Workout Physiology Supplements to Increase Muscle:

Dr. John G. Schoenenberger

The Pump:

Red blood cells carry nutrients and O2 to muscle tissue. The muscle pump is very important short term and long term. The larger the pump the greater the O2 to muscle tissue.

You also need amino acids, creatine fore the ATP cycle and glucose.

Sympathetic response- flight or flight also helps increase vasoconstriction and the ability to pump blood faster to tissue.

The more vascular channels you create the more blood flow there is delivered.

Cell physiology is crucial for the pump, sarcoplasmic internal cell makeup for the ATP cycle to deliver energy.

The pump increases growth increases the levels of certain hormones.

1. Vascular endothelial growth factor- VEGF
2. Nitric oxide- NO
3. Insulin- like growth factor- IGF-1

NO: (Nitrogen Oxide)

Increases blood flow to the muscle.

Training hard can raise the level of NO synthase (an enzyme) 3-6 times.

NO is the primary factor in getting and sustaining a pump.

Helps the muscles ability to maintain force, which is essential for strength gains.

(Arginine and Ornithine)

IGF-1:

Influences muscle growth by activating satellite cells and causing them to fuse into existing muscle fibers.

VEGF:

It is a hormone made by your muscles that increases the muscle growth, increases muscle oxygenation and increases the amount of capillaries. O2 is required for energy to build muscle.

** The greater the elevation of these hormone levels and the longer the elevation the greater chance the muscle have to grow.

Glycerin:

Pharmaceutical grade glycerin. Should be able to get at the local drug store.

To load take down 50 ml, of the glycerin. For every 10 mil. Take 20 oz. Of H2O.

Do this 1-hour before the workout.

Creatine:
Creatine should be taken every day as a supplement. Take at least 75 grams of carbs with it so that you force the insulin levels up to push the creatine into the muscle. Used to make ATP in the cell for energy so you need your system to be saturated with it for demand. Some other supplements you might want to take to increase the insulin would be chromium, Vit. C, alpha lipoic acid.

The muscle must be hydrated- cell volumized. It is more likely to sustain the pump. Dehydration has negative effects on strength.

The body has to be well fed to make gains.

Maximizing the pump:
1. Choose compound movements, do them explosively.
2. Get the mind- muscle connection down; concentration of the muscle you are working is important.
3. Use intensity techniques, do a lot of sets, drop sets and extended sets.
4. Use proper exercise selection.
5. Use high volume approach; use 20 sets-plus per body part.
6. Never do maximum singles or doubles in training unless you are a power lifter.

The pump can last for 45 minutes.

Increasing the size of the muscle:
- Need satellite cells and myofibrils.
- Myosin in the myofibrils increases the fusion of satellite cells into your muscles.
- The muscle is broken down and hormonal activity starts, hormones such as growth factor- FGF, insulin- like growth factor- IGF-1 leak into the broken muscle fiber they send a message out and the satellite cells come in response.
    - Bigger muscle fibers are stronger fibers.
    - Amino acids are for the protein to the actin and myosin which lie within the muscle fiber

Eating the right foods:
- Must eat the right foods 24-48 hours within a workout to govern hypertrophy.
- The pump will result in greater nutritional delivery.
- Anti-oxidants decrease free- radicals and the damage they do to muscle cells.
- Amino acids are the basic building block of muscle-protein.
- Once you have absorbed nutrients through digestion they can be sent to the muscles.
    - The pump can last for 45 minutes, so it is essential to replenish the body with nutrients within 5-15 minutes after a workout. You need highest quality of glucose, amino acids and creatine after your workout.

- Protein- 4 calories per gram.
- Glucose and creatine are a fuel source for muscle.
- Protein- from an animal source of protein are indispensable amino acids to a level in which you will not have any amino acid defiencies. Other sources from eggs and milk are also good.
- Plant sources are considered to be deficient in protein.
- 200lb person should try to get 50 grams of protein as part of his 6 meals per day.
- Carbohydrates- 4 calories per gram, they stimulate the release of insulin.
- Insulin is responsible for delivering sugars, amino acids, creatine, fatty acids and various other nutrients from the bloodstream to the interior of the body's various cells. Insulin may be the most crucial hormone to the athlete.
- When you eat the pancreas releases insulin.

Protein Strategy:

- Protein throughout the day must remain consistent. The muscle must have protein to grow.
  - You must take protein every 2-½ -3 hours.
  - This must be a complete source of protein.

Fat Strategy:

- Eat a lower fat diet filled with the right fats.
- Too much fat in the diet delays nutrient absorption by the gut.
- High-unsaturated fats like omega-3 fatty acids.
- These fats make the blood vessels more pliable and more likely to expand.
- This will help blood flow.

Carbohydrate Strategy:

- Timing is important, they involvement glycogen super compensation and modifying insulin sensitivity.
- Super-compoosition involves loading more glycogen into the muscle.
- Insulin sensitivity is the term used to describe how receptive your muscles are to the nutrient storage capabilities of insulin.
- If the muscles are sensitive then insulin can drive more amino acids and creatine into your muscles and create a situation that allows for more glycogen storage.
- To increase the insulin sensitivity we must stagger carbohydrate intake.
- Some meals must be very low in carbs which causes the muscles to be sensitive to insulin
- Then we hit the muscle with large doses of protein and carbs at specific times like the am or after a workout to maximize the nutrient storage and muscular pumps.

Maintain Nitrogen Balance:

- Nitrogen is the key atom found in every amino acid.
- If you can keep your body from losing nitrogen relative to the amount you eat then you are in positive nitrogen balance so you will retain or build muscle.