SPORTS NUTRITION

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FOUNDER FREEDOM WELLNESS MANAGEMENT

Precision, Skill ,Timings

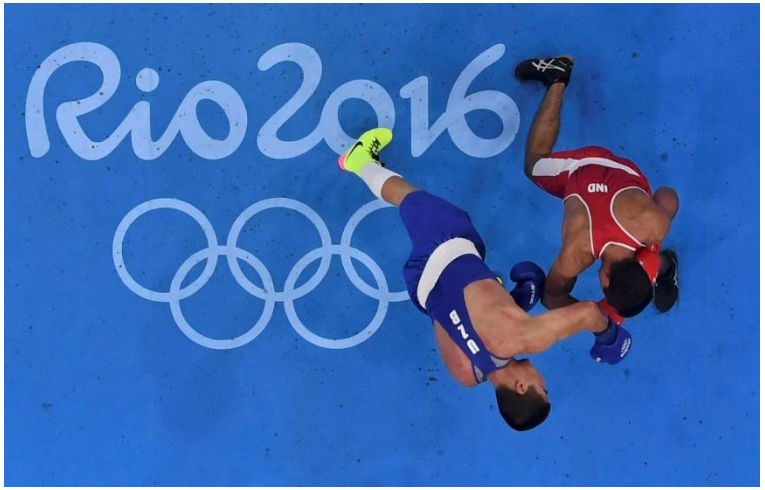
INDIAN MEN'S HOCKEY TEAM AT RIO OLYMPIC

LALITA BABAR COMPETING AT RIO OLYMPICS

Agility,Strenght and accumen

VIKAS KRISHAN OF INDIA AND BEKTEMIR MELIKUZIEV OF UZBEKISTAN COMPETE IN RIO OLYMPICS BOXING QUARTERFINALS

INDIA'S DIPA KARMAKAR COMPETES IN THE ARTISTIC GYMNASTICS QUALIFIERS DURING THE RIO 2016 OLYMPIC GAMES



What Influences Athletic Ability?

What Influences Athletic Ability?

Genetic Endowment

Optimal Training

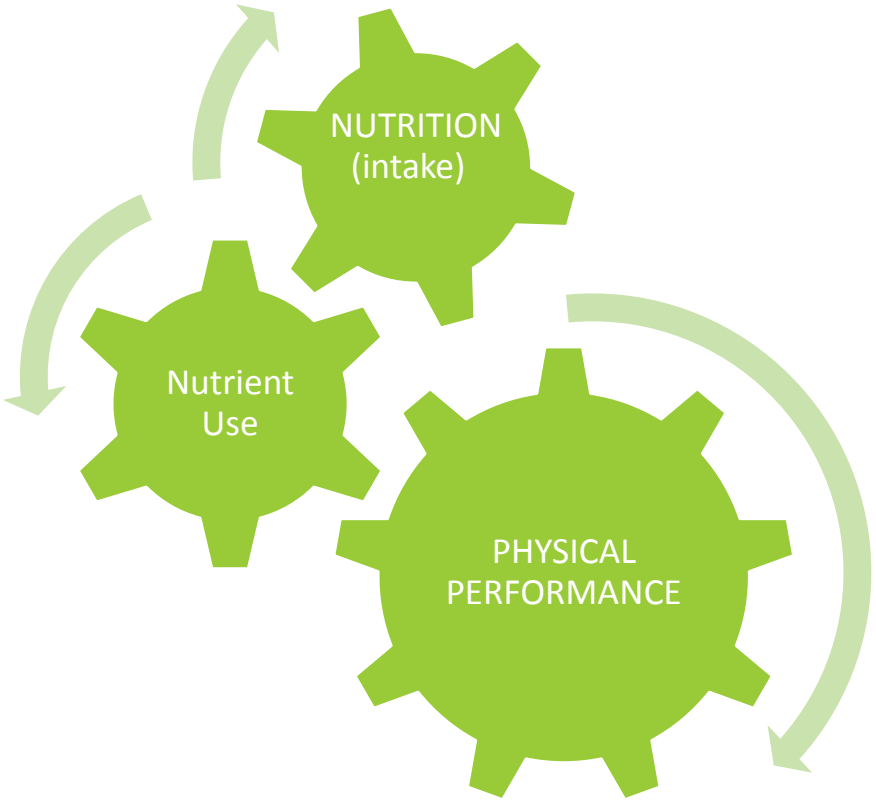
Good Nutrition

No “secret” ingredient!

A dream to a fit India

Cardiorespiratory fitness

Nutrition and Physical Activity



COMPONENTS OF FITNESS

HEALTH RELATED	SKILL RELATED
Cardiovascular fitness	Speed
Body composition	Agility
Muscular strength	Balance
Muscular endurance	Coordination
flexibility	Power
	Reaction time

INVASION GAMES		STRIKING & FIELDING GAMES	NET & COURT GAMES	TARGET GAMES	MOVEMENT EXPLORATION
› Hockey › Soccer › Australian rules football › Rugby league › Rugby union	› Basketball › Netball › Touch football › Water polo	› Cricket › Softball › Baseball	› Badminton › Squash › Tennis › Table tennis › Volleyball	› Golf › Lawn bowls › Tenpin bowling	› Gymnastics

Consequences of Poor Nutrition

- Weight loss
- Strength loss
- Lethargy
- Chronic Fatigue
- Soreness, joint pain
- Micronutrient Deficit
- Respiratory Infections

Brief History of Sports Nutrition

Documentation of "special" foods and nutrition strategies dating WAY back….

- Greek Olympians in 300BC used specific mushrooms to enhance performance
- In 1800's Dutch swimmers used caffeine before races, Belgian swimmers dipped sugar cubes in ether before racing.

Variation in Nutrition Requirements

- Type of exercise
- Intensity of exercise
- Duration of exercise
- Weight/body composition challenges
- Age/sex
- Training/competition schedule
- Goals?
- Travel and time zone changes

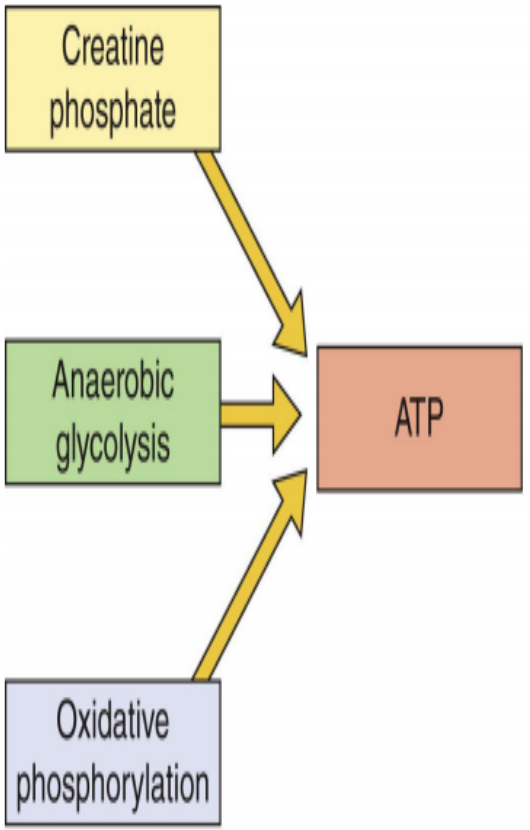
Nutrients that give us energy

Carbohydrates
Fats
Proteins

Digestion → → →

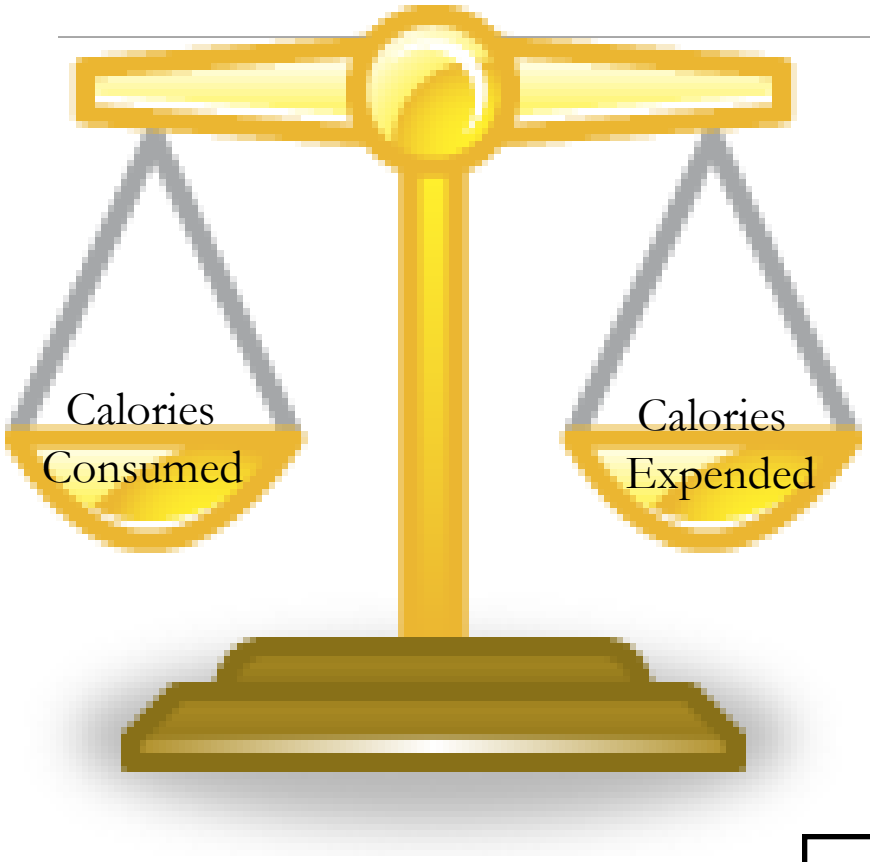
Glucose
Free Fatty acids
Amino Acids

Three Major Energy Systems



ATP = adenosine triphosphate

Calorie Needs for Athletes



Calories expended =
RMR + TEF + PA

Rule of Thumb:
Walk or run 1 mile = 100 kcals burned

Anaerobic Glycolysis

- Limited oxygen—Intense physical activity (running)
- Pyruvate is converted to lactate
- Produces 2 ATP per glucose
  - ~5% of energy potential
- Replenishes ATP quickly
- Cannot sustain ATP production
  - 30 seconds to 2 minutes of work
- Lactate build-up (soreness)
  - Changes acidity that inhibits glycolysis enzymes

Aerobic Glycolysis

Plenty of oxygen available (talk test)

Low to moderate intensity (jogging)

