

# **Nutrition And Exercise for Health and Fitness**

# Energy Balance

ENERGY IN  ENERGY OUT

**OVERVIEW**

# Energy Balance

ENERGY IN  $\longleftrightarrow$  ENERGY OUT

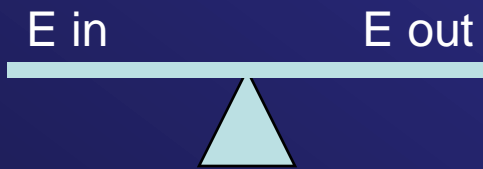


Energy in equals energy out resulting in maintenance of same weight

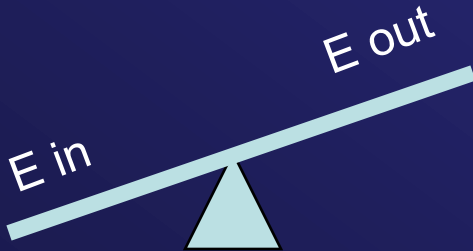
**OVERVIEW**

# Energy Balance

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Energy in equals energy out resulting in maintenance of same weight

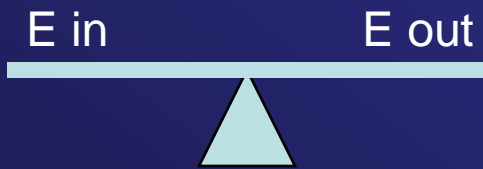


Energy in is less than energy out resulting in loss of weight

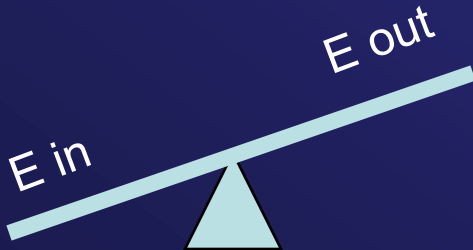
**OVERVIEW**

# Energy Balance

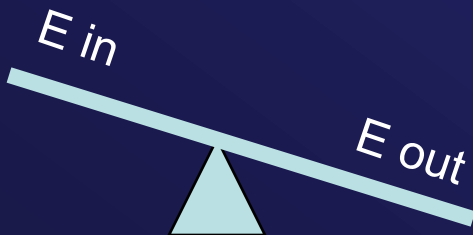
ENERGY IN  $\longleftrightarrow$  ENERGY OUT



Energy in equals energy out resulting in maintenance of same weight



Energy in is less than energy out resulting in loss of weight



Energy in is greater than energy out resulting in weight gain

**OVERVIEW**

# Energy Balance



**OVERVIEW**

# Energy Balance

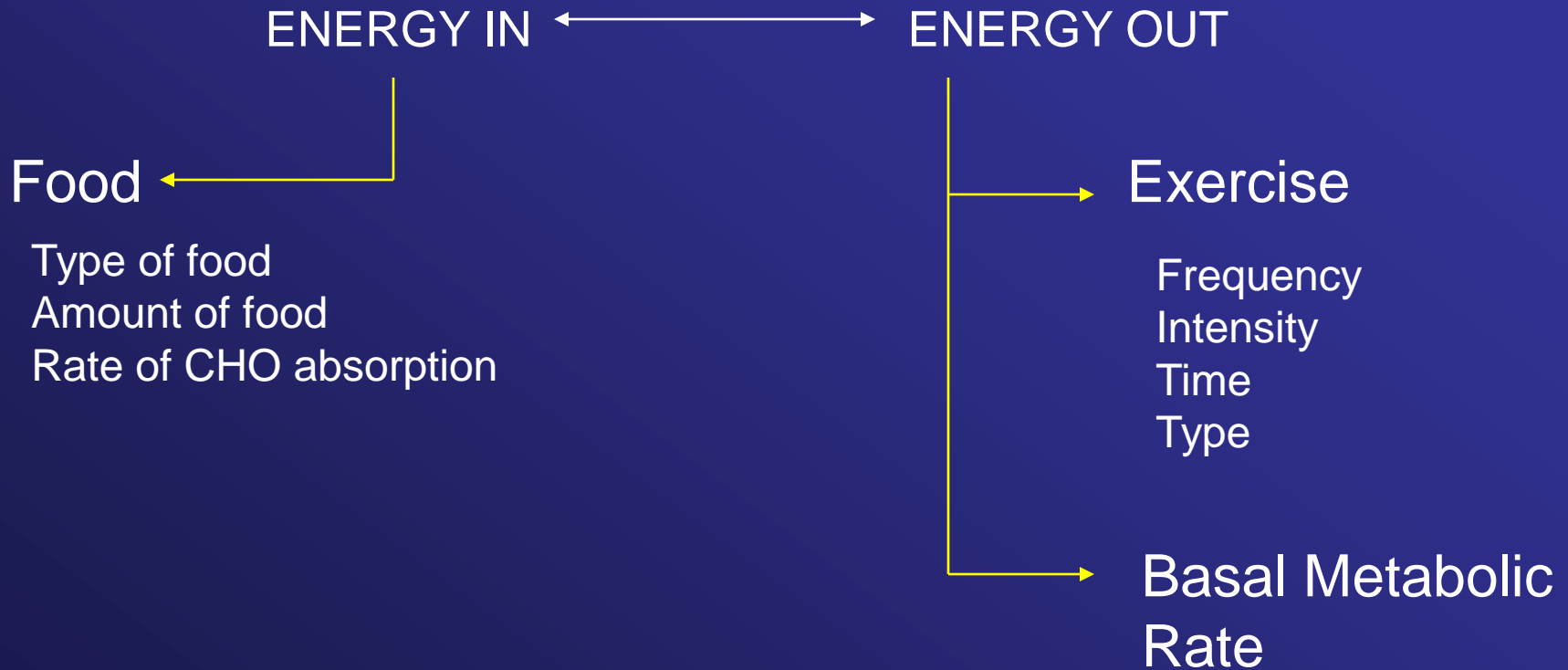
ENERGY IN  $\longleftrightarrow$  ENERGY OUT

