



## Lecture 4:

# Dietary Fiber



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# Fiber:

- Fiber is a non-starchy carbohydrate that the body is unable to digest.
- Being exclusively a plant nutrient, fiber cannot be chemically broken down by human digestive enzymes, though a small amount is fermented by the bacteria in the intestine.
- There are two types of fibers: **water – soluble** and **water – insoluble**.

# Dietary Fiber: Chemical Components

## a) Cellulose

- Glucans

## b) Chitins

- Chitosan (synthetic)

## c) Hemicellulose

- Beta-glucans
- Galactomannans
- Glucomannans
- Gums
- Mucilage
- Pectin
  - 1) Arabinogalactans
  - 2) Rhamnogalacturonans
- Xylans
- Xyloglucans

## d) Inulin

## e) Lignins

## f) Oligosaccharides

- Fructans
- Raffinose
- Stachyose

## g) Waxes

# Dietary Fiber: Differences

## Water - Soluble

- 1) Dissolves in water and form a gel.
- 2) Slows the rate of the passage of foods through the small intestine, increasing absorption of nutrients.
- 3) Can be easily fermented into gases in the colon.
- 4) Lowers LDL cholesterol.
- 5) Less effect on blood sugar.

## Water – Insoluble

- 1) Does not dissolve in water.
- 2) Accelerates the movement of foods via GI system by acting as bulking agents and laxatives.
- 3) Can be slightly fermented into gases in the colon.
- 4) Does not lower cholesterol.
- 5) More effect on blood sugar.

# Types of Dietary Fiber:

## Water - Soluble

Barley

Chia seeds

Flaxseeds

Fruits:

- Apple (skin)
- Avocado
- Bananas (ripe)
- Berries
- Pears (skin)
- Plums
- Prunes
- Quince (skin)

Legumes

Nuts, especially almonds

Oats

Psyllium

Rye

Vegetables:

- Artichoke
- Broccoli
- Carrots
- Onions
- Sweet potato

## Water – Insoluble

Corn bran

Flaxseeds

Fruits:

- Avocado
- Bananas (unripe)
- Grapes (skin)
- Kiwi (skin)

Legumes

Vegetables:

- Cauliflower
- Celery
- Green beans
- Potatoes (skin)
- Tomatoes (skin)
- Zucchini

Wheat

Whole grains

# Fiber Contents of Foods:

- The contents of fiber in grains, fruits and vegetables will be emailed to you in PDF forms.
- See our website.



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## **1 cup of legumes provides:**

- **40 grams of carbs**
- **16 grams of protein**
- **14 grams of fiber**
- **Glycemic index is 32**



