pressure rises and falls throughout the day
- When Blood Pressure stays elevated over time, it's called **High Blood Pressure**
- The medical term for High Blood Pressure is **Hypertension**

# Complications of High Blood Pressure

- 1 in 3 adults in the United States has High Blood Pressure
- Hypertension can lead to:
  - Coronary Heart Disease
  - Heart Failure
  - Stroke
  - Kidney Failure
  - Blindness
  - Death



# Blood Pressure Categories

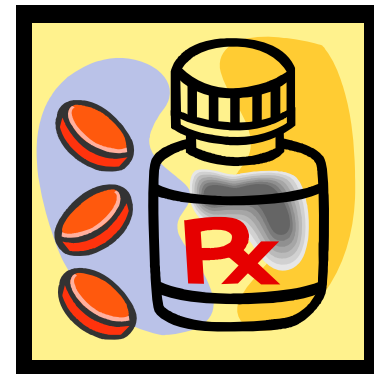
Category	Systolic (top number)		Diastolic (bottom number)
Normal	Less than 120	<b>And</b>	Less than 80
Pre-hypertension	120-139	<b>Or</b>	80-89
High Blood Pressure			
Stage 1	140-159	<b>Or</b>	90-99
Stage 2	160 or higher	<b>Or</b>	100 or higher



# Blood Pressure Drugs

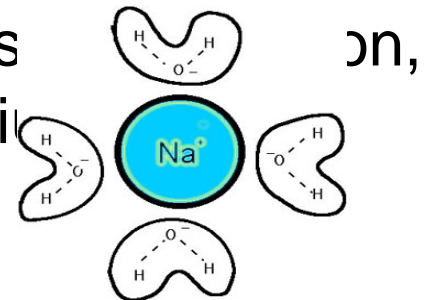
## Different Classes

- Diuretics
  - “water pills”
- Beta Blockers
- Angiotensin Converting Enzyme Inhibitors
  - “ACE” Inhibitors
- Angiotensin Receptor Blockers
- Calcium Channel Blockers
- Alpha Blockers
- Alpha-Beta Blockers
- Vasodilators



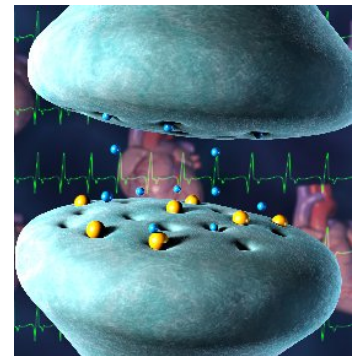
# Blood Pressure Drugs: Diuretics

- Commonly known as “water pills”
- Work in the kidney to remove excess water and sodium (salt) from the body
- Hydrochlorothiazide, Chlorothiazide, Indapamide, Furosemide
- Many combination antihypertensives have a diuretic as a component
- Side effects: ↑ Urination, Dizziness  
Changes in potassium and/or sodium



# Blood Pressure Drugs: Beta Blockers

- Work on the heart to make it beat less often and with less force → Blood Pressure drops
- Common Examples: atenolol, metoprolol, carvedilol, bisoprolol, propranolol, labetalol
- Can be used for many different purposes
  - After a heart attack
  - Used in people with irregular heartbeats
  - Used in people with migraine headaches
  - Used in people with heart failure



# BETA-BLOCKERS – SIDE EFFECTS

- Drowsiness or fatigue
- Weakness or dizziness
- Impotence





# Blood Pressure Drugs: ACE Inhibitors



- Angiotensin Converting Enzyme Inhibitors
- Block the formation of a hormone (called angiotensin II) our body produces that causes blood vessels to narrow
- Common examples: lisinopril, enalapril
- Side Effect: Dry Cough, Angioedema