Food  $\longleftarrow$

Type of food  
Amount of food  
Rate of CHO absorption

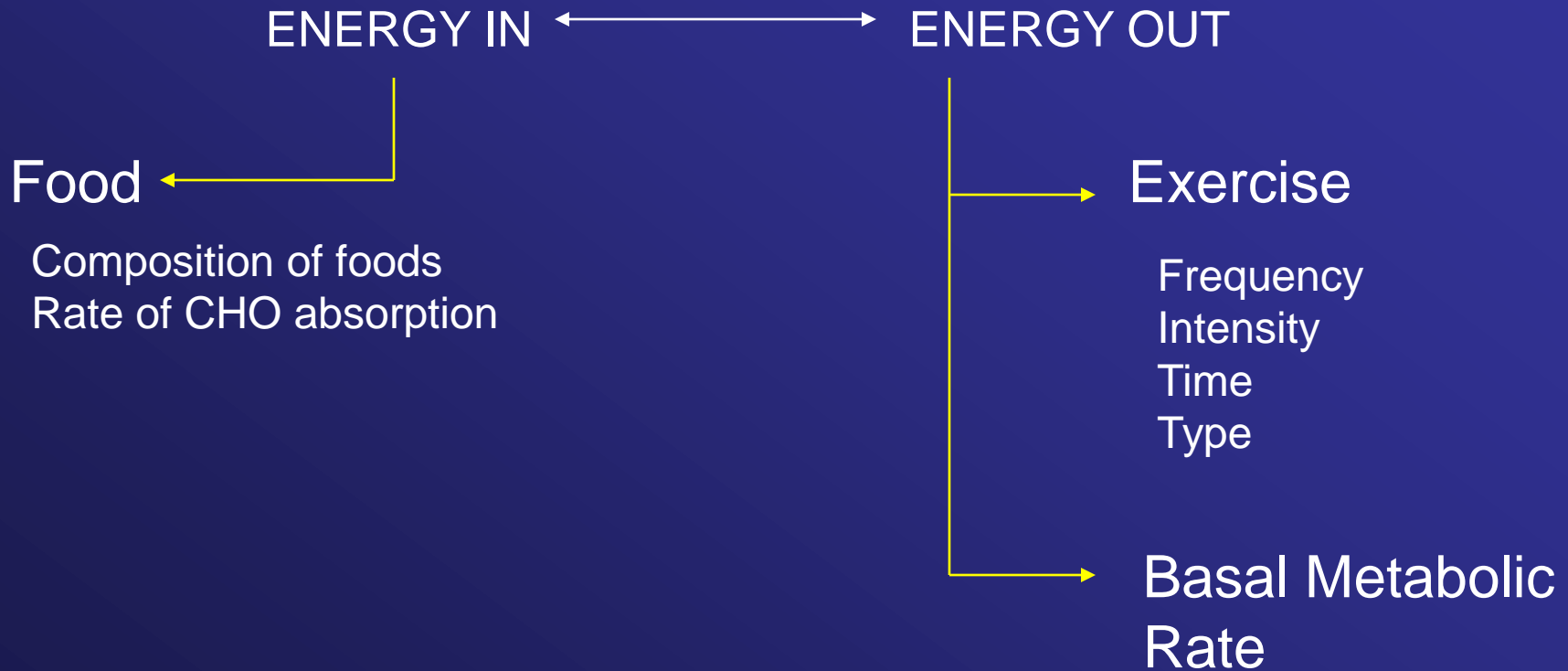
OVERVIEW

# Energy Balance



**OVERVIEW**

# Energy Balance



The following slides will provide information on each of these factors

**OVERVIEW**

# Recommended Energy Intake

| Age   | Males (kg) | Females (kg) |
|-------|------------|--------------|
| 10-12 | 2140       | 1920         |
| 13-15 | 2800       | 2250         |
| 16-18 | 2840       | 2050         |
| 19-29 | 2490       | 1860         |
| 30-49 | 2420       | 1810         |
| 50-64 | 2170       | 1620         |
| 65+   | 1890       | 1410         |

# Common Fast Food

Big Mac = 2050kJ



Average Male Aged 19-29= 2490KJ

# Common Fast Food

Big Mac = 2050kJ



Small Fries = 949kJ



Average Male Aged 19-29= 2490KJ

# Common Fast Food

Big Mac = 2050kJ



Small Fries = 949kJ



Small Coke = 451 kJ



Average Male Aged 19-29 = 2490KJ

# Common Fast Food

TOTAL BIG MAC MEAL = 3450kJ

AVE. ENERGY EXPENDATURE= 2490kJ

DIFFERENCE = 960kJ



Average Male Aged 19-29= 2490KJ

# Common Fast Food

TOTAL BIG MAC MEAL = 3450kJ

AVE. ENERGY EXPENDATURE= 2490kJ

DIFFERENCE = 960kJ



Average Male Aged 19-29= 2490KJ

# Football Specific

Energy Content of Beer

**NUTRITION**

# FOOD – Nutrients

- Nutrition is the study of nutrients and how the body uses them.
- Six nutrients in food:
  - carbohydrates
  - protein
  - fat
  - vitamins
  - minerals
  - water

# FOOD – Carbohydrates

- 55-60% of total caloric intake
- 4 calories per gram
- Carbohydrates are converted into glucose, provide energy, and are the main fuel source within the body.

# Carbohydrates

- Two types
  - Simple carbohydrates
    - Derived from fruits and sugars.
    - Low nutritional density (fast burning), found in honey, sodas, candy and cakes.
  - Complex carbohydrates
    - Derived from vegetable, grains, fruits, and beans.
    - High nutritional density (slow burning).



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# FOOD - Protein

- 15% of total caloric intake (4 cal/gm)
- Can be found in meat, eggs, fish, poultry, beans, peas, nuts, and dairy products.
- What does protein do?
  - Builds and repairs body tissues, and if not supplied in the diet, malnutrition will result.
  - Form enzymes, hormones and antibodies.
  - Plays a structural role in all body tissue

# FOOD - Fat

- 30% of total caloric intake
- 9 calories per gram
- Functions of fat:
  - Lines and insulates neurons (nerves) in the brain and body.
  - Carrier of certain vitamins (fat soluble vitamins).
  - Fat deposits protect and cushion the body.
  - Insulates the body against loss of heat

# Fat – Types of Fat

- Poly-unsaturated:
  - Fish, oils (corn, sunflower)
- Mono-unsaturated:
  - Oils (olive, peanut, canola), nuts
- Saturated:
  - Meats and dairy products, tropical oils (**coconut and palm oil**), solid at room temperature. Tends to raise blood cholesterol.
  - Should not account for more than 10% of total fat intake for the day.

# FOOD- Water

- Water is essential for life.
- The body is approximately 60% water.
- Muscle tissue is ~ 75% water.
- It is the major component of plasma and the major transportation mechanism in the body.
- Body temperature regulation (sweating)

# Water

- Water is essential for digestion and absorption of nutrients.
- The recommendation for adults is 2.5 liters or ten 8 oz cups per day.
- Any non-caffeine and calorie free fluid can count as water intake “water = water!”.

# Alcohol

- Alcohol is a source of calories (empty calories), but has no nutritional benefit, and is easily converted to fat in the body.
- According to the Department of Health and Human Services:
  - Men should not drink more than two drinks per day and women no more than one drink per day.
  - In some instances, the only guideline for safe drinking is not drinking at all.