Produces 36-38 ATP per glucose

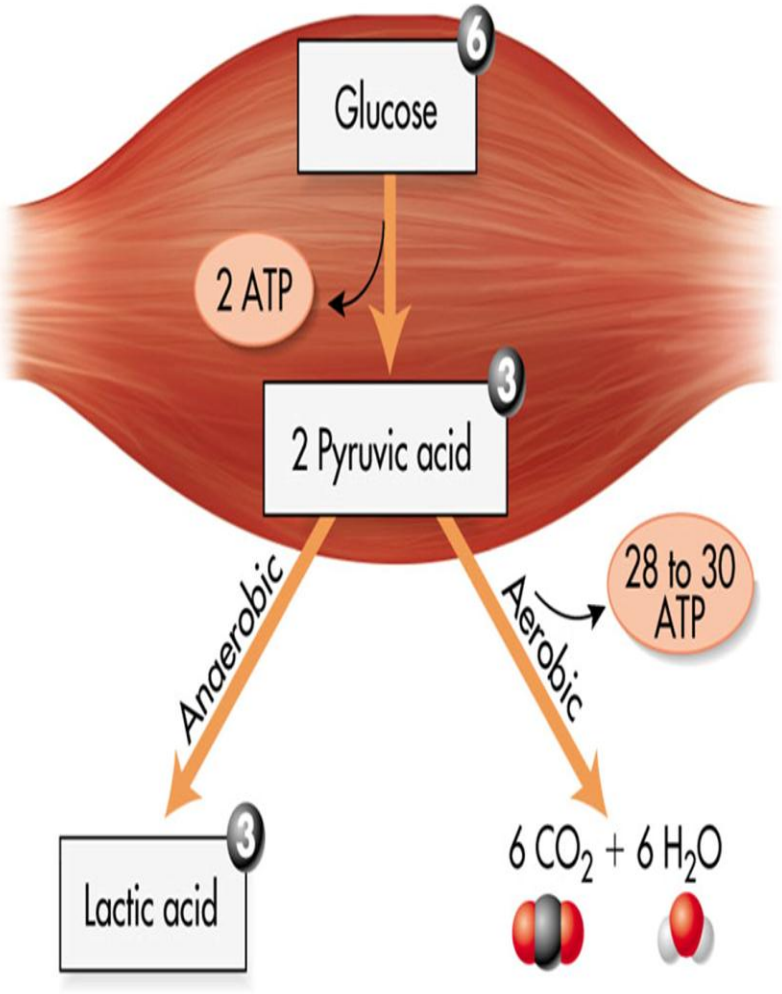
95% of energy potential

ATP replenished slowly

Sustained ATP production

2 minutes to 3 hours of work

Best for burning fat



Glycogen

Temporary storage of glucose in liver and muscle

Muscle glycogen

Used only by that muscle

Liver glycogen released into bloodstream

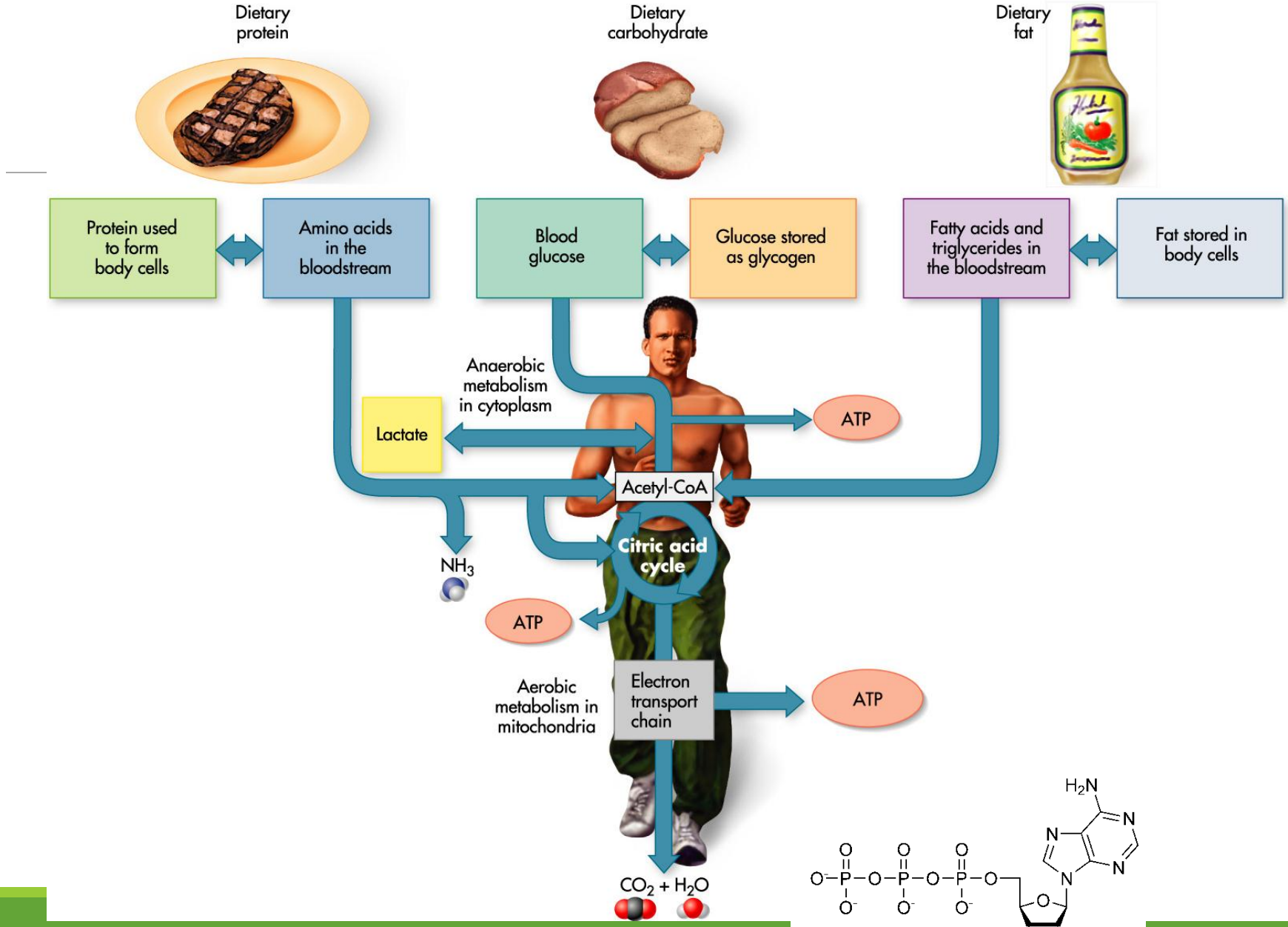
During low to moderate intensity

Can sustain work for up to 2 hours

"Bonking"

Depleted glycogen	Work at ~50% of maximal capacity

ATP Formation



The Effect of Diet on Physical Endurance

Calorie Needs

Individual needs vary

Monitoring weight and body fat

- If weight falls, increase intake
- If body fat increases, cut back in fat (& kcal) and maintain activity

Desirable body fat for male athletes: 5%- 18%

Desirable body fat for female athletes: 17%-28%

Physical Activity Factor Varies Widely Energy Needs-**15-30 kcal/#**

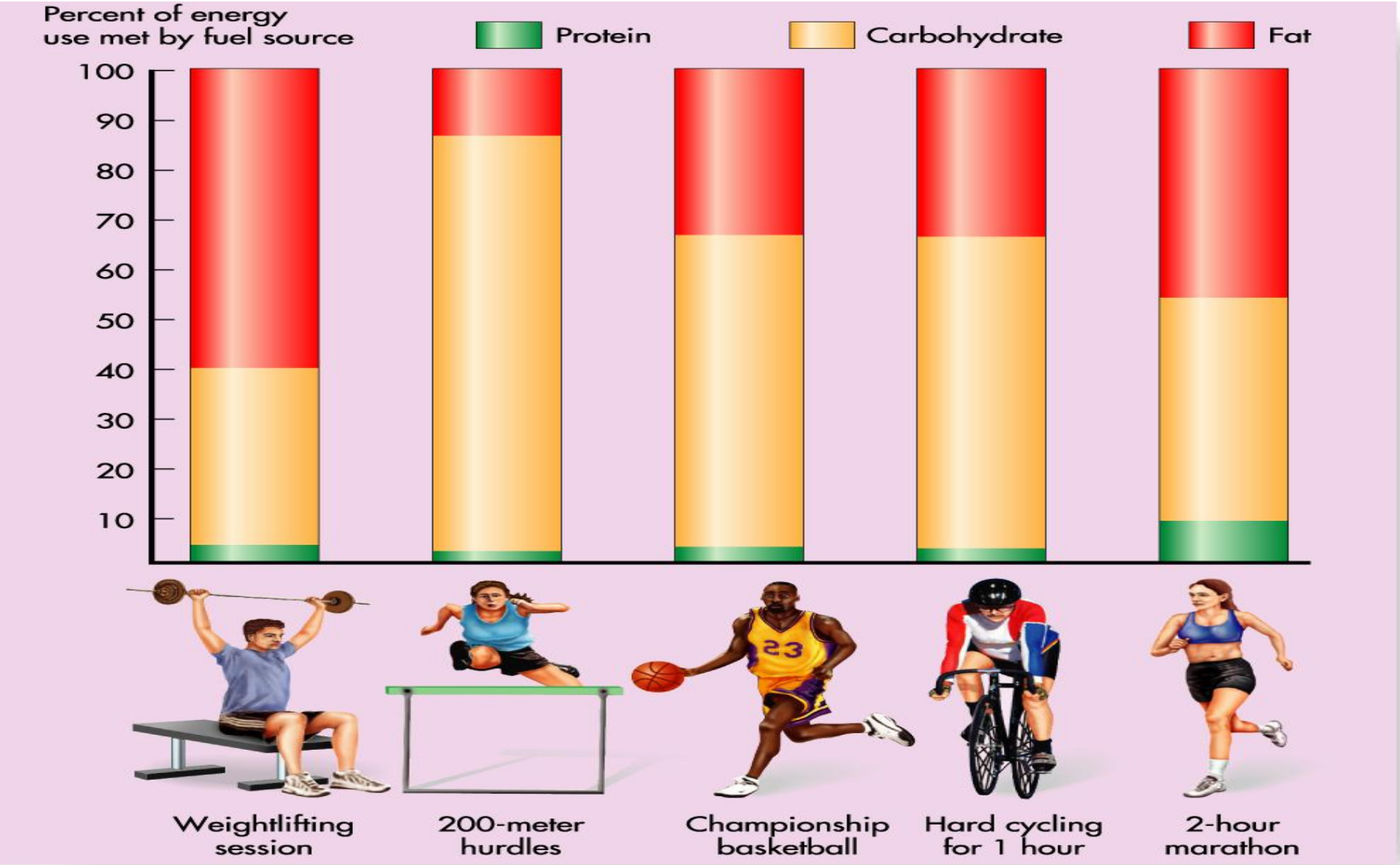
Female Olympic Gymnasts

- 1900 kcal/day

Energy Needs

Calories/#	120#	160#	240#
LOW - sedentary	1560- 1800	2080-2400	3120-3600
ACTVE (30-60min)	1920-2160	2560-1880	3840-4320
MODERATE (1-1.5hr)	2280-2520	3040-3360	4560-5040
HIGH (1.5-2hr)	2640-2880	3520-3840	5280-5760
VERY HIGH (2-3hr)	3000-3600	4000-4800	6000-7200

Fuel Use During Physical Activity



Carbohydrate *THE CHALLENGE?*

Maintain CHO supply to muscles and slow it's depletion by using fat as fuel

Messi – and CARBS

Male soccer player

Training 2-3 hours/day

75kg

9gm CHO/kg =

675 gm CHO

Carbohydrate Needs

Main fuel for many types of activity

Consume ~60% of total kcal from carbohydrate

≥ 5 gm of carbohydrate/kg body weight

Aerobic and endurance athletes

- 7-10 gm carbohydrates/kg body weight
- ~ 500-600 gm of carbohydrates/day

Carbohydrate (CHO) Loading

Events lasting longer than 60-90 minutes → Maximize glycogen stores → Tapering of exercise while increasing carbohydrate intake → Additional water weight

Days Before Com-petition	6	5	4	3	2	1
Time of exercise	60	40	40	20	20	rest
CHO (grams)	450	450	450	600	600	600

Protein-Role in Exercise?

