Project: Protein --- 0.7 g/lb. Fat --- 0.45. Carbs --- the rest

**Notes 10/12/17**

* Banned Substance Control Group does not mean that it’s safe.
* NSF inspects facilities, final products, from the shelf. NSF is what to look for
  + In more than 40 countries
  + New analytical labs in shanghai, China
* Supply chain for Dietary Supplements: raw materials 🡪 brokers 🡪 processors 🡪 manufacturers 🡪 ? 🡪 consumers
* Adulteration: product or raw material is contaminated with an inferior material used to pass known analytical testing parameters
* Spiking: where a manufacturer specifically adds raw material to a formulation so the product has a desired effect.
* Cross contamination: Inadvertent contamination due to poor manufacturing conditions or poor cleaning procedures
* Whey Protein: isolates: 90-95% protein by weight, no carbs = no lactose. Concentrates are 50-70% protein by weight (has some fat and carbs, carbs = lactose). Methods:
  + Differences in solubility (function of pH and ionic strength of environment.
  + Purification: size exclusion techniques (ultrafiltration)
  + Chromatographic approaches: particle size, density, charges, polarity)
* Separating milk: acid separates casein from whey. Whey starts in liquid form. Curds = casein (cottage cheese is primarily casein).
* Whey protein concentrate: low levels of fat, low levels of carbs, percentage of protein in WPC depends on how concentrated it is.
* Whey protein isolate: further processed to remove all fat and lactose.
* Whey protein hydrolysate: predigested form of whey protein as it has already undergone partial hydrolysis.
* Why whey protein? People’s reasons:
  + Increase muscle mass
  + Improve exercise recovery
  + Improve performance
  + Decrease soreness
  + Improve health
  + Lose weight
* Benefit of Whey: does acute or repeat consumption of supplemental whey decrease soreness? Acute: no. repeat over time, yes.
* Eccentric: muscle contraction and stretch at the same time. (lowering part of a squat or bench press) concentric is just contraction (coming up in a squat)

**Notes 10/19: Beta Alanine**

* Combines with histidine to form carnosine.
  + Beta alanine is typically the limiting factor for carnosine formation
* Supp Companies say: improve lean muscle mass, decrease muscle fatigue.
* 3-aminoprpanoic acid, non-essential amino acid.
* Generally not used in protein synthesis.
* Carnosine is ingested through chicken, beef and fish.
  + Can’t get into cell – must get broken down first and have beta alanine go into the cell to form more carnosine.
* Buildup of H+ ion while exercise is lactic acid (the “burn” you get when exercising, changing acidity). Carnosine can bind to H+ and slow down the rise in pH
* Precursor to nitric oxide (vasodilator – increased blood flow)
* Parasthesia – due to an increase in blood plasma concentration of beta alanine that binds to nerve endings.

**Sodium Bicarbonate:**

* People who compete in events that last between 1 and 7 minutes.
* At intensities that fall between 80 and 125% of peak maximal oxygen uptake (VO2MAX)
* These events stress the anaerobic glycolysis system significantly and produce a lot of acidity.
  + 400 m – 1500 m running
  + 100 m – 400 m swimming
  + Sprint cycling
  + Kayaking
  + Rowing
  + Canoeing events
* Sports dependent on repeated anaerobic bursts may also benefit.
* Dosage: 300 mg of sodium bicarbonate per kg body weight or 140 mgs/pound of body weight 1-2 hours prior
* Should be consumed with 1-2 liters of water.
* Side effects:
  + Severe alkalosis: blood pH out of normal range --- end up in hospital
  + Side effects like vomiting, gastrointestinal discomfort, bloating, diarrhea w/o sufficient water
  + Vomiting and diarrhea are frequently reported as a result of ingestion of even relatively small doses of bicarbonate.
  + No long term adverse consequences
* Should be co-ingested with a small high carb meal to optimize blood alkalosis and reduce the occurrence of GI symptoms.
* Taken 120-150 minutes before the start of exercise.
* More favorable gastrointestinal tolerance effects after chronic multiday bicarb supplementation.
* Performance of high intensity exercise may be enhanced for a full 2 days after cessation of chronic bicarb supplementation.
* Ergogenic aid for improving performance in short term, high intensity exercise, (300 mg/kg body weight)
* Continued use may help athletes to become less susceptible to the side effects and may give larger improvements in performance
* Use of chronic SB supplementation in combination with HIIT appeared to result in greater VO2MAX.