# FOOD – Energy Content Review

## CALORIC CONTENT OF FOODS

- Carbohydrate - 4 calories per gram
- Protein – 4 calories per gram
- Fat – 9 calories/g
- Alcohol – 7 calories/g

# FOOD – Health Lifestyle

- For a healthy lifestyle:
  - Carbohydrates should make-up 55-60% of diet.
  - Protein 15% of diet.
  - Fat 30% or less.

# The Food Pyramid

**Fats, Oils & Sweets**  
**USE SPARINGLY**

**KEY**

- Fat (naturally occurring and added)
- ▼ Sugars (added)

These symbols show fats and added sugars in foods.

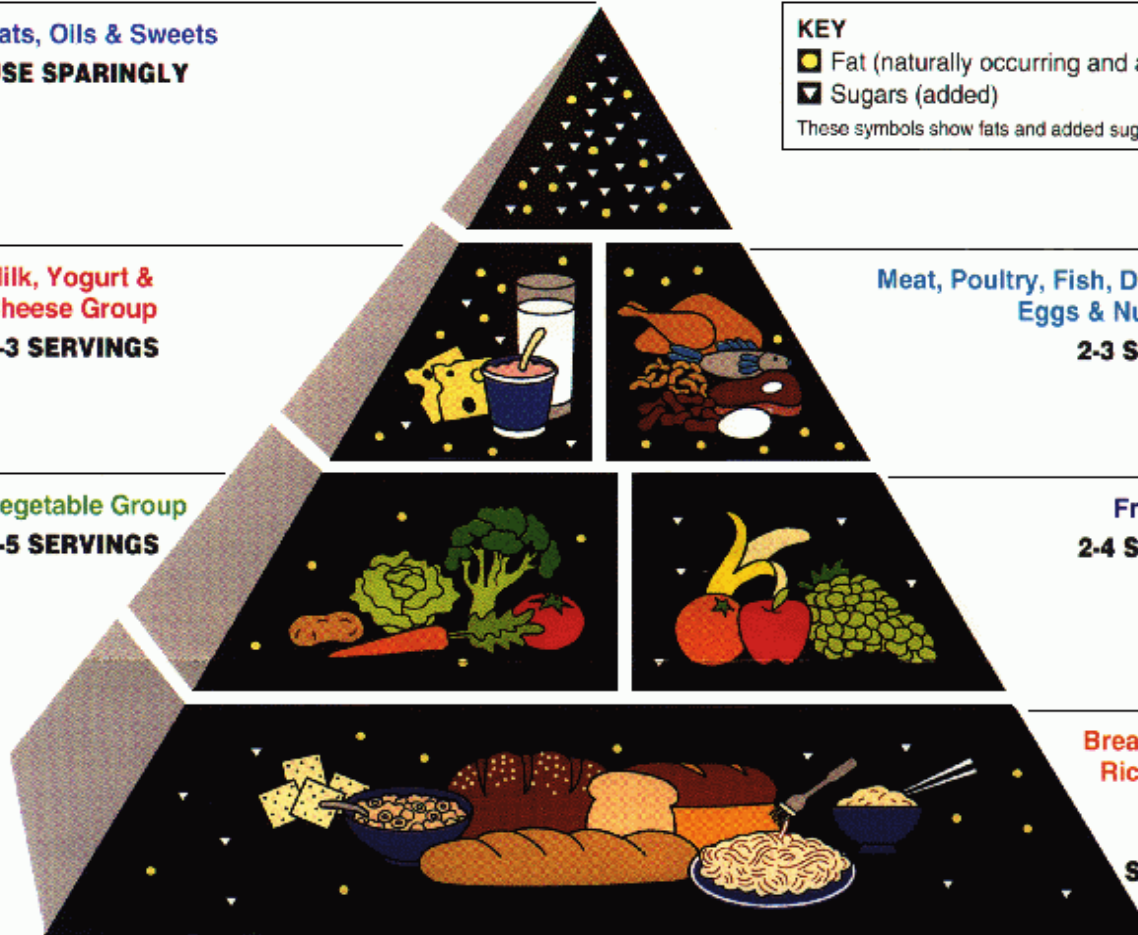
**Milk, Yogurt & Cheese Group**  
**2-3 SERVINGS**

**Meat, Poultry, Fish, Dry Beans, Eggs & Nuts Group**  
**2-3 SERVINGS**

**Vegetable Group**  
**3-5 SERVINGS**

**Fruit Group**  
**2-4 SERVINGS**

**Bread, Cereal, Rice & Pasta Group**  
**6-11 SERVINGS**



# Basal Metabolic Rate

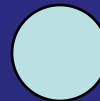
- Is the amount of energy required to maintain life
- Accounts for the majority (70%) of the total daily calories expended
- Two main contributors
  - Age (metabolic rate decreased with age)
  - Lean Body Mass (increases with LBM)
- Exercise increases LBM

# **FOOD – Rate of Carbohydrate Absorption**

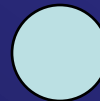
- Different foods take different amount of time to be broken down and enter the bloodstream
- The rate at which this occurs is known as Glycaemic Index