Muscle growth and repair

Supplies 10% of fuel when glycogen stores are low

Supplies 5% of fuel when glycogen stores are high

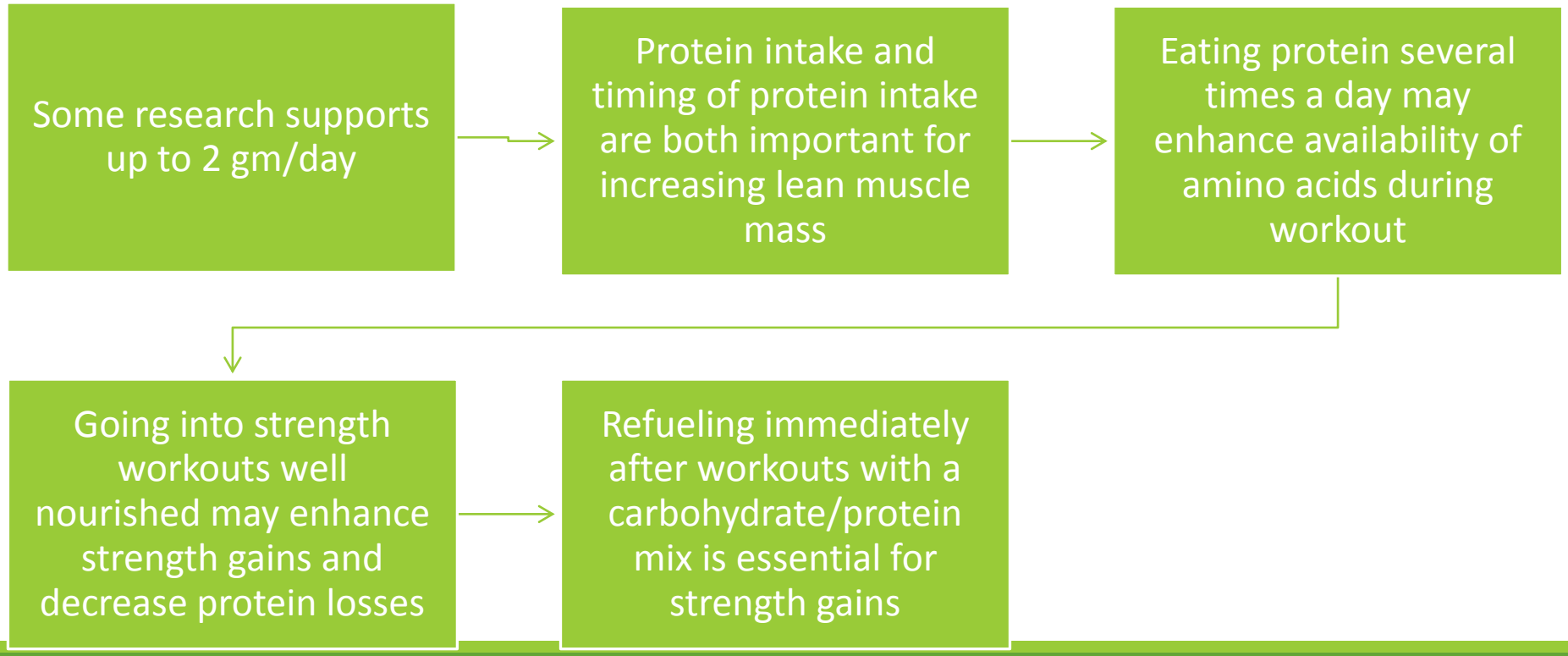
Aids in repair/recovery following muscle damage

Individuals with Higher Protein Needs

New training program	
Energy Restriction	Diet or extreme expenditure
Vegetarians	
Disease	
Injury rehab	
Young or old athletes	

Protein for Tissue and Muscle Building and Repair

Protein Needs: 1.2 to 1.7 g/kg (0.5 – 0.8g/#)



Vegetarian Athletes

Vegetarian athletes (like others) must learn to complement proteins

Vitamin B12, calcium, iron, and zinc

Eating enough calories can be difficult

- Vegetarian diets are in bulk & in calories

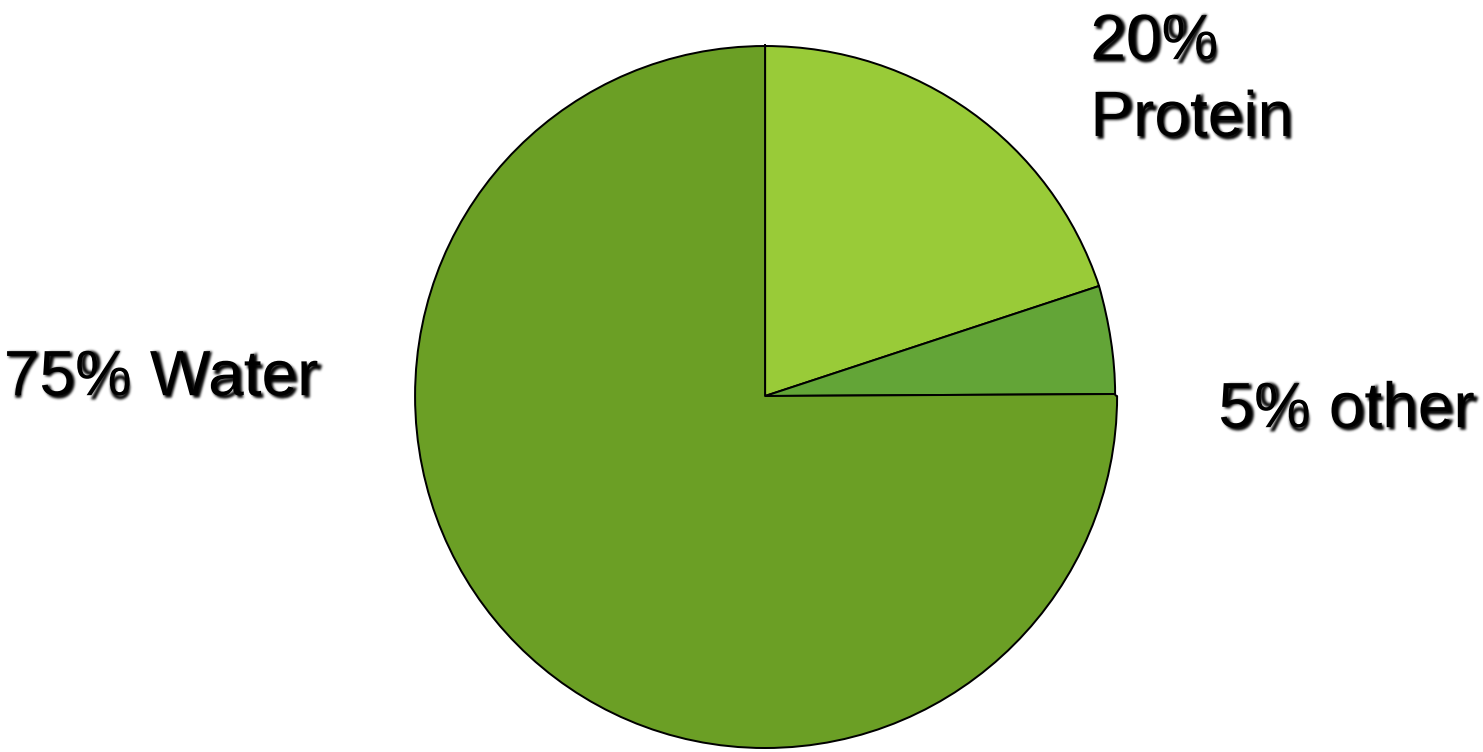
Current Protein Recommendations

Activity Group	grams/kilograms	Amount for a 70-kilogram (154 lb) Person (grams)
Sedentary	0.8	56
Strength trained, maintenance	1.0–1.2	70–84
Strength trained, gain muscle mass	1.5–1.7	105–119
Moderate intensity endurance activities	1.2	84
High-intensity endurance training	1.6	112

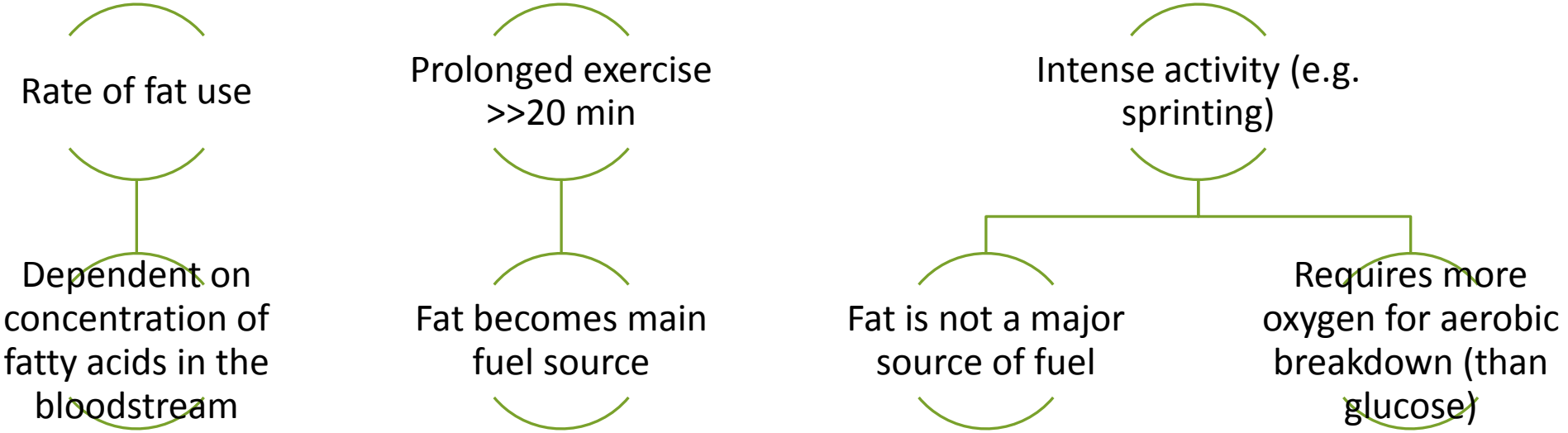
*Calculate kilograms by dividing pounds by 2.2.

