SHAWN DASSIE
TACTICAL HUMAN PERFORMANCE

Performance Nutrition II: Fueling for Your Sport
April 25, 2016



SPORTS NUTRITION: FUELING FOR YOUR SPORT

- Overview – sports nutrition
- Recovery (Fuel/Build/Hydrate)
  - Pre
  - During
  - Post
- Supplements
  - Pre
  - During
  - Post

01

WHAT IS SPORTS NUTRITION

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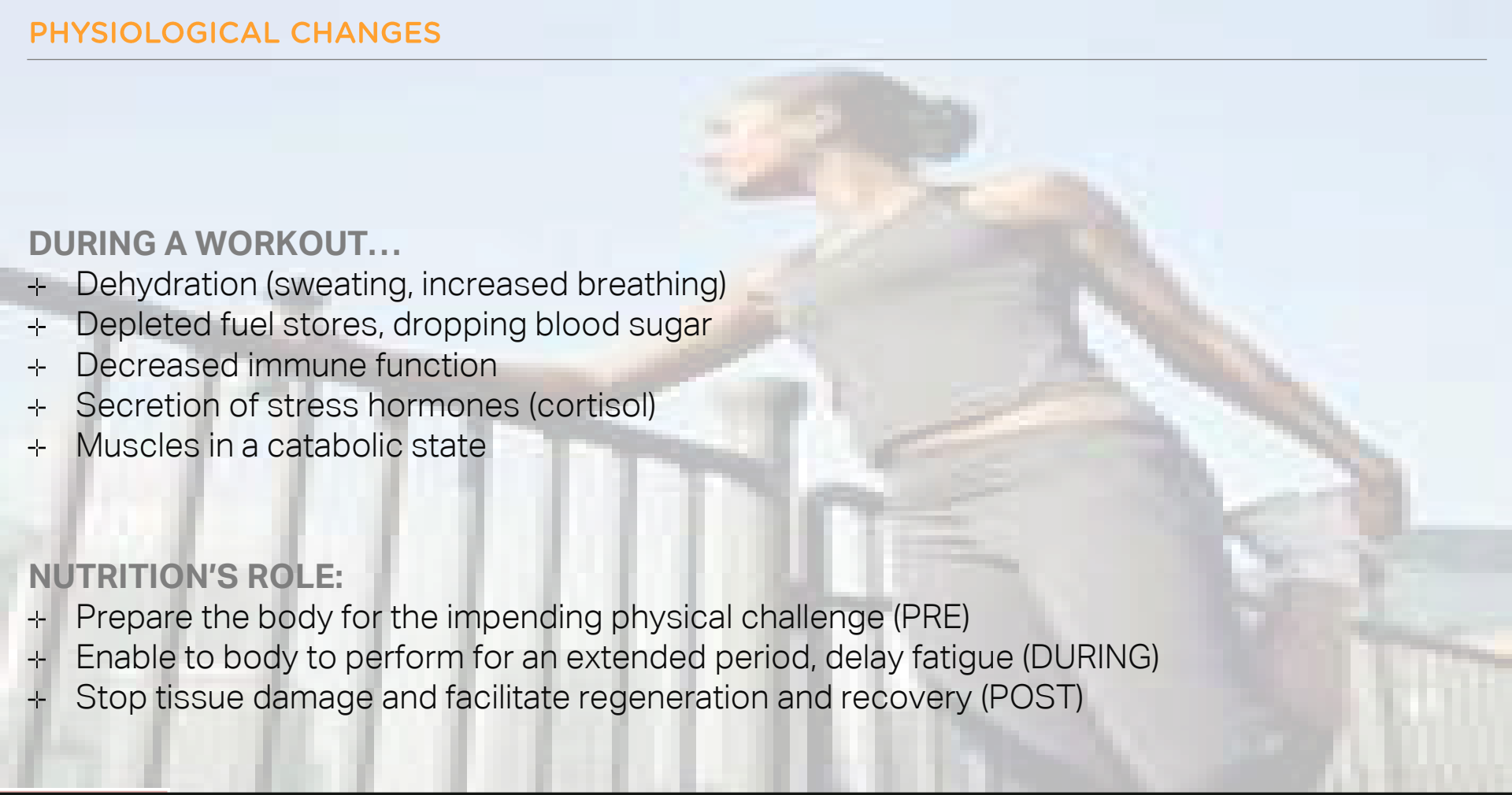