# Rate of CHO Absorption

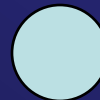
FOOD



Blood Glucose



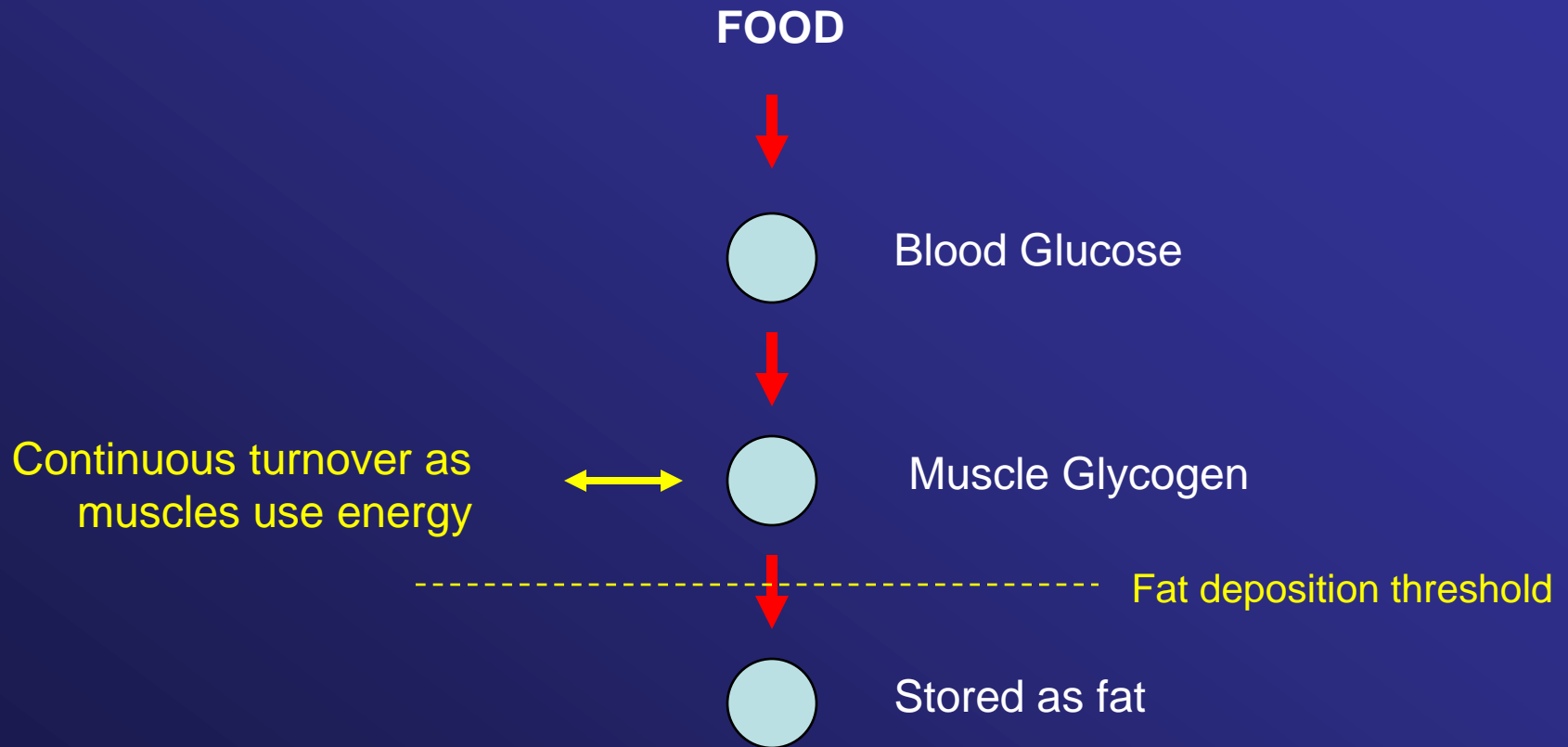
Muscle Glycogen



Stored as fat

**NUTRITION**

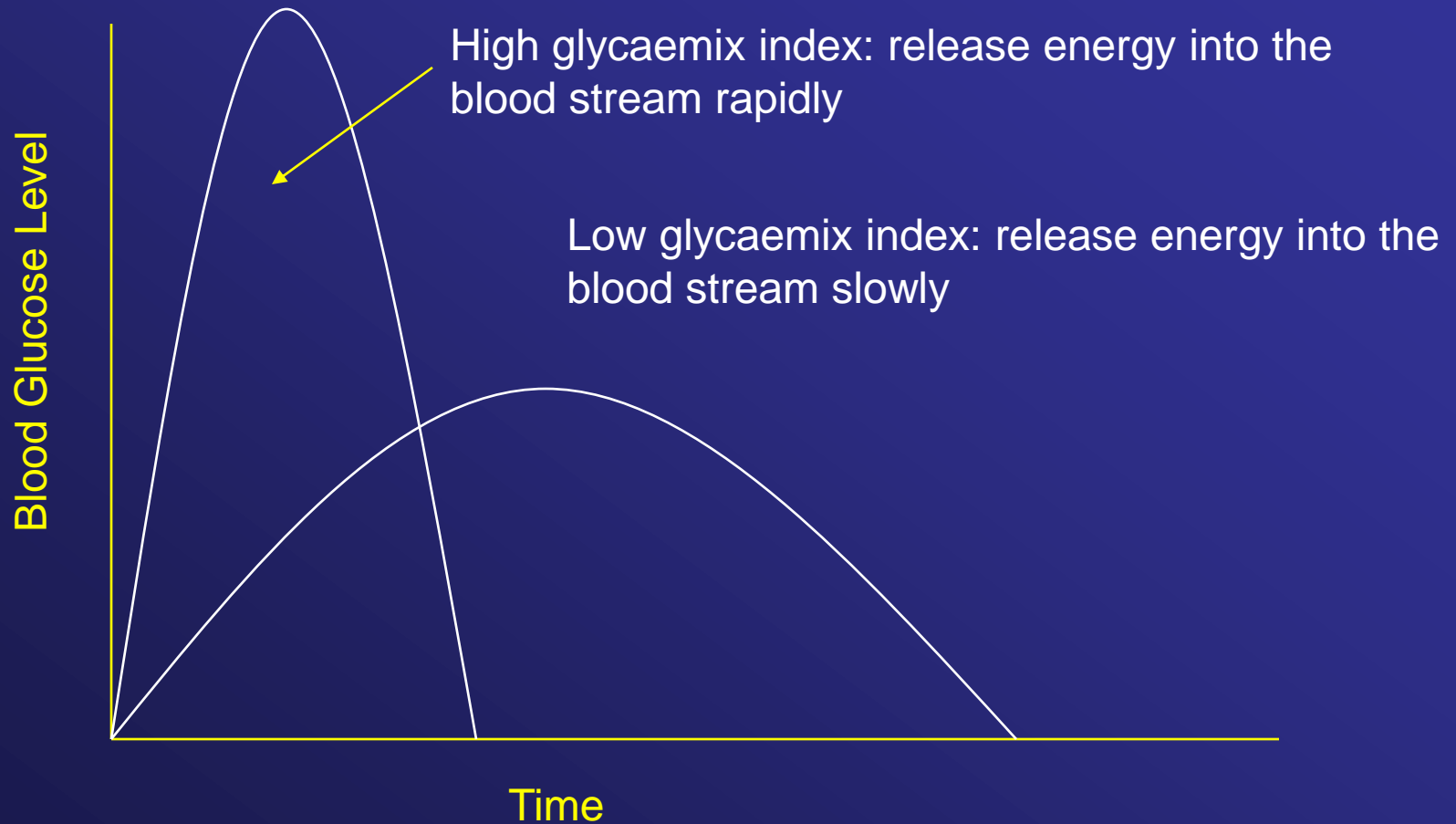
# Rate of CHO Absorption



# Glycaemic Index

- Rate of carbohydrate absorption
- High glycaemic index – rapidly absorbed
- Low glycaemic index – slowly absorbed