# Blood Pressure Drugs: Angiotensin Receptor Blockers

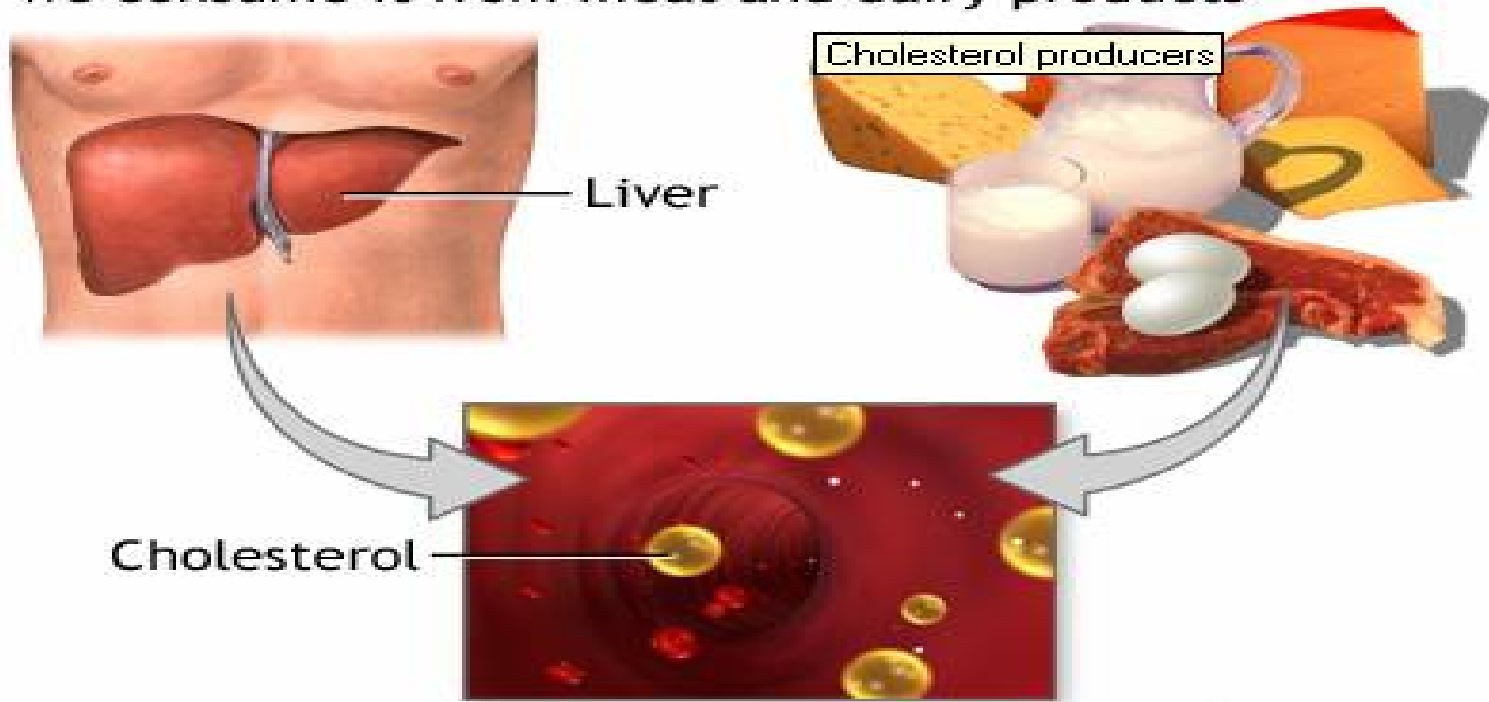
- Also called “ARB’s”
- Blocks enzyme that relaxes Blood vessels → ↓ blood pressure
- Common examples: Cozaar, Avapro, Diovan, Benicar, Micardis
- Cozaar (Losartan) is generic, also available in combination with a diuretic

# Blood Pressure Drugs: Calcium Channel Blockers

- Keep calcium from entering the muscle cells of the heart and blood vessels → blood vessels relax and pressure goes down
  - diltiazem, verapamil, amlodipine, felodipine
- Side Effect: Feeling Tired, Swelling of the abdomen, ankles or feet , Heartburn or upset stomach, Constipation (verapamil)

