

EXERCISE SCIENCE
SACRED HEART UNIVERSITY



NUTRITION FOR RUNNING PERFORMANCE

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LECTURE OVERVIEW

- ◉ Energy Intake
- ◉ Macronutrients
 - CHO, PRO, FAT
- ◉ Micronutrients
 - IRON, CAL, D
- ◉ Hydration
- ◉ Tricks

- ◉ GOAL: is to provide you with the necessary evidence to make good nutritional choices



ENERGY INTAKE

- ◉ “Appropriate energy intake is the cornerstone of the athlete’s diet”- ACSM
- ◉ What is energy intake?
- ◉ Exercise/body processes/etc. (Total Energy Expenditure) = NEGATIVE energy
- ◉ FUEL/FOOD = POSITIVE energy
- ◉ We need to get to the point where $-Energy = +Energy$
- ◉ How???

EAT!!!!!!!!!!





RED-S

Relative Energy Deficiency in Sport

- ◉ Negatively affects:

Menstruation, bones, endocrine system, blood, metabolism, growth/development, psyche, cardiovascular system, gastrointestinal system, immunological systems.

- ◉ Negatively affects **RUNNING PERFORMANCE** via:

Decreased Endurance, increased injury risk, decrease training response, decreased coordination, decreased concentration, irritability, depression, decreased glycogen stores, and decreased muscle strength.

- ◉ Adequate caloric intake is best defense/cure



TIMING

- Eating a balanced diet with CHO/PRO/FAT in each meal covers 90% of your needs
- Athletes should focus on fueling FOR the activity, and refueling AFTER the activity

Generally CHO heavy before activity, CHO/PRO after



Timing Continued

4 hours before activity= last big meal

Can eat generally whatever you want

Inside that 4 hour window, snacking encouraged based on tolerance

More CHO



WHY, WHAT, WHEN, HOW MUCH?

- ◉ Carbohydrate
- ◉ Protein
- ◉ Fats
- ◉ Iron
- ◉ Vitamin D
- ◉ Calcium
- ◉ Hydration