PHYSIOLOGICAL CHANGES



DURING A WORKOUT…

- Dehydration (sweating, increased breathing)
- Depleted fuel stores, dropping blood sugar
- Decreased immune function
- Secretion of stress hormones (cortisol)
- Muscles in a catabolic state

NUTRITION'S ROLE:

- Prepare the body for the impending physical challenge (PRE)
- Enable to body to perform for an extended period, delay fatigue (DURING)
- Stop tissue damage and facilitate regeneration and recovery (POST)

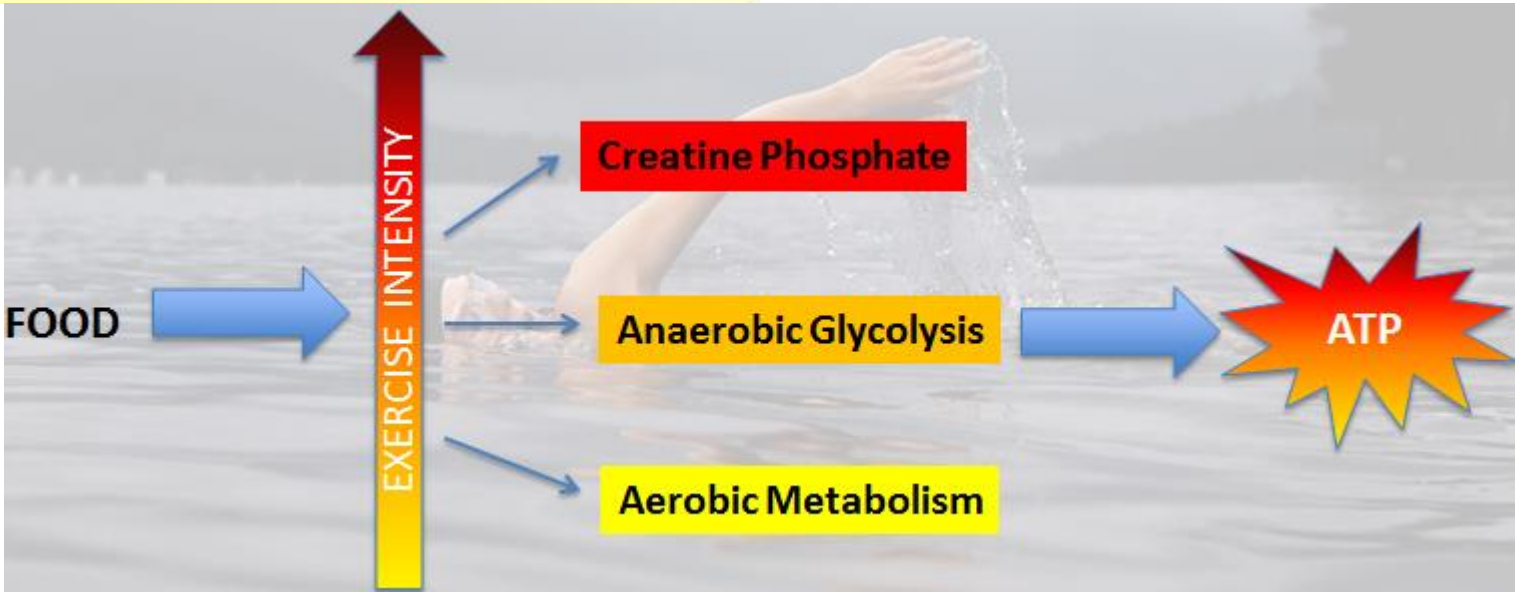
ENERGY PATHWAYS

FOOD IS CONVERTED TO ENERGY VIA…

- Aerobic Metabolism (with Oxygen)
- Anaerobic Metabolism (without Oxygen)
  - ATP + CP (Creatine phosphate)
  - Anaerobic glycolysis

ENERGY PATHWAY USED IS DETERMINED BY…

- Training intensity
- Duration
- Level of fitness



FUELING ENERGY PATHWAYS

CARBOHYDRATE

- Fuels moderate to high intensity for short periods
- More efficient than fat metabolism but has limited stores