Source: Burke L, Deakin V: Clinical Sports Nutrition, McGraw-Hill, Roseville NSW2069, Australia, 2000.

Components of Muscle



Fat Fuel


Rate of fat use
Dependent on concentration of fatty acids in the bloodstream
Prolonged exercise >>20 min
Fat becomes main fuel source
Intense activity (e.g. sprinting)
Fat is not a major source of fuel
Requires more oxygen for aerobic breakdown (than glucose)

Dietary Fat Recommendations

- Dependent on energy needs
  - Higher energy expenditure → higher fat needs
- Most athletes require ~ **1.0 g/kg/day**
  - 20-35% of total calorie intake
- Endurance athletes
  - Up to **2.0 g/kg/day**
- Ultraendurance athletes
  - Some reported to consume up to **3.0 g/kg/day**

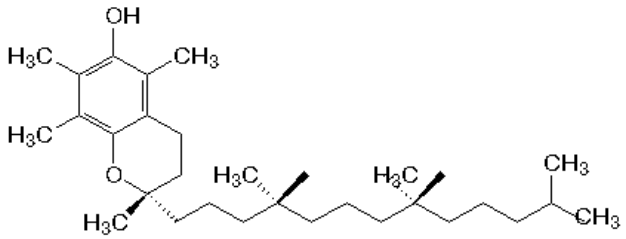
Dietary Fats

- Primarily monounsaturated and polyunsaturated
- Monounsaturated fats:

  olives, oils, nuts, avocadoes
- Polyunsaturated fats:

  fish, fish oil, flaxseed, walnuts, some oils
- **<10% of total calories should be from saturated fat**

Vitamins and Minerals



Vitamin E （α-tocopherol）

Vitamin E and C

- Slightly higher needs
- Antioxidant properties

Vitamin C

Thiamin, riboflavin, vitamin B-6, potassium, magnesium, iron, zinc, copper, and chromium needs

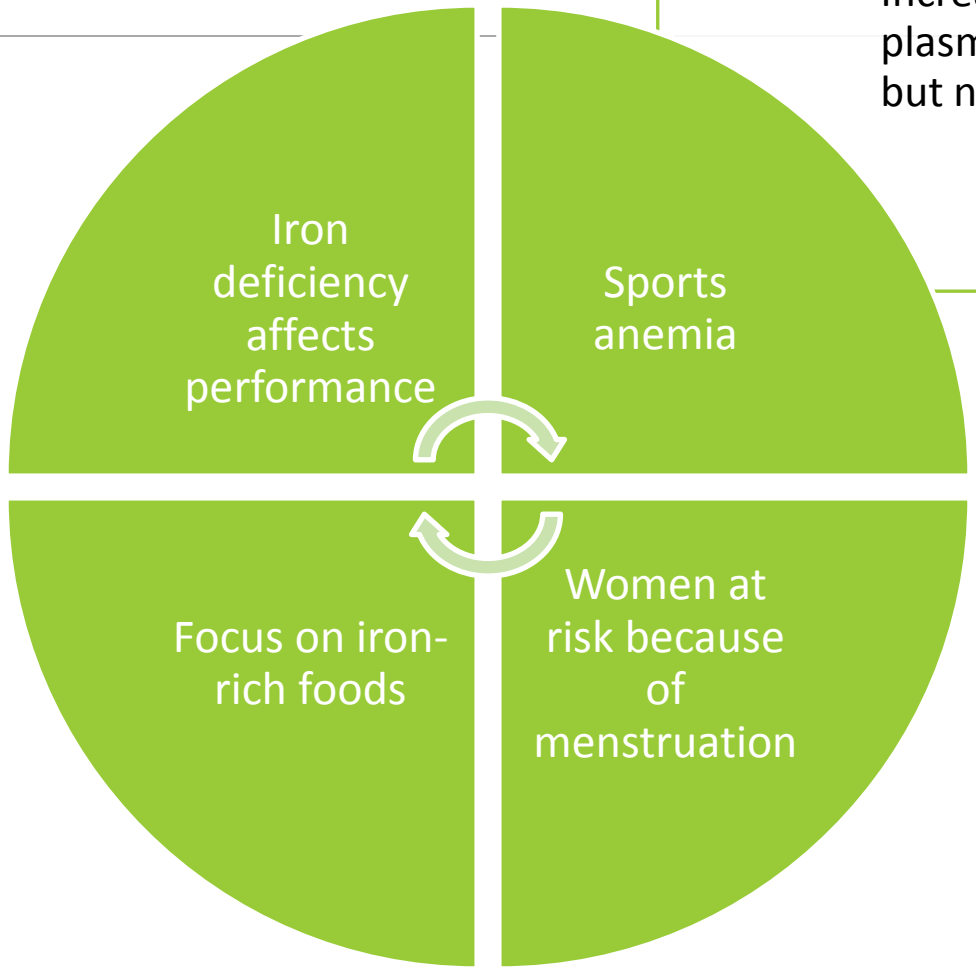
- May also be higher (role in metabolism or sweat)

Increase intake of fruits and vegetables

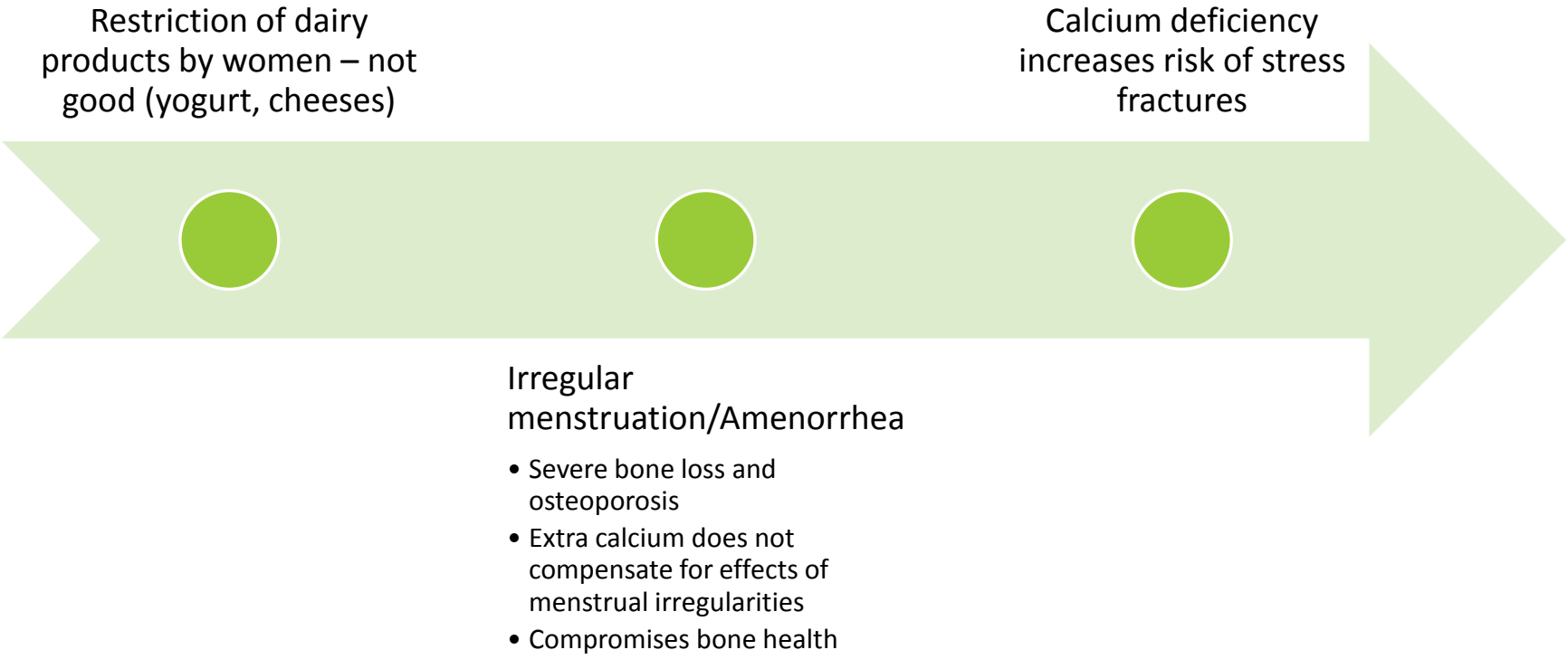
Special Catalysts: Antioxidants

Iron Needs

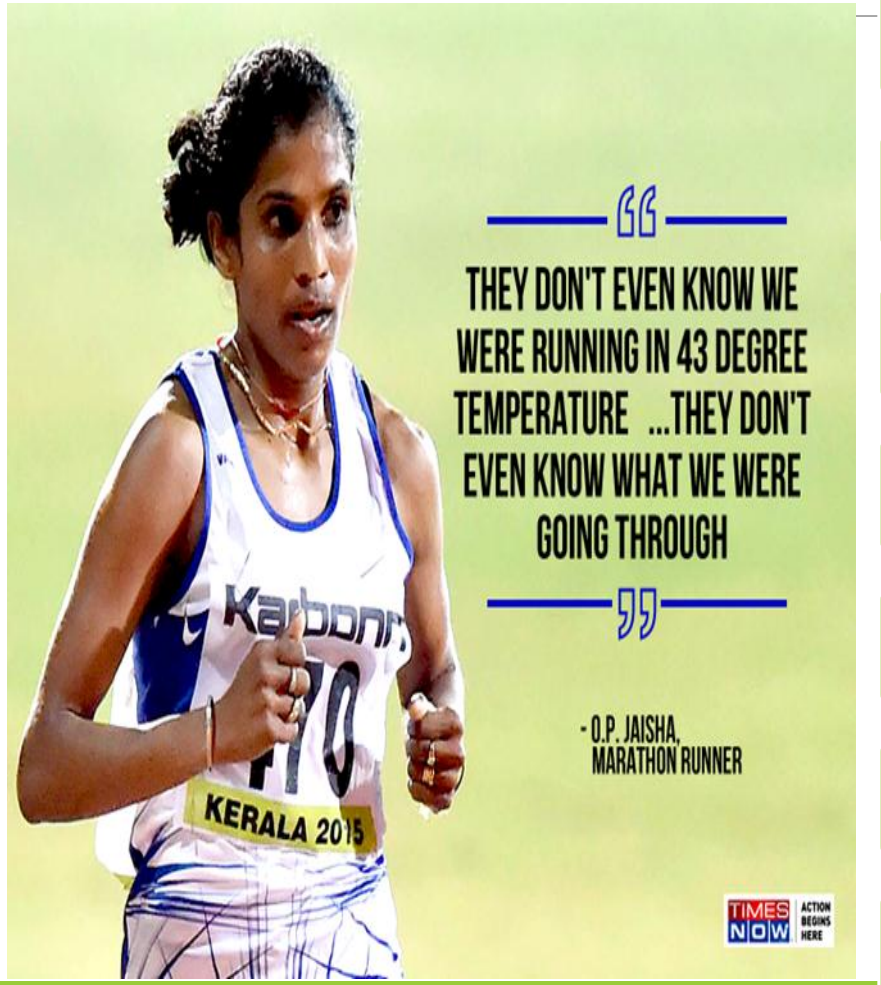
- Increase in plasma volume but not RBCs