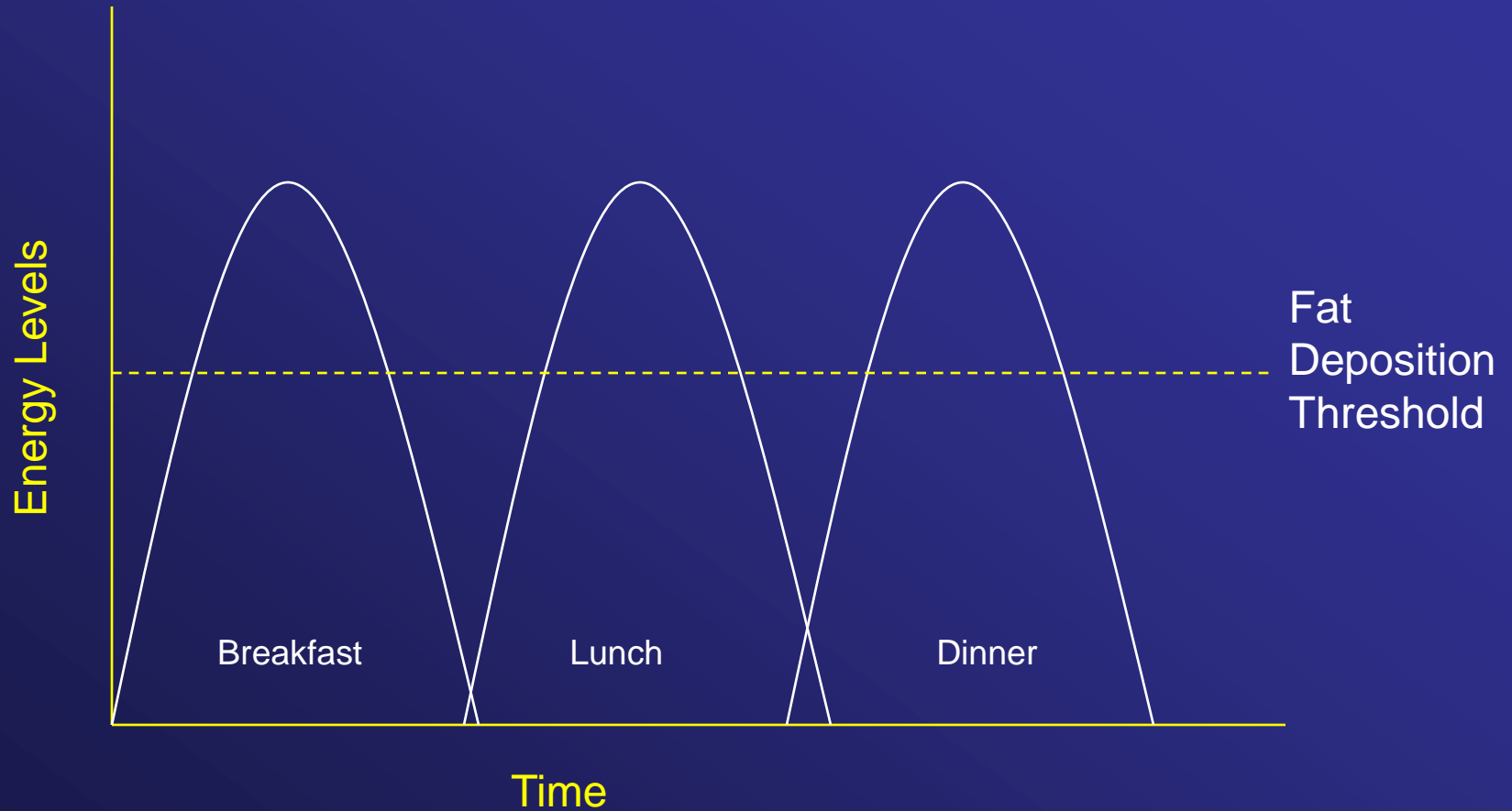
# High and Low Glycaemic Index



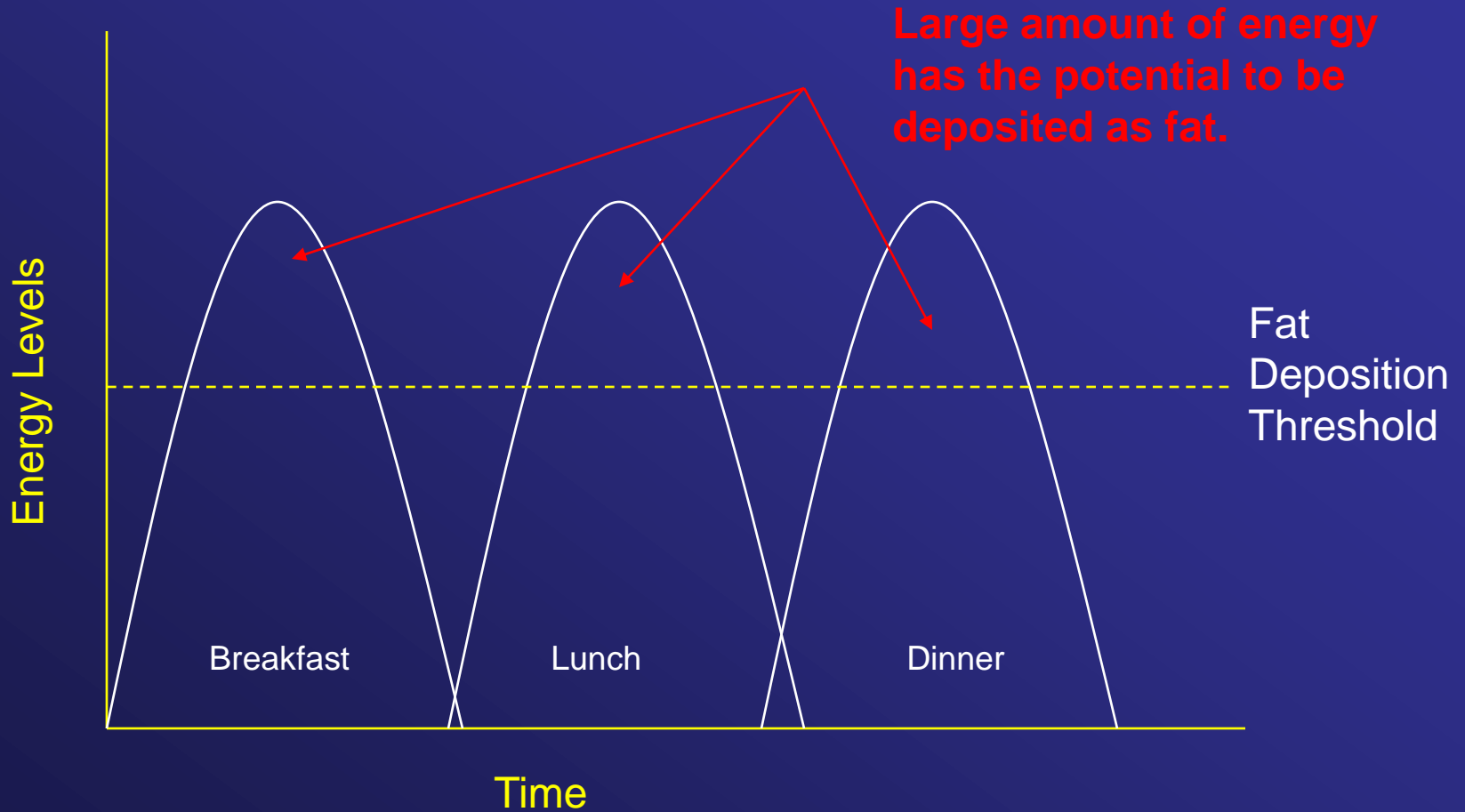
# 3 Meals Across the Day



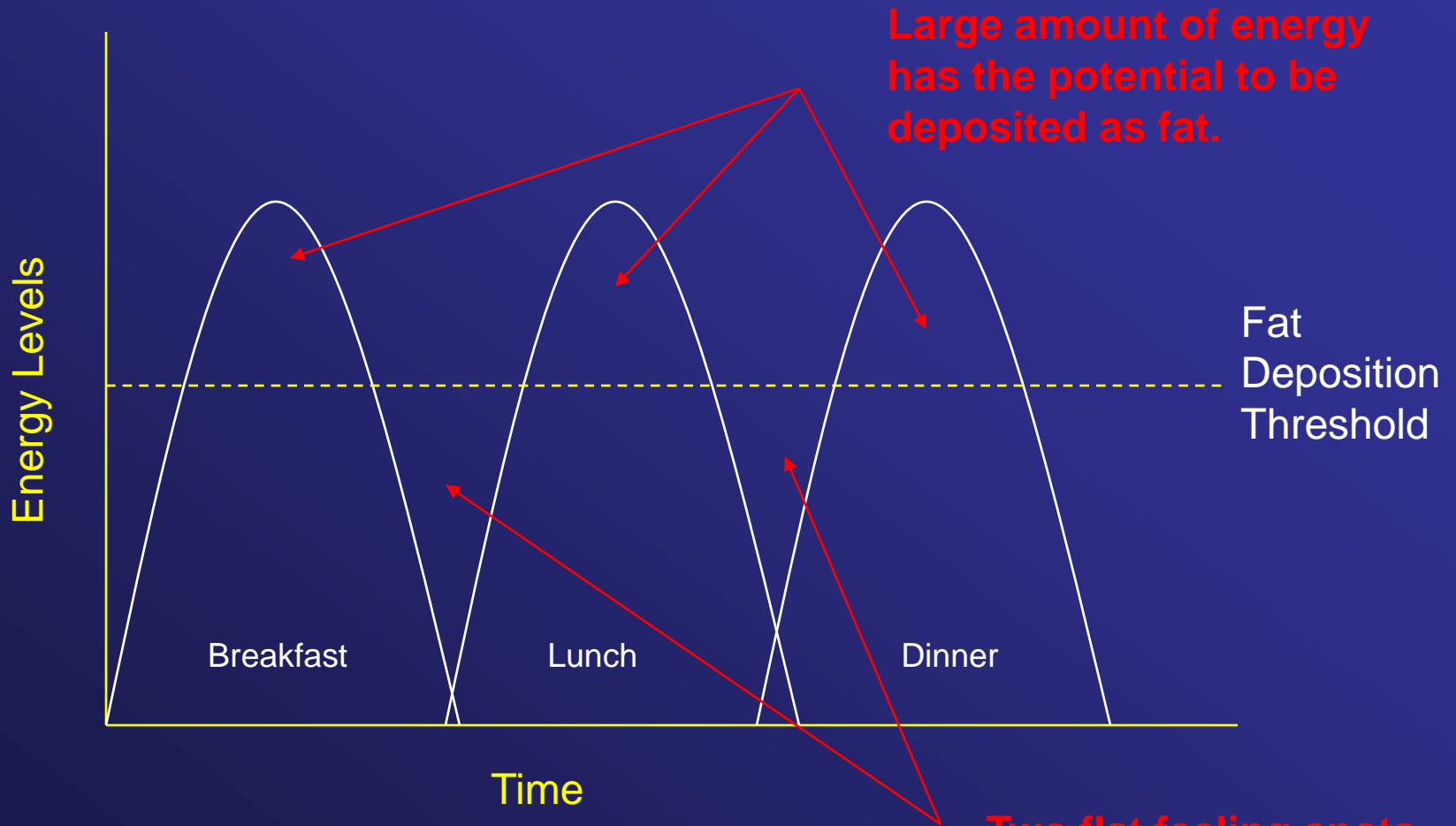