# What is Cholesterol

Cholesterol is produced by the liver and we consume it from meat and dairy products



# What is Cholesterol?

- Cholesterol is an important part of a healthy body and performs many needed bodily functions
  - It is a constituent of membranes and the source of steroid hormones
- High cholesterol causes plaques that narrow the lumen of blood vessels
  - Artherosclerosis

# Cholesterol

**Total Cholesterol**: Sum of all cholesterol

- **LDL**: Low density lipoprotein
- “Bad” cholesterol
- **HDL**: High density lipoprotein
  - “Good” cholesterol
- **VLDL**: Very low density lipoprotein
  - Like LDL but more dense, not often measured
- **Triglycerides**: Most common type of fat

# Cholesterol Goals

<b>Total Cholesterol</b>	<u>Normal: &lt; 200mg/dL</u> <u>Borderline High: 200-239mg/dL</u>
<b>LDL (BAD Chol)</b>	<u>Low Risk: &lt;160mg/dL</u> <u>Moderate Risk: &lt;130mg/dL</u> <u>High Risk: &lt;100mg/dL</u> <u>VERY High Risk: &lt;70mg/dL</u>
<b>HDL (GOOD Chol)</b>	<u>Goal: M:&gt;40mg/dL, W:&gt;50mg/dL</u> <u>Best: &gt;60mg/dL</u>
<b>Triglycerides</b>	<u>Normal: &lt;150mg/dL</u> <u>Borderline High: 150-199mg/dL</u>

# Medications to Lower Cholesterol

- LDL lowering
  - Statins, Ezetimibe, Niacin, Bile Acid Sequestrants
  - Alternate: Fibrates, Plant stanols/sterols
- Triglyceride Lowering
  - Fibrates, Niacin, Fish Oil
- Raise HDL
  - EXERCISE!, Niacin





# Statins

- ↓ synthesis of cholesterol in body
- ↓ CVD & stroke by an average of 33.8%



- >40% who need statins are not on a statin

# Statins

- Examples:
  - Simvastatin, Pravastatin, Lovastatin,
  - Lipitor ®, Crestor®,
- Adverse Effects
  - Muscle Aches
  - Increased liver enzymes



# Nicotinic Acids

- Lower LDL and Triglyceride synthesis
  - Immediate release Niacin
  - Extended release Niaspan®
- Adverse Effects
  - Flushing
  - Upset stomach
  - ↑ blood glucose, uric acid



# Fibric Acids

- ↓ rate of triglyceride synthesis is liver
  - Fenofibrate (TriCor)
  - Gemfibrozil
- Adverse Effects
  - Dyspepsia
  - Muscle Aches
  - Gallstones



# Bile Acid Sequestrants

- Bind to Bile acids
- Interfere with the absorption of other drugs
  - Warfarin
- Adverse Effects
  - Constipation
  - Upset stomach



# Zetia

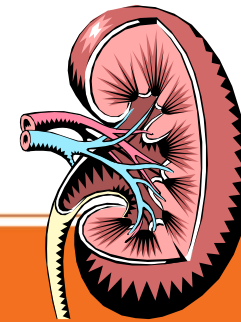
- ↓ absorption of cholesterol from the gut



- Adverse Effects: Headache, Rash

# Diabetes

- Type 1: Absolute lack of Insulin
- Type 2: Progressive ↓ in Insulin secretion and insulin resistance
- Symptom: ↑ Urination, ↑ thirst, unexplained weight loss
- Complications: Heart, blood vessels, kidneys, Eyes, Nerves, Skin



# Diabetes

- What is A1c?
  - Blood test that measures the average blood glucose level over the past 2 to 3 months, reported as a percentage
- Goals
  - A1c of  $< 7\%$
  - Before meal blood glucose 70-130mg/dl
  - After meal blood glucose  $< 180$  mg/dl