Calcium Needs



Fluids & Hydration



- Males - 60% body wt.
- Females - 50% body wt.
- Cardiovascular function
- Thermoregulation
- Injury prevention
- Performance
- Recovery
- Sweat losses during 2 hours of exercise can = 2 liters or more

Physiological Effects of Dehydration

↑ sweat rate → ↓ blood volume & ↑ heart rate

↑ core body heat

↓ cardiovascular function

-less O2 and nutrient-rich blood to muscles

-more reliance on anaerobic system

Slower removal of wastes → cramping, fatigue

Impaired Performance!

Muscle strength

Speed

Stamina

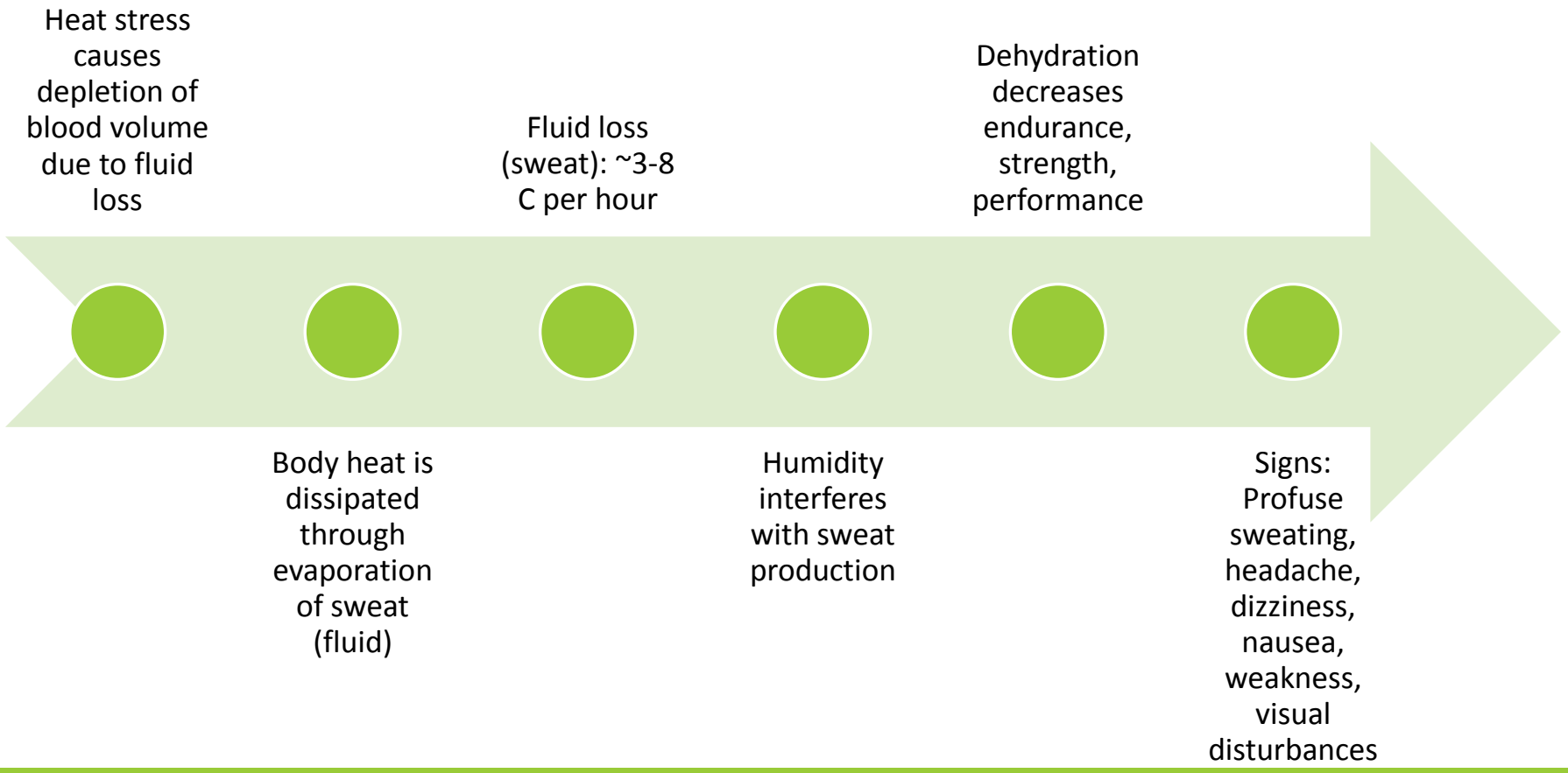
Energy

Cognitive Process

Risk of Injury

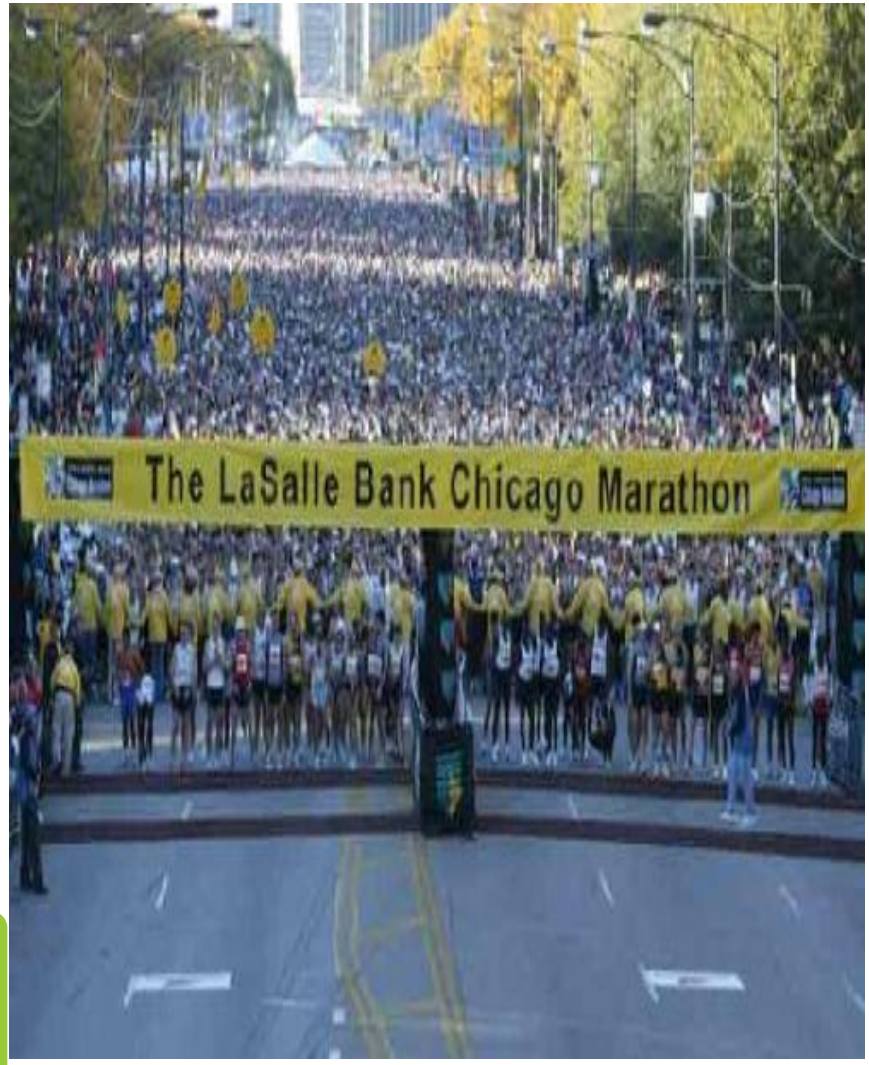
95% of muscle cramps are due to dehydration!

Heat Exhaustion



2007 Chicago Marathon-Heat Stroke

- Exceptionally hot and humid day for October (88 degrees, 86% humidity at 10 am)
- Race was stopped at 3 ½ hour mark
- 250+ racers hospitalized for heat related ailments
- Water stations ran out of water early
- Very limited sports drinks