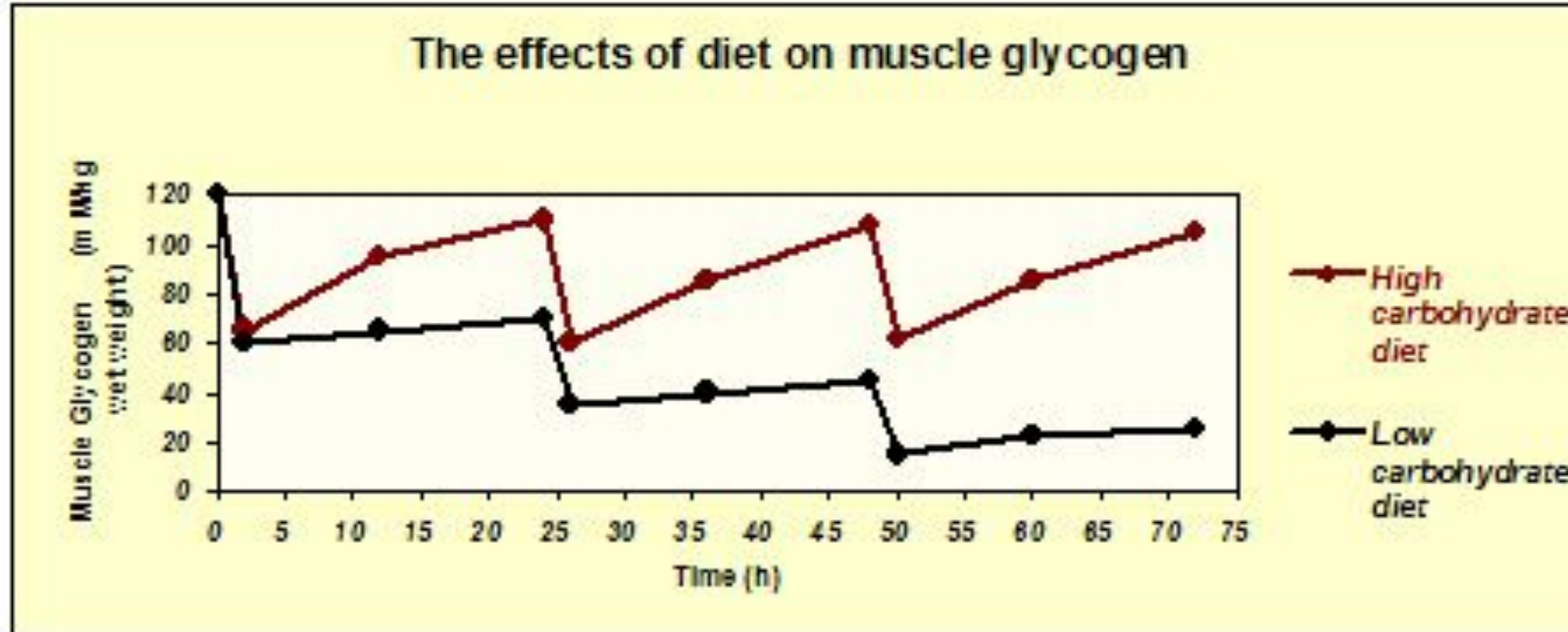


CARBOHYRATE!!!



CHO WHY?

- ◉ All intense exercise (fast running, sprinting, lifting, etc) utilizes CHO for fuel
- ◉ CHO Stores deplete after 90 minutes



Costill, D.L., Miller, J.M. Nutrition for endurance sport: Carbohydrate and fluid balance. *Int. J. Sports Med.* 1:2-14, 1980.

CHO WHAT?



CHO WHEN?

- Pre: 1-4g/kg consumed 1-4hr before
Person dependent
- Post: 1-1.2g/kg/hr for first 4 hours then resume daily needs
Post workout snack important





CHO HOW MUCH?

- ◉ General: 3-10g/kg/BW
- ◉ 110lb=50kg x 10g CHO= 500g CHO
- ◉ Don't skimp on CHO!!!

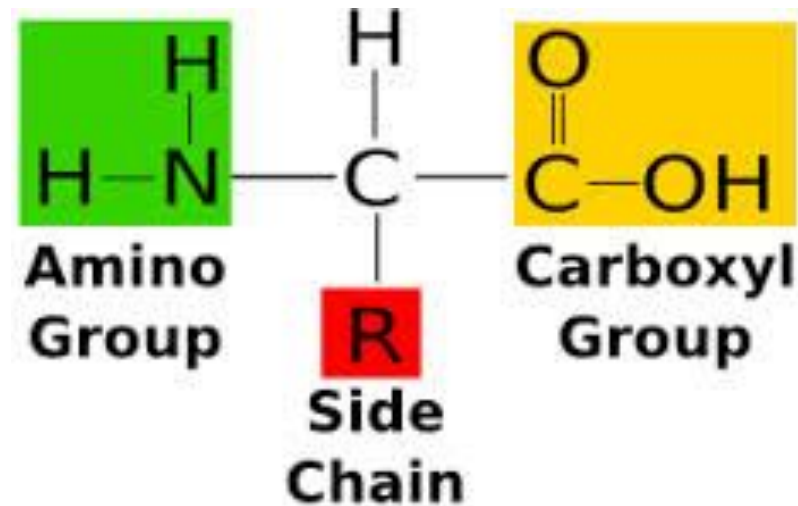


PROTEIN!!!



PRO WHY?

- ◉ Building blocks of bone, muscle, tendon, etc.
- ◉ Good rationale for athlete intakes well above RDA for normal people





PRO WHAT?

- Research claims dairy to be superior





PRO WHEN?

- ◉ Regular spread of moderate amounts of high quality protein across the day
- ◉ Take care to include in post workout meal (with CHO)
 - Chocolate Milk





PRO HOW MUCH?

- ◉ General- 1.2-2.0g/kg/d
- ◉ $110\text{lb} = 50\text{kg} \times 2.0\text{g} = 100\text{g protein/day}$

That's a lot!

Spread it out!