# 3 Meals Across the Day



# 3 Meals Across the Day

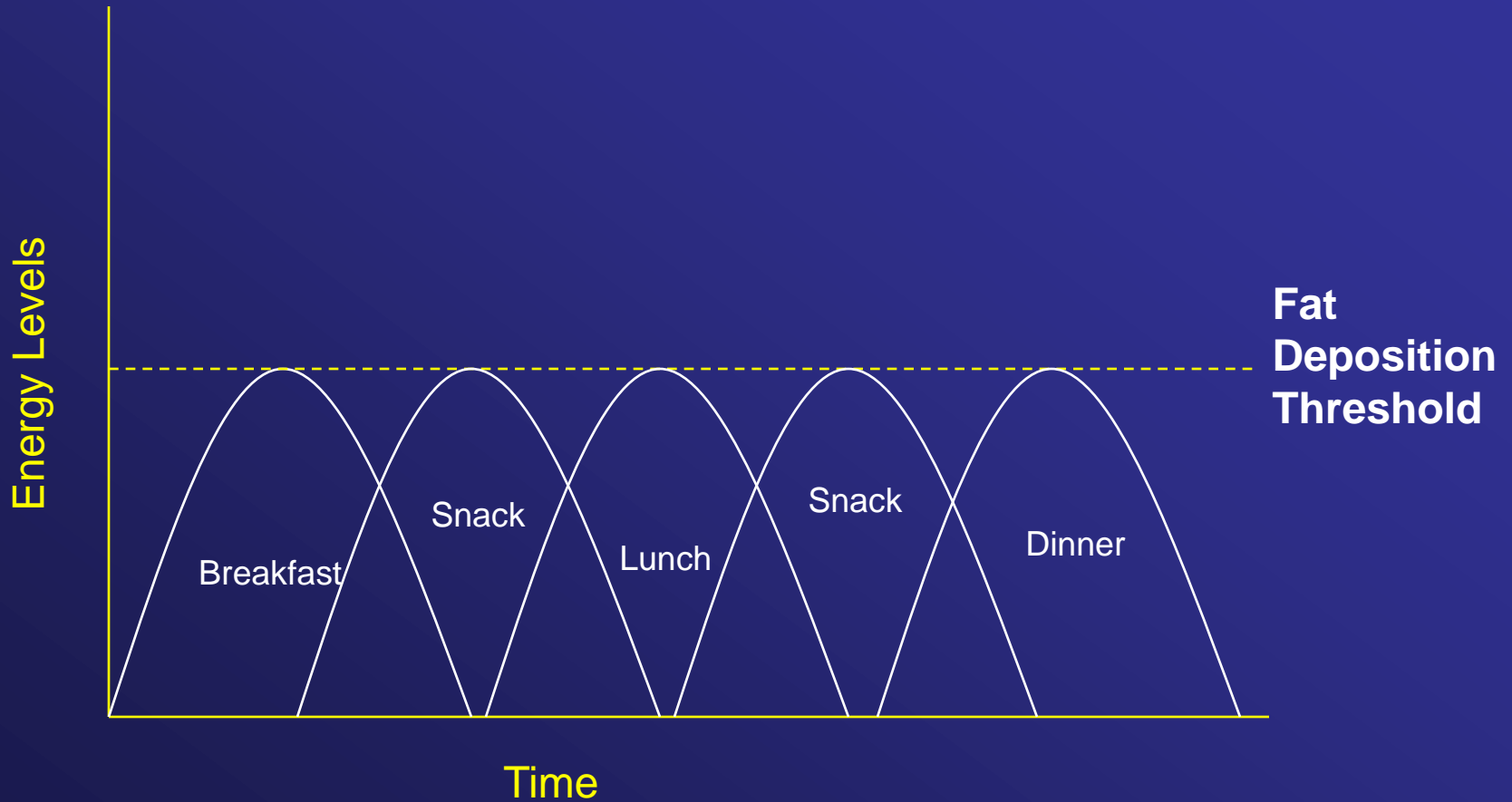


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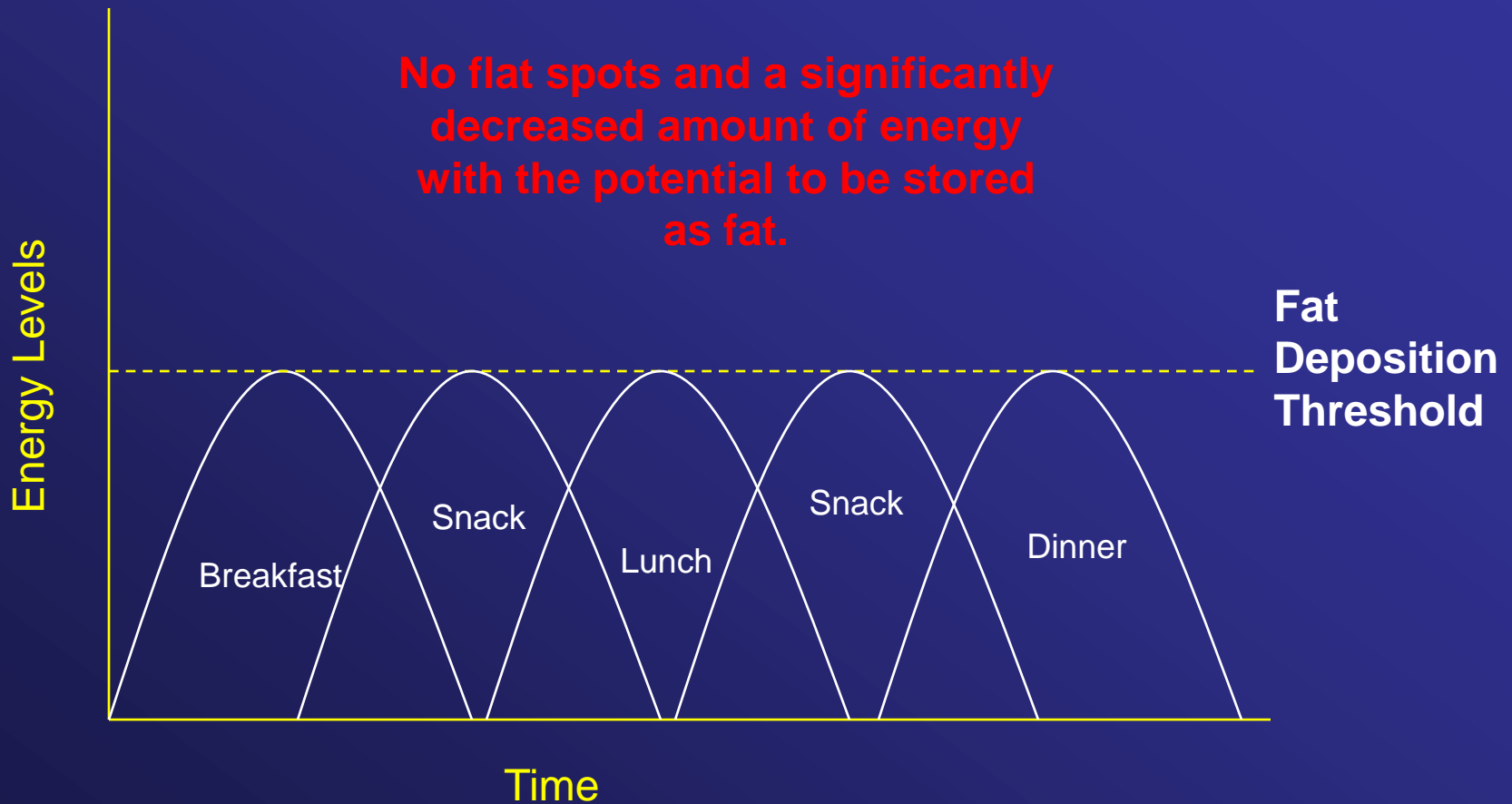


**NUTRITION**

# 3 Meals Across the Day



# 3 Meals Across the Day



**EXERCISE**

# FITT Principal

- FITT Principles of Exercise
  - Frequency
  - Intensity
  - Type (mode)
  - Time (duration)
- Training Effect of Exercise