Cricket

Contusions

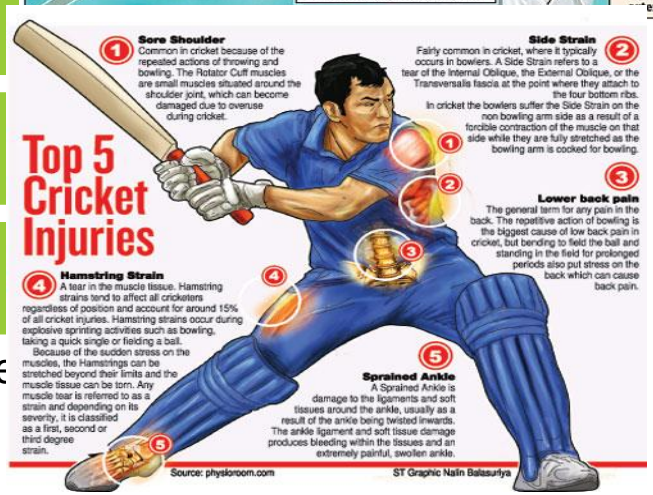
Rotator cuff strain

Ankle Sprains

Medial meniscus injury

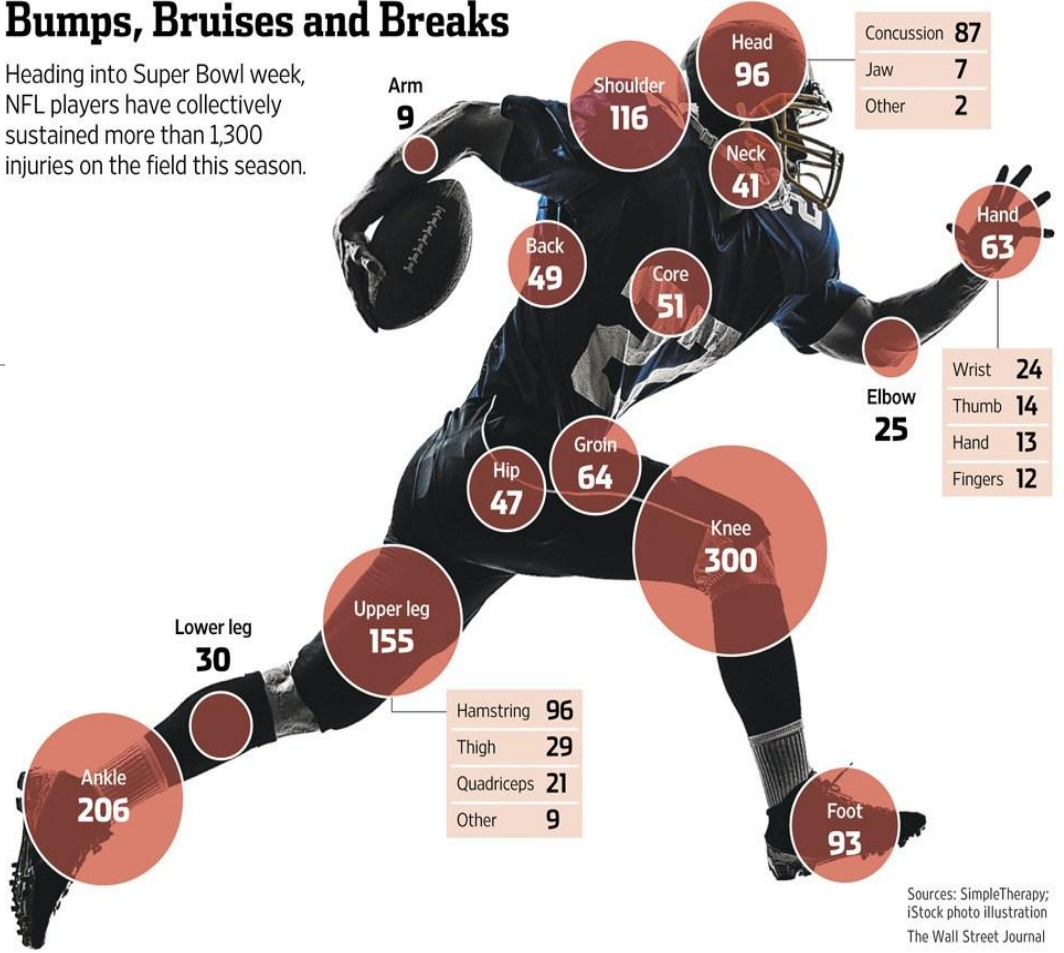
Most common gradual onset injuries

- Impingement syndrome (swimmer’s shoulde
- Golfer's elbow
- Lower back pain



Bumps, Bruises and Breaks

Heading into Super Bowl week, NFL players have collectively sustained more than 1,300 injuries on the field this season.



Sources: SimpleTherapy; iStock photo illustration

The Wall Street Journal

Hyponatremia

Fluid/electrolyte disorder that occurs when Na level in blood is below normal (<136 mEq/L)

Can lead to seizures, coma, death in severe cases

Headache, malaise, confusion, swollen hands and feet, wheezy breathing

Excessive sweating, excessive Na losses in sweat, over drinking up to or during event, replacing sweat losses with only H2O, Intentional Urine Dilution (before drug testing)

Hyponatremia and Women

Pre-Exercise Fuel

- Provide energy to working muscles
- Maximize blood sugar and glycogen stores
- Provide a psychological edge
- Minimize hunger during play
- Maximize hydration
- Be individualized

Pre-Exercise Fuel

Meals should be 2/3 normal size

Meals: 3-4 hours before competition

Snacks: 1-2 hours before competition

The closer they are to competition, rely more on liquids and small snacks

CHO AMOUNT RECOMMENDED

- 1 hour before 0.5 gm CHO/#
- 2 hours before 0.5-1.0gm CHO/#
- 3-4 hours before 1.0-1.5gm CHO/#

Timing of protein & carbohydrate

To enhance protein synthesis in muscle and replace glycogen stores…

Don’t exercise in *fasted* state

Eat immediately after exercise *[window of opportunity]*

- ***~ 6-8 g protein + 1-1.5g CHO/kg BW within 30 minutes***

Recovery

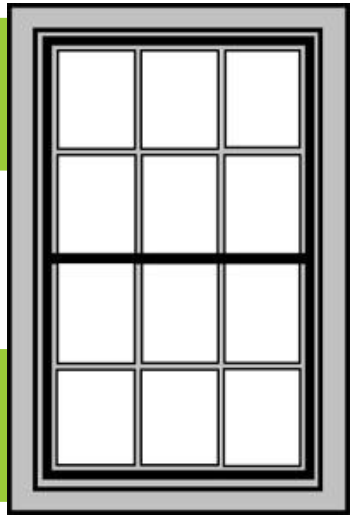
Defined: Helping athletes *bounce* back for future exercise bouts

- Considerations
  - Intensity of exercise
  - When will athlete exercise again?
- Nutrition Recovery Goals:
  - Glycogen restoration
  - Fluid & electrolyte replacement
  - Muscle repair and adaptation

Refueling after Exercise

VERY Important for Athletes

- For those in multiple events in one day
- *For those training daily*



"Window" for Refueling

- First 30 minutes after exercise is critical
- Glycogen repletion occurs faster after exercise
  - Increased blood flow to the muscle
  - Enzymes that produce glycogen are most active

Refueling after Exercise

Facts:

Muscles replace glycogen @ 5% /hour

20-24 hrs post exercise to maximally replenish glycogen stores

How?

0.5 g / kg CHO immediately after activity

0.5 g / kg CHO in next 90 min.

Rest

Sports drinks

needed for exercise lasting more than an hour

- if the activity is intense & occurs in hot, humid conditions
- Very easy way to improve performance
- fight dehydration
- decrease recovery time

Energy Drinks

300mg caffine!

Different from Sports Drinks

Contain caffeine, other stimulants, sugar, herbs and vitamins

Use nutrition, hydration, and lifestyle changes to improve energy level

Gels and Bars

Provide additional fuel

Should be taken with fluids

Ideal bars for endurance athletes

- Contain 40 gm carbohydrate, 10 gm of protein, 4 gram fat, 5 gm of fiber
- Fortified with vitamins and minerals
- Toxicities possible with overuse

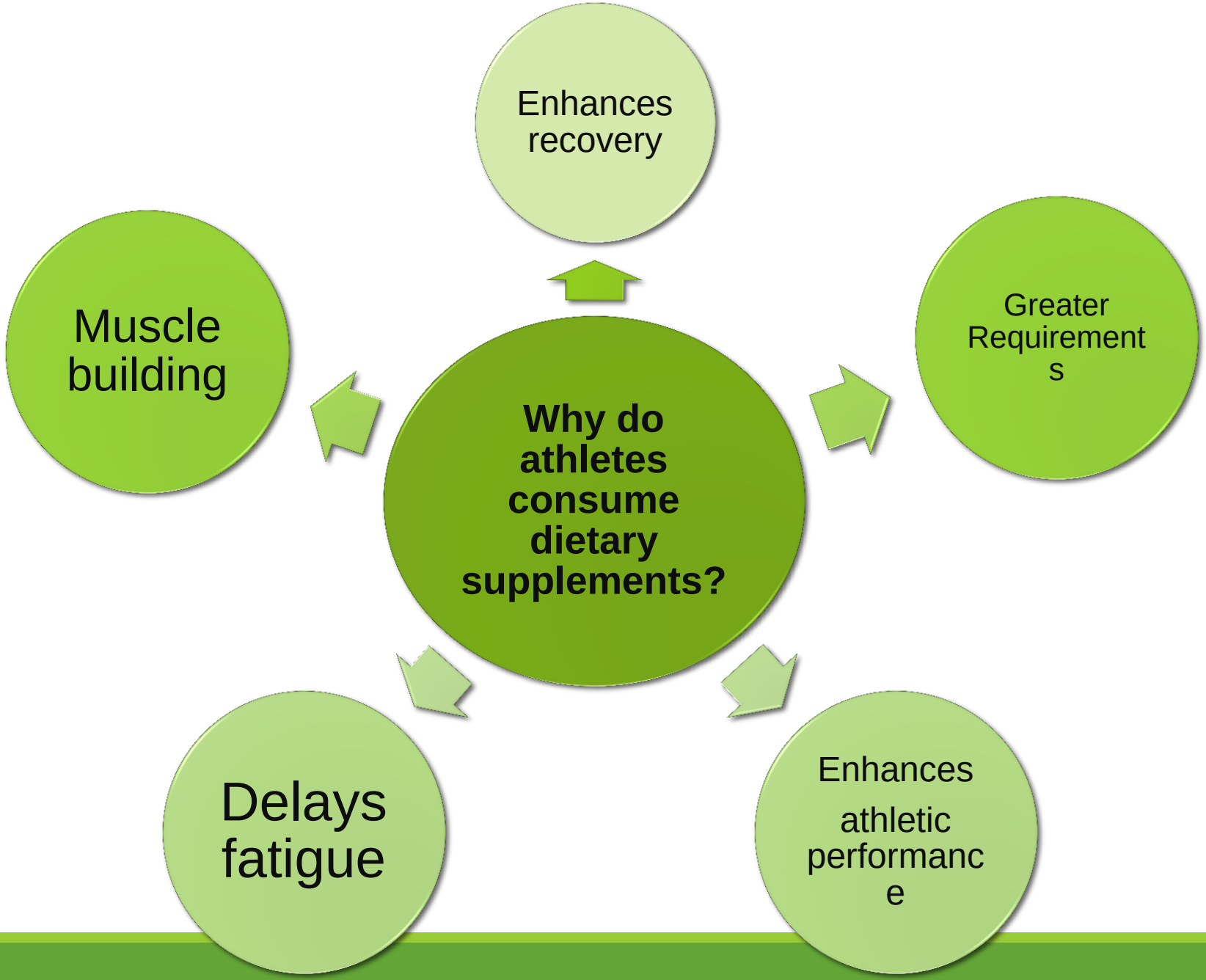
Economic home made pre and post game meals

Nuts - walnuts, almonds and pistachio.	**Energy bars** made of palm sugar, oilseeds,nuts	**Vegetable halwa** made of carrot or beetroot.	**Dry fruit powder** made of dates, apricots and raisins.
Hydrate enough. Electrolytes can be added to the water.	**Dark Chocolate with nuts**	Vitamin enriched candies	Garden cress seeds' pudding
Ragi+garden cress seeds+ pumpkin seeds Laddoo	Chikki	Icelollies or lollypops	Aam papad