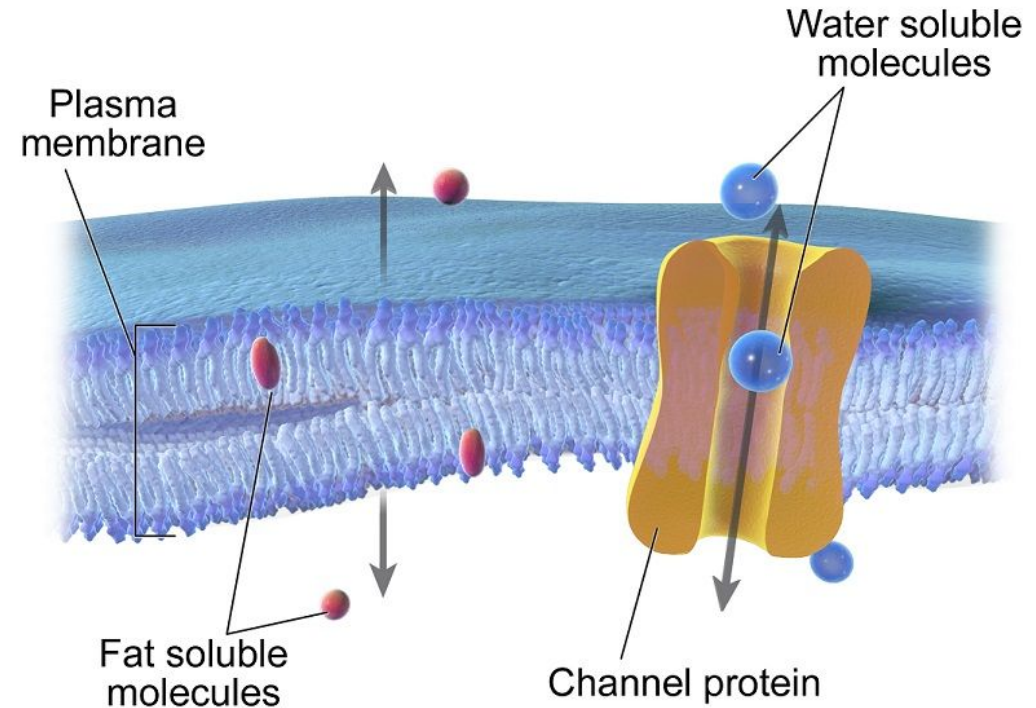
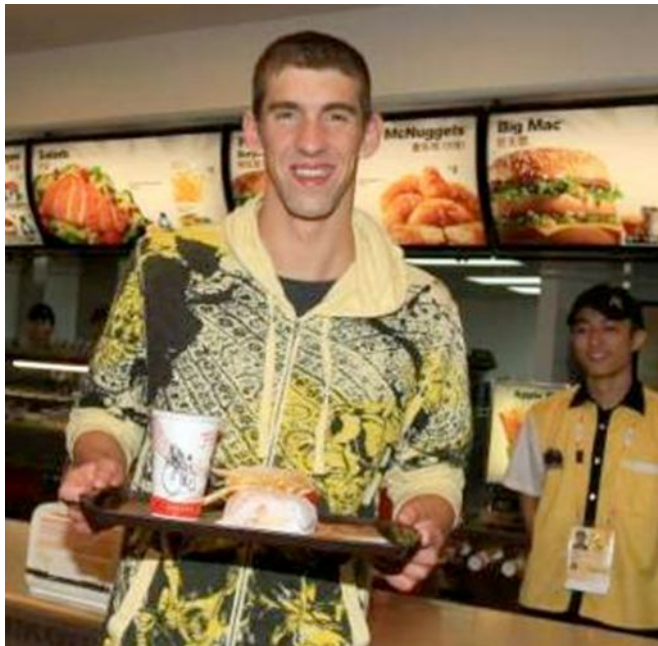
- ◉ Post Run
 - .3g/kg after each session
 - .3g/kg every 3-5 hours thereafter (multiple meals)



FATS!!!

FATS WHY?

- ◉ Necessary for:
 - Energy (highly caloric)
 - Cell membranes
 - Fat Soluble vitamins (ADEK)



FATS WHAT?





FATS WHEN?

- ◉ Throughout the day
- ◉ Be careful with overconsumption too close to runs
May cause gastrointestinal distress





FATS HOW MUCH?

- ◉ Fat intakes range from 20-35% of energy
- ◉ No performance benefit when consuming <20% fat
- ◉ High Fat/low carbohydrate diets do not benefit performance



ULTRAMARATHON RUNNING

Because 26.2 is for sissies. In real sports, you go until your organs start shutting down.

FreePosterMaker.com



MICRONUTRIENTS

- ◉ Low energy intake, removal of certain food groups, bad diet can reduce micronutrient intake.