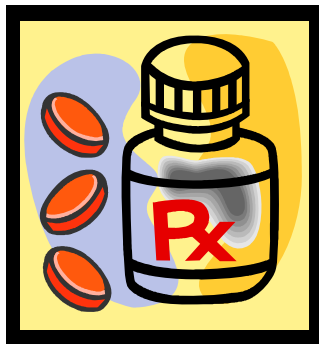
# Diabetes Medication: How do they work

- **Stimulating the pancreas to produce and release more insulin**
- **Inhibiting the production and release of glucose from the liver, which means you need less insulin to transport sugar into your cells**
- **Blocking the action of stomach enzymes that break down carbohydrates or make tissues more sensitive to insulin.**

# Diabetes Medications

## Different Classes

- Sulfonylurea
- Metformin
- Thiazolidinediones
- Alpha glucosidase inhibitors
- DDP4 Inhibitors
- Glucagon like peptide agonist
- Insulin



# Diabetes Medications

- Biguanides: Improves the effectiveness of Insulin
  - Metformin (Glucophage®)
  - Side effect: Nausea, Diarrhea, weight loss
- Sulfonylureas: ↑ production and release of Insulin
  - Glimepride (Amaryl®), Glipizide (Glucotrol®), Glyburide (DiaBeta®, Glynase®)
  - Side effect: Hypoglycemia, Weight gain

# Diabetes Medications

- Meglitinides
  - Repaglinide (Prandin), Nateglinide (Starlix)
  - Side Effect: Hypoglycemia, Weight gain
- Alpha glucosidase Inhibitors
  - Acarbose(Precose) Miglitol(Glycet)
  - Side Effect: Diarrhea, abdominal pain, flatulence,
- DDP-4 Inhibitors
  - Saxagliptin (Onglyza), Sitagliptin (Januvia)
  - Side Effect: Hypoglycemia, allergic skin reactions



# Diabetes Medications



- Insulin

- Fast acting: Insulin asparte (Novolog), Insulin gluisine (Apidra), Insulin Lispro (Humalog)
- Intermediate acting: NPH Insulin (NovolinN), Regular Insulin (NovolinR)
- Long acting: Insulin glargine (Lantus®) Insulin detemir(Levemir®)

# Diabetes Medications



Injectables Medications that ↓ Glucagon secretion, gastric emptying and food intake, ↑ insulin secretion...

- Amylin Analogues:
  - Pramlintide (Symlin)
  - Side Effect: Nausea, Hypoglycemia, Nausea, Weight Loss
- Incretin mimetics: ↓ Glucagon secretion, gastric emptying and food intake, ↑ insulin secretion
  - Affects after meal glucose
  - Byetta, Victoza
  - Side Effects: Nausea, diarrhea, hypoglycemia, pancreatitis

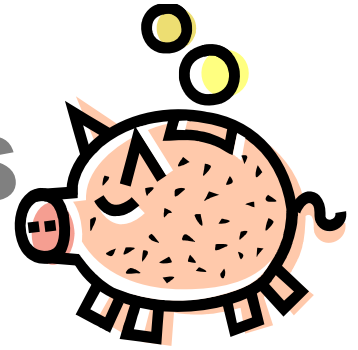
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HMM. HAVING TROUBLE  
PRONOUNCING THE NAMES  
OF YOUR GENERIC  
DRUGS, I SEE.





# Generic Medications

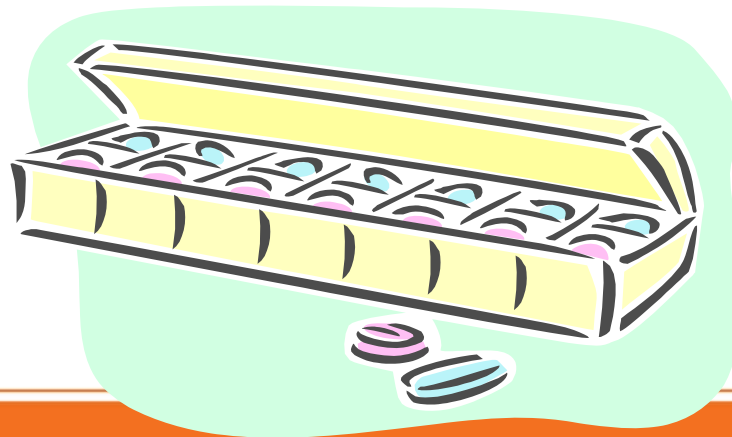


- Same as the brand-name drug in dosage, safety, strength, how it is taken, quality, performance and intended use
- FDA requires all drugs be safe and effective. Generics use the same active ingredients and are shown to work the same way in the body
- They have the same risks and benefits as their brand-name counterparts