**Psyllium is a water soluble fiber.**



**Flaxseeds contain both fibers, water soluble and water insoluble (4 gr per one tablespoon of flaxseed).**

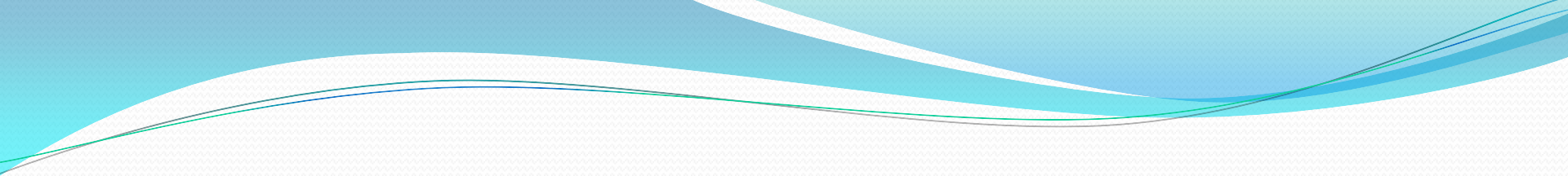


# How Much Fiber Do We Need?

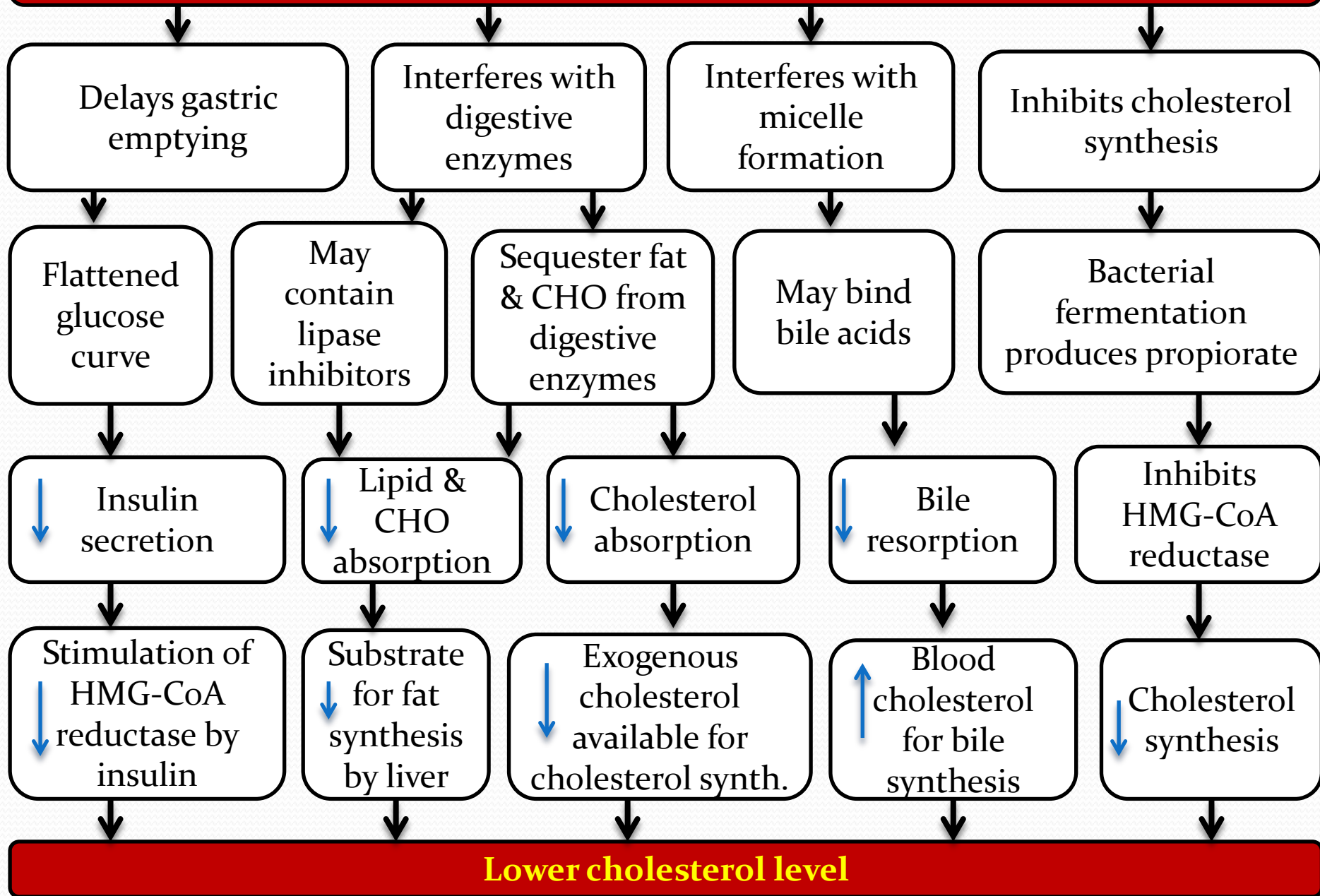
- Adults: **25 – 35 grams** of fiber per day or **25 grams of fiber per 2000 calories per day**, whichever is higher.
- The ratio of insoluble fiber to soluble fiber in daily diet should be **3 to 1**.
- Excessive intake of fiber may inhibit the absorption of the minerals **iron, calcium, and phosphorus**.

## **Benefits of Fiber:**

- **Helps soften the stool and encourages normal bowel function.**
- **Alleviates constipation.**
- **Promotes satiety by decreasing the release of hunger hormone, ghrelin.**
- **Lowers LDL cholesterol level.**
- **Lowers blood sugar level.**
- **May reduce the risk of developing diabetes type II.**

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- **Reduces the risk of developing colon cancer.**
  - **Improves cardiovascular health.**
  - **Promotes insulin sensitivity.**
  - **Has a protective effect against diverticulosis.**
  - **Is useful in weight management.**

# Dietary Fiber



# Homework:

- 1) Describe the benefits of fiber.
- 2) Describe three possible mechanisms by which fiber could lower LDL cholesterol level.





























































