Possible benefit from supplementation

- ◉ Important micronutrients for runners:

Iron

Calcium

Vitamin D



IRON WHY?

- ◉ Iron deficiency can impair muscle function, work output, training adaptation, overall performance
- ◉ Mostly results from low iron intake from HEME iron or **inadequate energy intake.**



IRON WHAT?

- ◉ Red Meat/ liver
- ◉ Clams/shellfish
- ◉ Chicken
- ◉ Leafy Greens
- ◉ Dried fruit
- ◉ Fortified cereals
- ◉ Cooking with cast iron pans



LEAFY GREENS



rebelDIETITIAN.US



IRON WHEN?

- ◉ Doesn't Matter
- ◉ Consume with Vitamin C (citrus, colorful vegetables, peppers, etc.) and apart from calcium





IRON HOW MUCH?

- ◉ Iron requirement for female runners may be increased by up to 70% of average
- ◉ IRON RDA 15mg/day (Females 14-18yo), 11mg/day (males 14-18yo)
- ◉ Low iron status requires intervention
 - Dietary
- ◉ Iron Deficiency Anemia
 - Seek medical advice including supplementation, dietary improvements, restriction of activity
- ◉ Unadvised supplementation is NOT warranted
 - See your doctor



VITAMIN D WHY?

- ◉ Helps with calcium and phosphorus absorption
- ◉ Bone health
- ◉ Reduced inflammation
- ◉ Reduced risk of stress fractures





VITAMIN D WHAT?

- ◉ Sun (35th parallel)
- ◉ Fatty fish (tuna, mackerel, salmon)
- ◉ Mushrooms
- ◉ Egg yolks→ STOP THROWING AWAY YOUR YOLKS
- ◉ Dairy
- ◉ Fortified cereals
- ◉ Fortified juices





VITAMIN D WHEN?

- ◉ Throughout the day
- ◉ Doesn't really matter, just make sure you're getting it.



VITAMIN D HOW MUCH?

- ◉ RDA 600IU/day, blood levels 20nanograms/ml
- ◉ Can safely supplement up to 4000IU/day (ask your doctor)

CALCIUM





CALCIUM WHY

- ◉ Responsible for:
 - Growth, maintenance, repair of bone
 - Muscle contraction
- ◉ Risk of Low BMD and fracture increased by low energy availability, menstrual dysfunction, and low calcium intake
 - Consequently 62% decrease in fracture risk with each additional cup of skim milk- Nieves et al.



CALCIUM WHAT?

- ◉ Sources:
- ◉ Dairy
- ◉ Boney fish
- ◉ Leafy Greens
 - Spinach, kale, collards
- ◉ Fortified cereals and juices
- ◉ Best source of calcium???

ICE CREAM!!!





CALCIUM WHEN?

- ◉ Just consume with Vitamin D and apart from IRON





CALCIUM HOW MUCH?

- RDA= 1300mg/day
 - 1 cup of milk is about 300mg

HYDRATION





HYDRATION WHY?

- ◉ Dehydration can result in decrease blood volume, cardiovascular stress, increase glycogen use, alter CNS functioning, rise in body temperature
- ◉ Goal is to be in a constant state of EUHYDRATION
Dehydration of >2% compromises aerobic performance



HYDRATION WHAT?

- ◉ WATER!
- ◉ Gatorade is a tool. Does not replace water.



HYDRATION WHEN AND HOW MUCH?

- ◉ Quick hydration: Consume 5-10 ml/kg or 2-4ml/lb 2-4 hours before exercise
- ◉ Sip water all day (.4-.8L/Hour)
- ◉ During longer events/runs try to replace sweat loss before deficit reaches >2%



TRICKS OF THE TRADE

⦿ Snack Regularly

Snack Rule!

- ⦿ Eat full/whole meals
 - ⦿ Be cognizant of timing
 - ⦿ Comfort/personalization is suggested
 - ⦿ Avoid Fads
 - ⦿ Gatorade is a tool
 - ⦿ 3 Meals AND snacks daily (don't skip meals)
 - ⦿ K*I*S*S*
-
- ⦿ Treat your nutrition like it's part of your training!

INFLUENCES

- ◉ Dr. Beau Greer
- ◉ Coach John Kenworthy
- ◉ Dr. Matt Moran
- ◉ Coach Tim Beach



QUESTIONS?