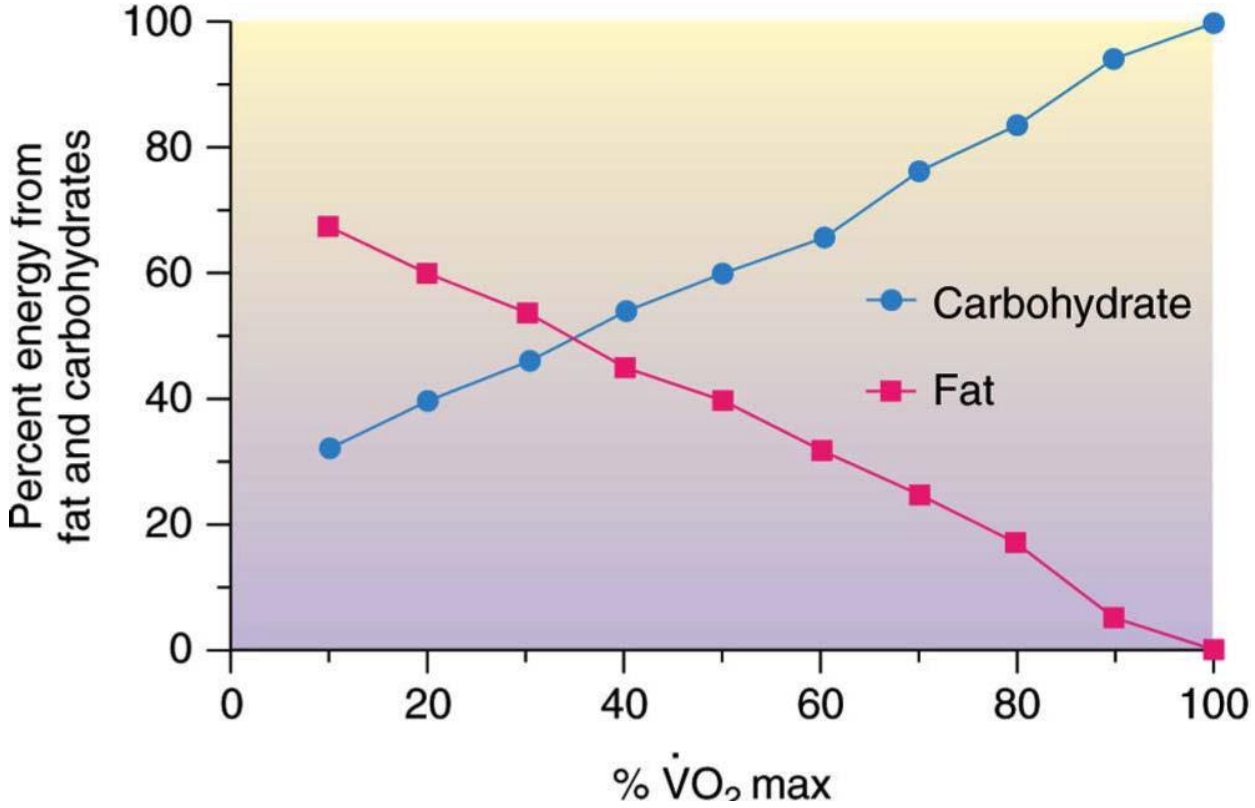
FAT

- Fuels low intensity for long periods
- Not adequate for sprints or intervals

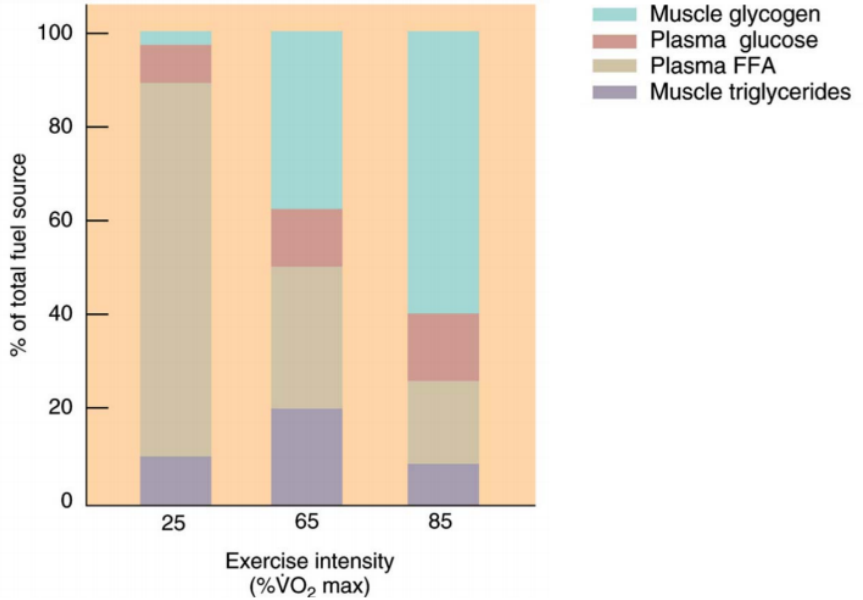
PROTEIN

- Used to repair and maintain body tissues
- Not normally used to power muscle activity*

THE CROSS OVER CONCEPT



Influence of Exercise Intensity on Muscle Fuel Source



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Figure 4.15

GLYCOGEN

- Mid to higher intensity exercise
- Immediately accessible
- Provides energy during the first few minutes of *any* sport/event
- Lasts 30 to 90 minutes (without replenishment)

LIVER GLYCOGEN

- Contains up to 100 g
- Primary source of blood sugar

SKELETAL GLYCOGEN

- Contains up to 500 g
- ~2 hours of moderate-intensity activity

Effect of Exercise Duration on Muscle Fuel Source

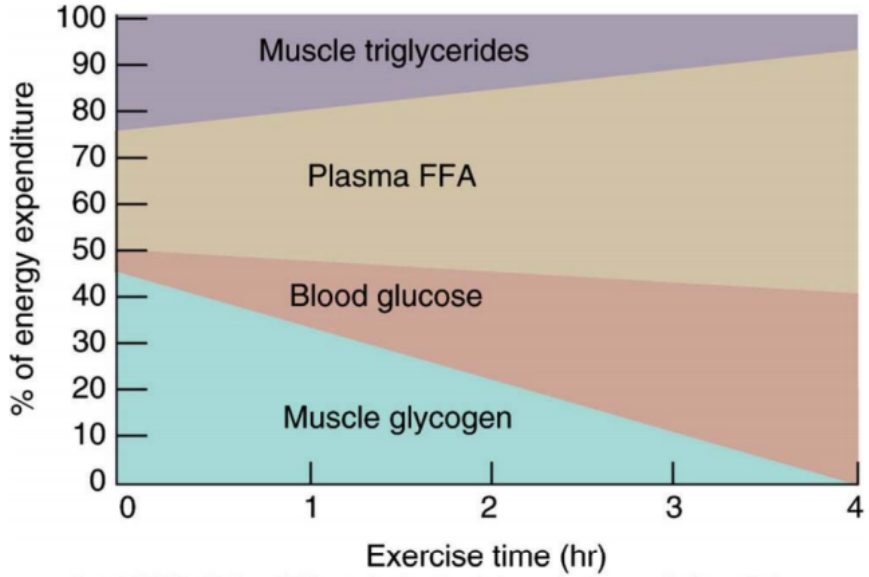


Figure 4.16

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02

RECOVERY

- PURPOSE – FUEL/BUILD/HYDRATE
- RECOMMENDATIONS
  - PRE
  - DURING
  - POST

DON'T WASTE YOUR WORKOUT

- Recovery includes pre, during, and post-activity
- Composition
  - Carbohydrates (Fuel)
  - Protein (Build)
  - Fluids (Hydrate)
- Timing is of the essence



PRE-WORKOUT NUTRITION

- Top off your tank about 1-2 hours before exercise
  - 15-30 grams of carbohydrates
  - Small amount of protein (lean)
  - Avoid fatty goods
- Hydrate with 16-20 ounces of water

WHOLE FOOD EXAMPLES:

- ½ turkey sandwich
- Greek yogurt with fruit or honey
- ½ cup cooked oatmeal with low fat milk
- 1 slice whole grain toast + hard-boiled egg
- Piece of fruit with cottage cheese



DURING-RECOVERY

GENERAL HYDRATION GUIDELINES DURING WORKOUTS

MAINTAIN HYDRATION

2% Keep weight loss to less than 2 percent during your workout.