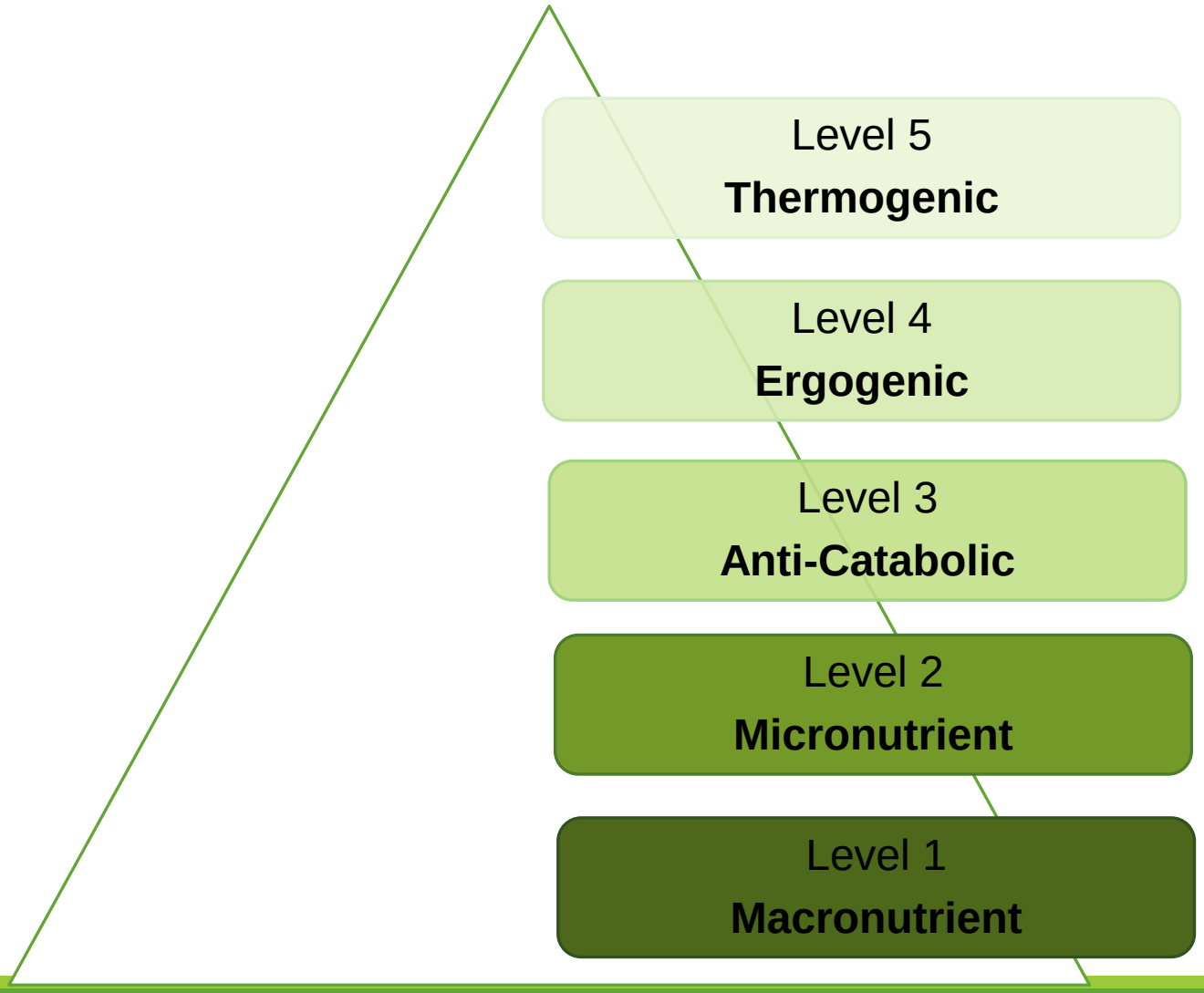
COMMON DIETARY SUPPLEMENTS USED BY ATHLETES

What are Dietary Supplements?

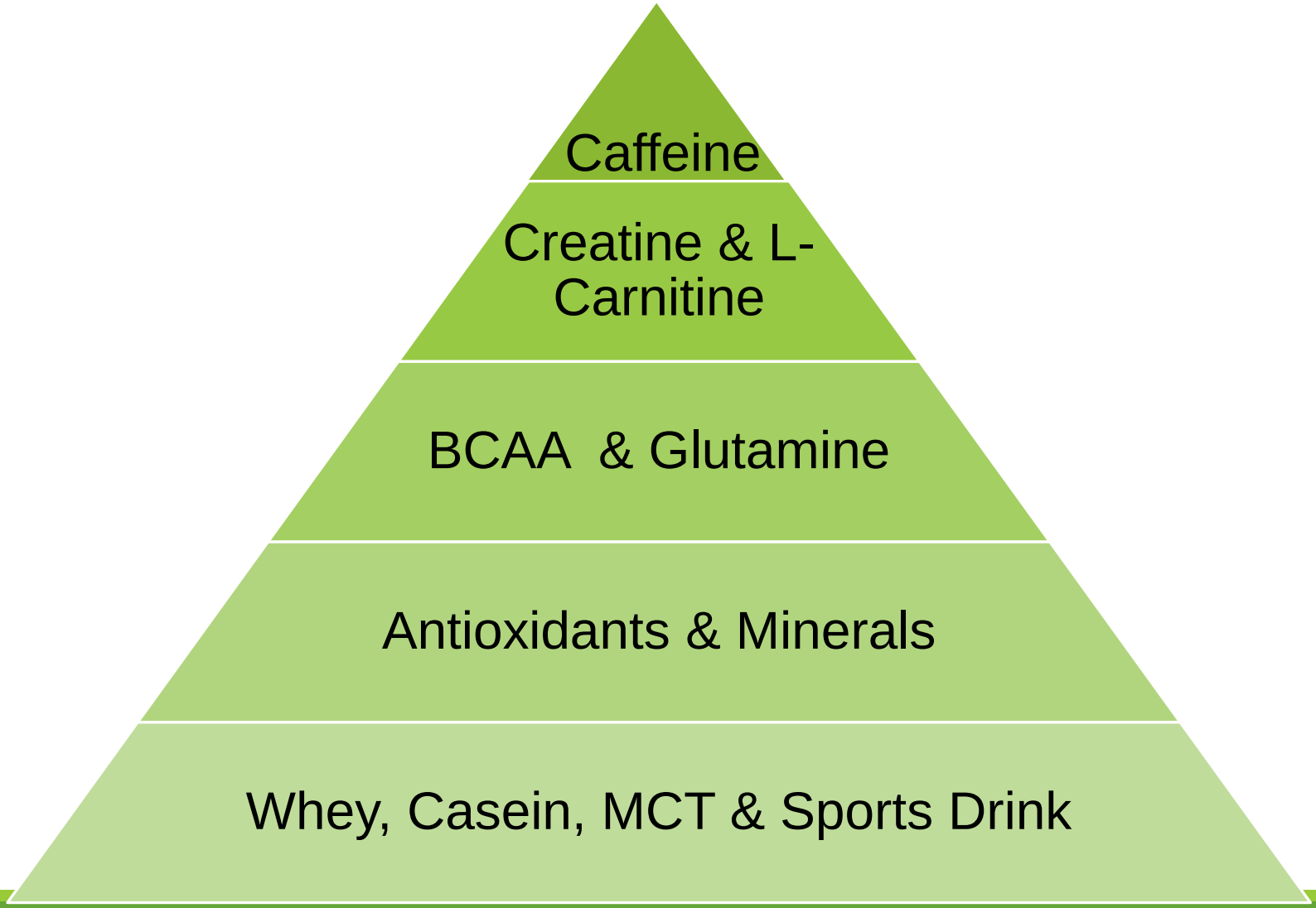
- Intends to augment the diet
- Contains one or more dietary ingredients
- Is labelled as a dietary supplement
- FORMS: Soft gels, tablets, capsules, powder, liquid and gelcaps


Why do athletes consume dietary supplements?
Enhances recovery
Greater Requirements
Enhances athletic performance
Delays fatigue
Muscle building

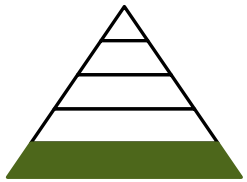
Supplement Pyramid



Major Supplements used by athletes segregated according to supplement pyramid



Whey



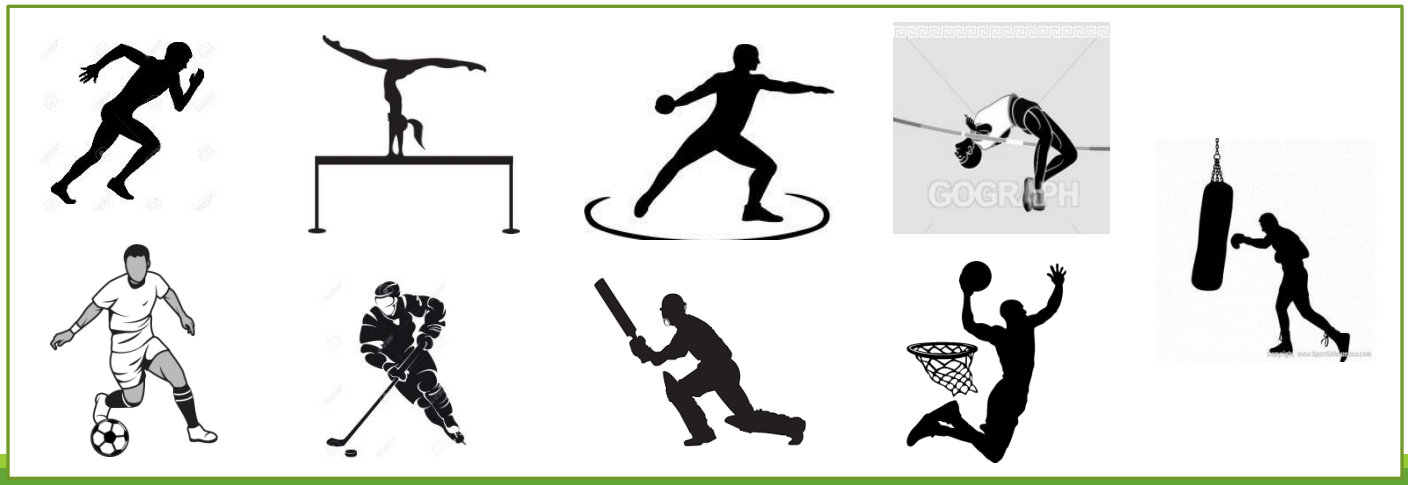
- Milk
  - Casein protein(80%)
  - Whey protein (20%)
    - Concentrate
    - Regular
    - Isolate ★

It is considered a complete protein as it contains all 9 essential amino acids.

- Maintains and increases lean mass without affecting fat mass.
- Helps in recovery and minimises performance losses.