# Frequency

Minimum of three times a week

Threshold at 5 times per week – little benefit following this point

**EXERCISE**

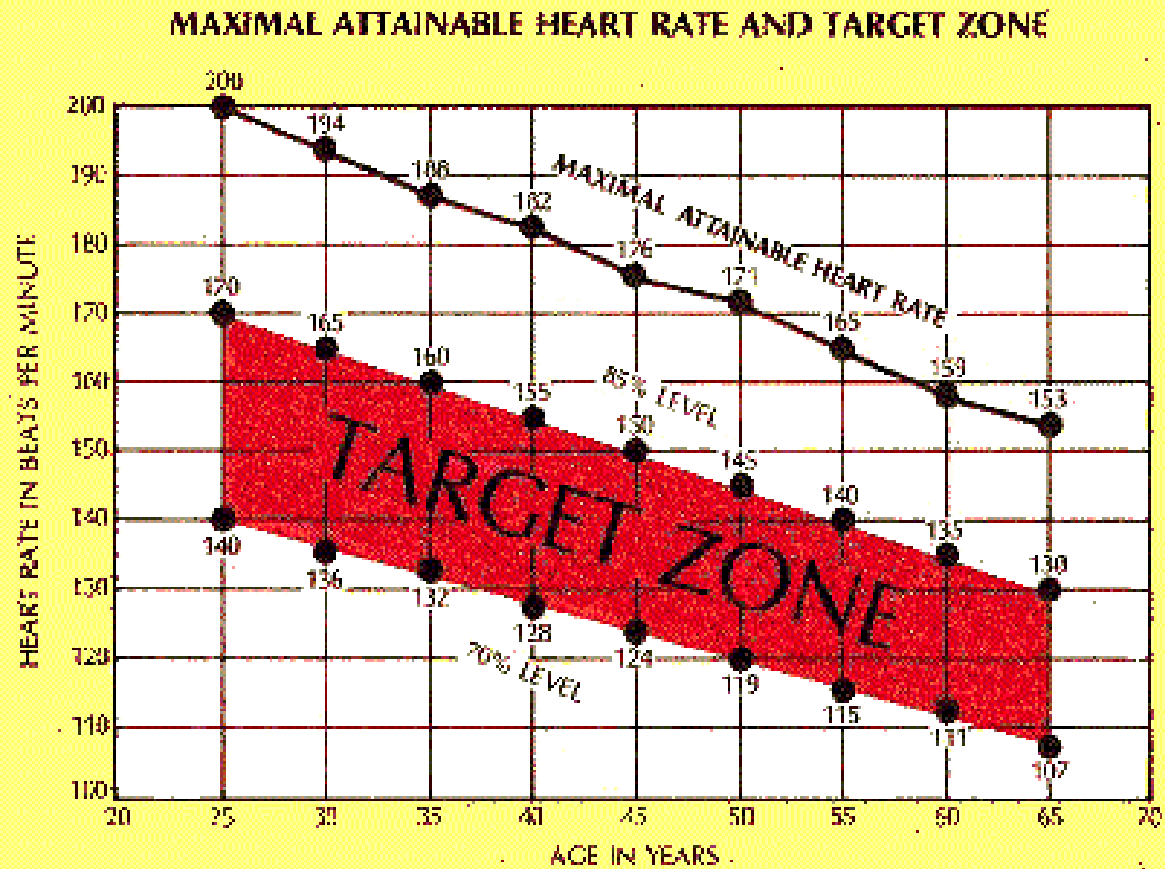
# Intensity

- How hard you are exercising
- Relative to maximum heart rate
- Maximum HR =  $220 - \text{Age}$
- An example for a 40 year old person would be as follows:
  - $220 - 40 = 180$  beats per minute (Maximum Heart Rate)
- Train at 70-85 Percent of max heart rate

# What can Physical Activity Do For You?

- Gives you more energy
- Improves your mood
- Reduces body fat and firms muscles
- Lowers body weight
- Reduces stress, anxiety and depression
- Lowers risk of heart disease, diabetes, high blood pressure

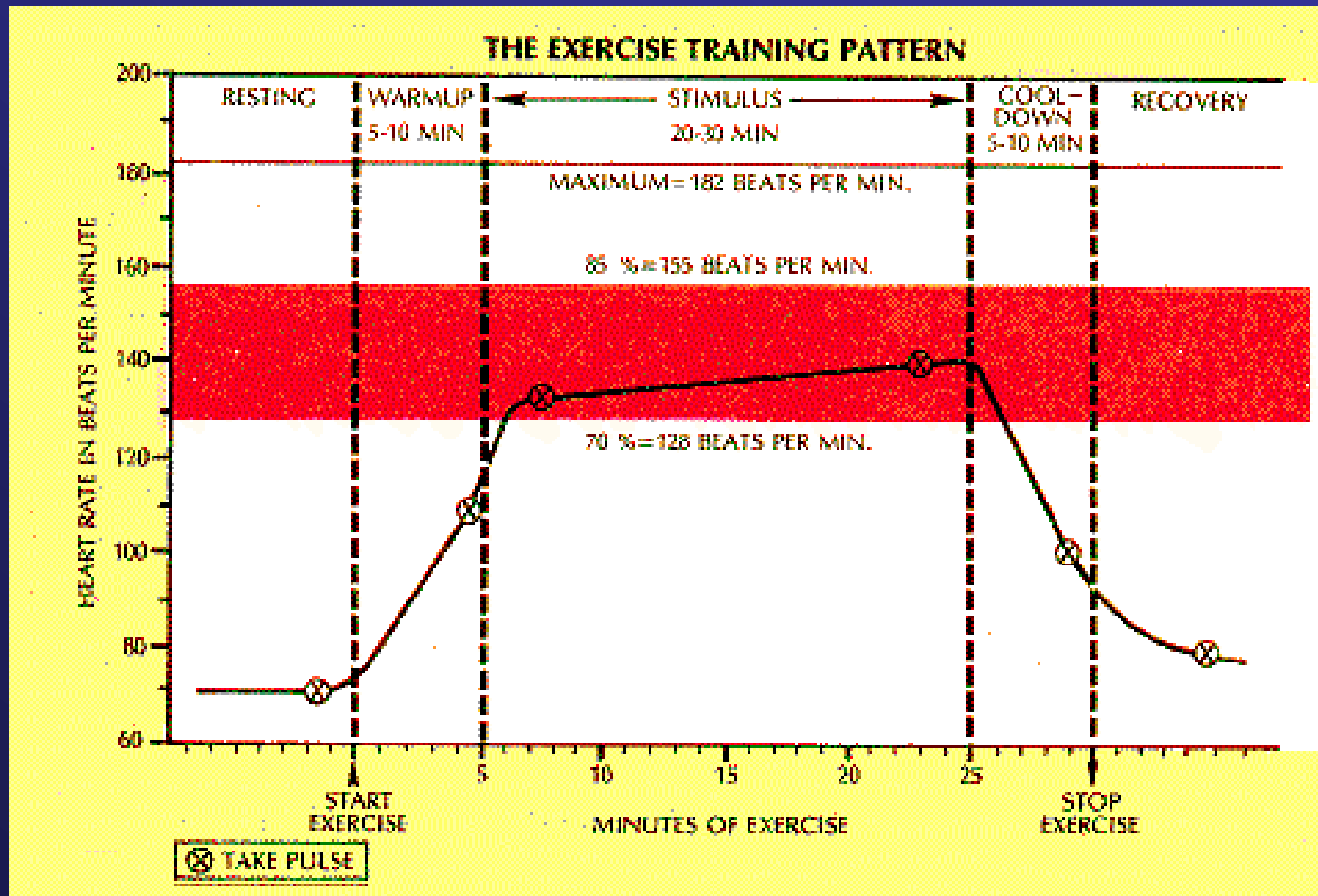
# Target Heart Rate



# Time

- Half an hour accumulative Across the day
- Means a person can complete 15 minutes at the beginning of the day and another 15 minutes later in the day.
- Exercising over 60 minutes has no additional benefits compared to shorter periods.

# Time



**EXERCISE**

# Questions

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**SUMMARY**