Take 4-6 gulps of fluid about every 15 minutes.

\+ Pay extra attention to your hydration when you're sweating more than usual or in an extreme environment.

MAINTAIN FUEL AND ELECTROLYTES

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When you need something more than water, choose a sports drink with at least 110 milligrams of sodium per 8 ounces to help prevent cramping and maintain electrolytes.

\+ When your exercise level warrants the consumption of a sports drink, 20-32 ounces an hour is all you need to keep your body fueled. Balance the rest of your hydration needs with water.

DRINKING SPORTS DRINKS

NO, IF...

+ Training for less than an hour
+ Weight loss is the goal of the training session

YES, IF...

+ Training for over an hour
+ Training in extreme environments
+ Lean body mass gain is the goal
+ You enter the workout without any fuel
+ You have a short but extremely intense workout



POST TRAINING ENVIRONMENT

State of Breakdown: Catabolic

- Dehydrated
- ⇩ Blood insulin
- ⇧ Cortisol
- ⇩ Immune system
- ⇩ Muscle & liver glycogen
- ⇧ Proteolysis

State of Building: Anabolic

- Rehydrate
- ⇧ Blood insulin
- ⇩ Cortisol
- ⇧ Immune system
- ⇧ Muscle & liver glycogen
- Stimulate muscle protein synthesis and tissue repair

Courtesy of Dr. Jeffery Stout, University of Oklahoma, Professor and President of the International Science of Sports Nutrition, 2007.

POST-RECOVERY

POST-WORKOUT

The sooner you get your post-workout nutrition, the quicker you recover.



WITHIN 10 MINUTES OF TRAINING

1 REFUEL WITH CARBS

The more intense the training, the more carbohydrates you need.

2 REBUILD WITH PROTEIN

Body weight determines protein needs post-workout.

3 REHYDRATE WITH FLUID

Drink 20-24 ounces of fluid for each pound lost during training.