Depending on daily requirement
1 scoop (30g)=24 g (approx.)

Post training (with water)



Casein

Casein protein

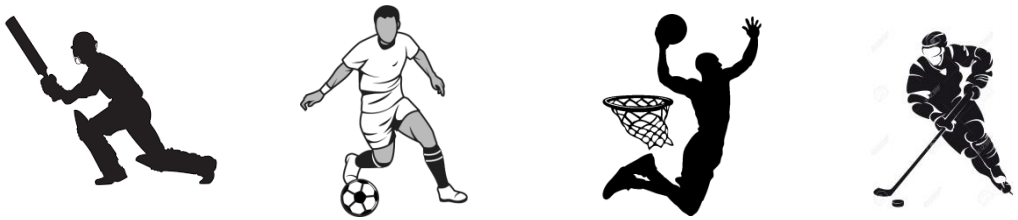
- Pure Casein ★
- Casein Milk Combination

It is a “slow absorbing protein” and naturally contains Glutamine.

- Inhibits the breakdown of muscle.
- Enhances recovery and muscle development

Depending on the protein daily requirement
1 scoop (35g)=23 g (approx.)

- Pre- training
- Bedtime



Medium Chain Triglycerides

MCT's are fatty acids that can easily enter the mitochondria of the cell and be converted to energy via fat metabolism because of their shorter structure.

- Provide a quick source of energy
- Help mobilize body-fat stores for energy
- Increase the metabolic rate
- Spare lean body mass (muscle).

- 9 capsules (each containing 1g MCT oil)/day

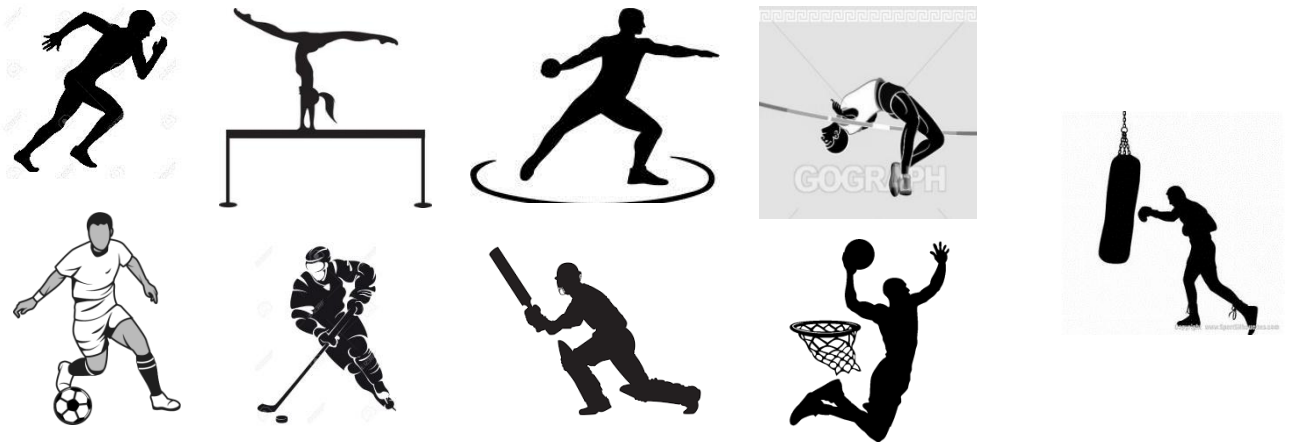
Can be taken pre, during and post training/match.

Sports Drink

They are a great alternative to plain water and comprise of carbohydrates and electrolytes.

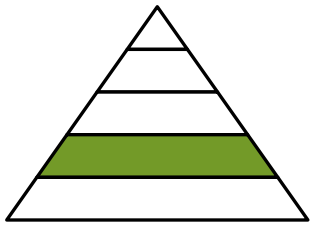
- Aids in hydration.
- Replenishes lost electrolytes and glycogen stores.
- Improves CNS function.
- Regulates body temperature.
- Eliminates nitrogenous waste and lactic acid build up.

During training/ match



Antioxidants

Vitamin C, Vitamin E and CoQ10



- Minimize free-radical damage to skeletal muscle, thereby reducing muscle fatigue, inflammation, and soreness

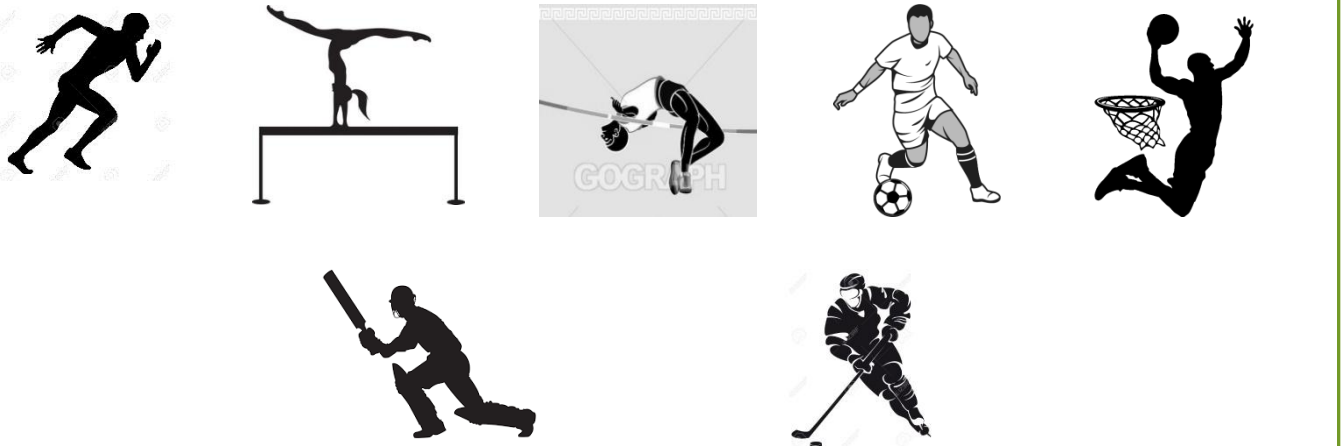
- Vitamin C: <2,000 mg/day
- Vitamin E: <1,500 IU/day
- CoQ10:

Minerals
Calcium and Vitamin D

- Co-supplementation of Calcium and Vitamin D will help prevent bone-loss in athletes, but does not enhance exercise performance.

Iron

- Increases oxygen uptake
- Reduces heart rate
- Decreases lactate concentrations during exercise



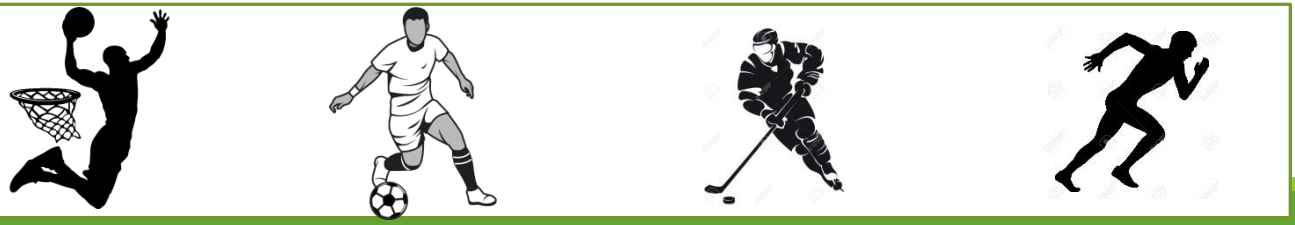
Branched Chain Amino Acids

BCAA include essential amino acids namely, Leucine, Isoleucine and Valine in the proportion of 2:1:1.
Mechanism: It inhibits tryptophan to pass the blood brain barrier thereby preventing build up of serotonin, thus delaying fatigue.

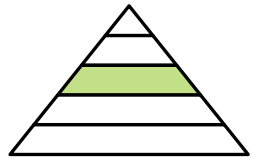
- Increases rate of protein synthesis(muscle mass and strength)
- Delays central fatigue
- Enhances weight loss

<20g/day

Pre, during and post training/game



Glutamine



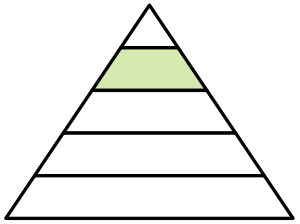
It is the most abundant amino acid in the body and forms about 60% of the amino acid pool.

- Helps with recovery of muscle strength and reduce muscle soreness after exercise
- Enhances immune function.
- They prevent muscle breakdown

- 45g/day

- Post Training/tournament

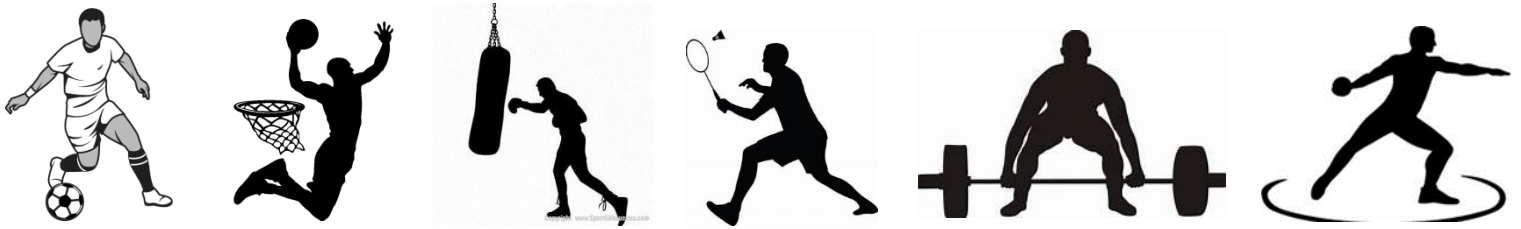
Creatine



- Increases high- intensity exercise capacity
- Increases lean body mass
- Improves power

0.3g/ kg/ day for atleast 3 days followed by 3-5g/ day to maintain levels.

Pre and post training/game throwers



L-Carnitine

It serves as an important transporter of fatty acids from cytosol into the mitochondria of the cell

- Increase VO2 max.
- Prevents and protects against muscle damage
- Increases fat burning

- 0.5-2g/day

Caffeine

Caffeine is a central nervous system stimulant and a muscle relaxant

- Improves endurance performance.
- Increased free fatty acid concentration in plasma.
- Reduces perceived pain and exertion.

- 400-500mg/day

*the more you consume, the more you need to consume to achieve the same ergogenic effect


RECEIPE FOR HAPPINESS
INGREDIENTS
2 heaped cup of patience
1 heart full of love
2 hands full of generosity
1 head full of understanding
METHOD
Mix all the ingredients, sprinkle generosity and kindness
Add faith and mix well.
Add a dash of laughter, spread over a period of time
Serve smiling to everyone you meet to spread happiness.