# Quick Tips for Adherence

- Keep a medication calendar near your medication and make a note every time you take your dose
- Do not stop taking your medication without talking to your physician or provider
- Keep a list of your medications with you

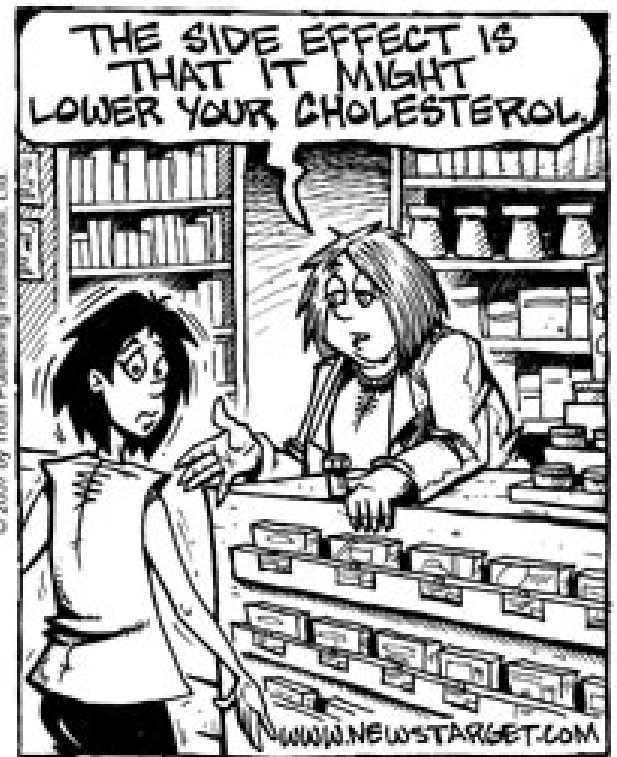
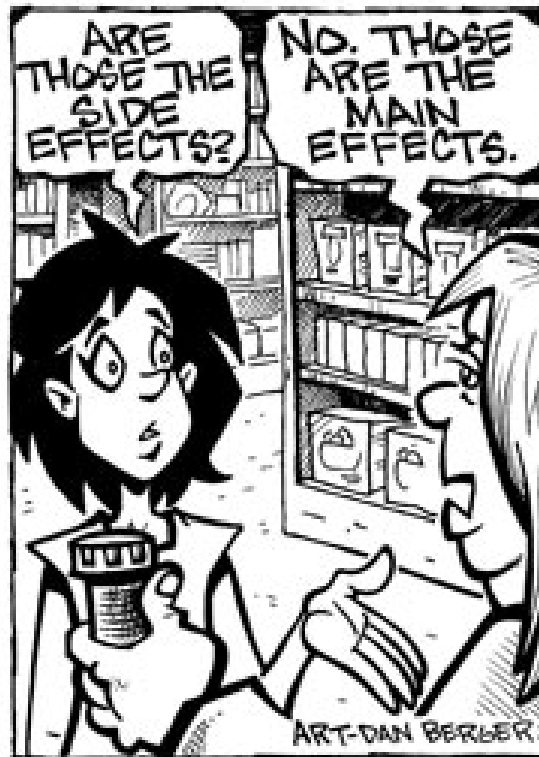


# Take Charge

- Know your numbers
- Know your goals
- Know the name of medications
- Know the possible side effects of your medications
- Know how to take your medication
- Know what to do if you miss a dose



# COUNTER THINK



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# QUESTIONS