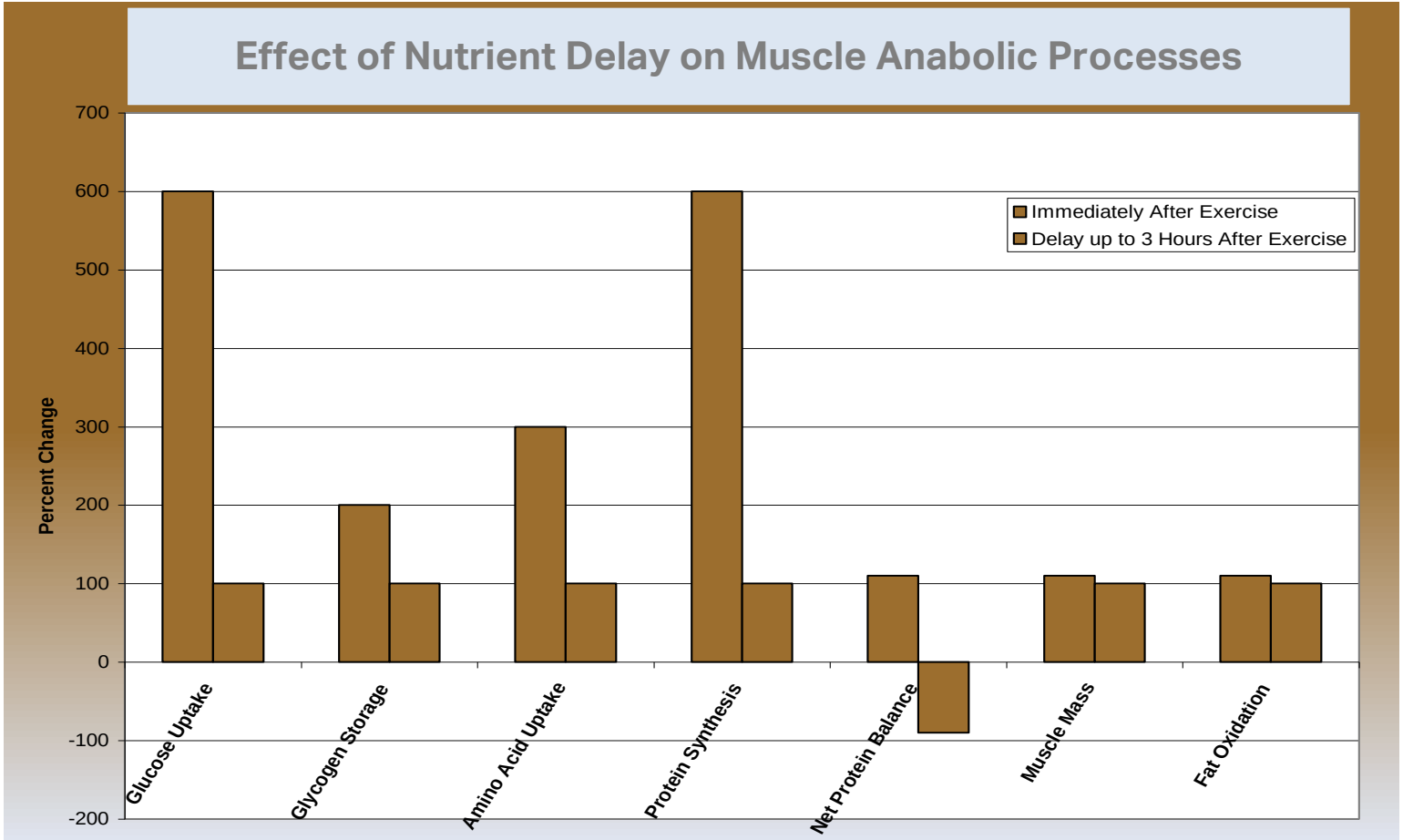
WHAT YOU NEED TO RECOVER

BODY WEIGHT	PROTEIN	CARBS
150 - 180 lbs	25 - 30 g	60 - 75 g
181 - 215 lbs	30 - 35 g	75 - 90 g
216 - 245 lbs	35 - 40 g	90 - 105 g

RECOVERY NUTRITION OPTIONS

+ 20-ounce low-fat chocolate milk and banana
+ Turkey and pasta salad
+ Tuna sandwich and baked chips
+ Meal replacement bar or shake
+ Scrambled eggs or egg whites with whole wheat toast and 6 ounces of juice
+ Turkey sandwich and yogurt
+ Fruit smoothie blended with yogurt or whey protein

RECOVERY: IMMEDIATE VS. DELAYED POST WORKOUT SUPPLEMENTATION



03

SUPPLEMENTS

- Pre- Fuel
- During- Hydrate
- Post- Fuel, Build, Hydrate
- Caffeine

2 COMPONENTS – CARBS + PROTEIN:

- Top of the tank
- Carbs
  - Provide glycogen for energy
- Protein
  - Helps retain muscle mass
  - Stable energy







CREATINE:

- Provides extra stores of creatine to the Creatine phosphate system (CP)
- Aids in power/strength development
- Explosive movements
- Used in first 10 seconds of exercise



DOSAGE:

- 5g/ day

ELECTROYTES:

- Helps replenish lost vitamins and minerals lost in sweat
- Aids in keeping you hydrated

EXERCISE DURATION:

- If longer than 60 minutes start adding in a small amount of glucose (carb soured)

- Example: Fuel + Catalyte



RE-HYDRATE WITH WATER AND/OR ELECTROLYTES

- 20-24 oz (~600-700 ml) needed for each pound lost
- 1-1.5 oz per lb body wt per day (30-60 ml per kg)

WITHIN 30 MINUTES OF COMPLETING TRAINING

RE-FUEL WITH CARBOHYDRATE:

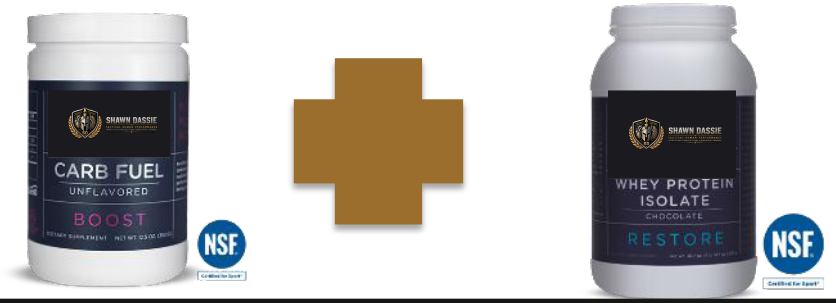
- Dependent on intensity level
- 1:1, 2:1, 3:1 carb to protein ratio
- Look for easily digestible sources… this is not the time for whole grain!

RE-BUILD WITH LEAN PROTEIN:

- Intensity and duration dependent
- 1:1, 2:1, 3:1 carb to protein ratio

DOSAGE:

- Dependent on exercise intensity and duration
- Protein
  - LBM (kg) 0.3- 0.4
  - LBM (lbs) 0.1- 0.2
- Carbohydrate
  - LBM (kg) 0.8-1.2
  - LBM (lbs) 0.1 – 0.2



BCAA SUPLEMENTATION

- BCAA's made up of 3 EAA
  - Leucine
  - Isoleucine
  - Valine
- Preventing muscle Catabolism:
  - Especially in diets low in CHO



STIMULANTS: CAFFEINE

- Caffeine
  - Stimulant to improve aerobic capacity and potentially improve strength/power.
- 3-5 mg/kg BW 30-45 minutes prior to physical activity
- Do not use every day
  - Suggested: dose on heavy load days/before games
  - Nothing new on game day



WEEK 1- DON'T WASTE YOUR WORKOUT

TIP:

- Protein shakes and post workout snacks are not just for guys pumping iron! Jump-start your recovery with a 1:1 or 2:1 carbohydrate to protein ratio. The best time to eat is within 30 minutes of completing your workout.

CHALLENGE:

- If you are exercising intensely for more than 45 minutes, end your workout with a 200-400 calorie meal or snack that contains both carbohydrate and protein. Whole foods are preferred over processed shakes/bars/powders that contain artificial ingredients.
    - Low-fat chocolate milk.
    - Greek yogurt with fruit.
    - peanut butter and jelly sandwich on whole wheat bread.

RECIPE:

- 5 Post Workout Shakes

WEEK 2- TOP OFF YOUR TANK

TIP:

- Don't go into your workout this week without being properly fueled! Making sure you have your tank properly "topped off" will help ensure you can get the most out of your workout
- Remember to think about what your eat….carbohydrate (fuel), protein (build), and fat (protect) try to have something high in carbohydrate (15-30 g) and low in protein and fat

CHALLENGE:

- Fuel for your workouts this week by topping off you tank with a high carbohydrate snack (15-30g) 1-2 hours before you work out, healthy options include:
    - ½ turkey sandwich
    - Greek yogurt with fruit or honey
    - ½ cup cooked oatmeal with low fat milk
    - 1 slice whole grain toast + hard-boiled egg

RECIPE:

- C

WEEK 3- STAY HYDRATED

TIP:

- Stay hydrated throughout the day to optimize concentration, boost metabolism and reduce risk of injury during exercise. Water helps cushion joints and muscles, flush out waste products, deliver nutrients, regulate temperature and improve brain activity.

CHALLENGE:

- Travel like a camel. Keep a water bottle with you at all times.
- Aim to drink at least ½-1 oz of water or unsweetened tea for every pound of body weight (30-60mL for every kilogram). Drink additional fluid in hot conditions and during and after exercise. If your urine is darker than lemonade—drink up—you are dehydrated!

RECIPE:

- Mint Iced Tea

WEEK 4-GET OUT THERE

TIP:

- Incorporating more than one form of exercise can be very beneficial in activation of your different energy pathways, just like eating a variety of different foods, having a variety of different workouts helps keep your body functioning at it's highest potential

CHALLENGE:

- Try a new workout class this week!
- The world is your oyster, here are a few ideas of some different classes that may be available near you…cycle, Zumba, yoga, Pilates, tabata training, water aerobics, boxing, TRX training, running, biking, kayaking, rollerblading, etc.