

Basic Concepts; Elite Sports Nutrition

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Elite Sports Nutritionist
Perform and
Function

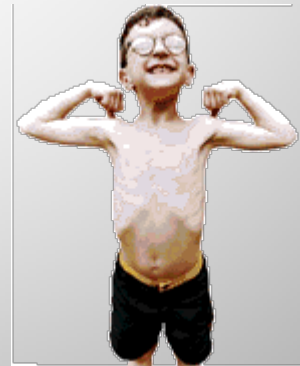
What did you have for lunch?

- Tom yum soup – immune boosting
- Spinach, garlic and lemon – immune and alkaline forming foods, high in calcium
- Filet steak – high quality protein with iron and b-vitamins
- Salmon steak – good levels of omega 3 and proteins
- Basmati rice – low GI carbs
- Pineapple and papaya – enzyme rich protein digesting foods

Weapons of Mass Destruction



Healthy Vending Machines?



What the right nutrition can do

- Hydration for energy & performance
- Balance blood sugar for mental/physical performance
- Support fat loss and/or muscle gain
- Improve cellular function
- Provide the right fuel for maximum performance
- Support a healthy immune system

- Influence the way you feel, think and behave

Consequences of Poor Nutrition

- **LACK OF ENERGY!**
- Lower mental acuity
- Poor aerobic capacity worsened by;
- Failure to gain lean muscle mass
- Increased fat mass
- Lethargy - 'Heavy legs'
- Slow recovery from sporting events
- Infection and injury
- Shorter life span
- Sarcopenia



Consultants To;

- ERFU – since 2002
- UKA – Loughborough site 2012 Olympics
- Tigers, Wasps, Saracens, Irish
- Olympic finalists and medallists
- Brisbane Broncos
- Boxing, British light weight champion
- Your grandma
- 1000's of ill and over weight clients.....

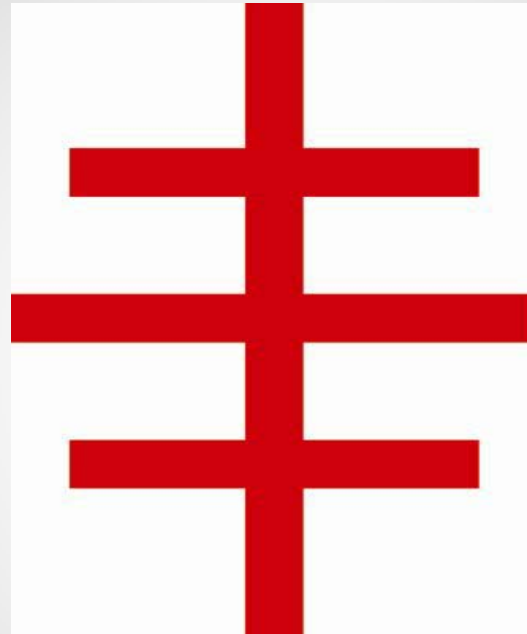
Get the Basics Right.....

- BASICS ESTABLISH A BASE
- 9 out of 10 of these things you probably already know
- Hopefully the 10th thing will add a little bit to your own knowledge and ability to apply that knowledge.....
- You will get all slides for your reference and information pack email me.....

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FREE

-to evolve
-to choose



CHEERFUL

-Happy

HARDY

-strong work ethic

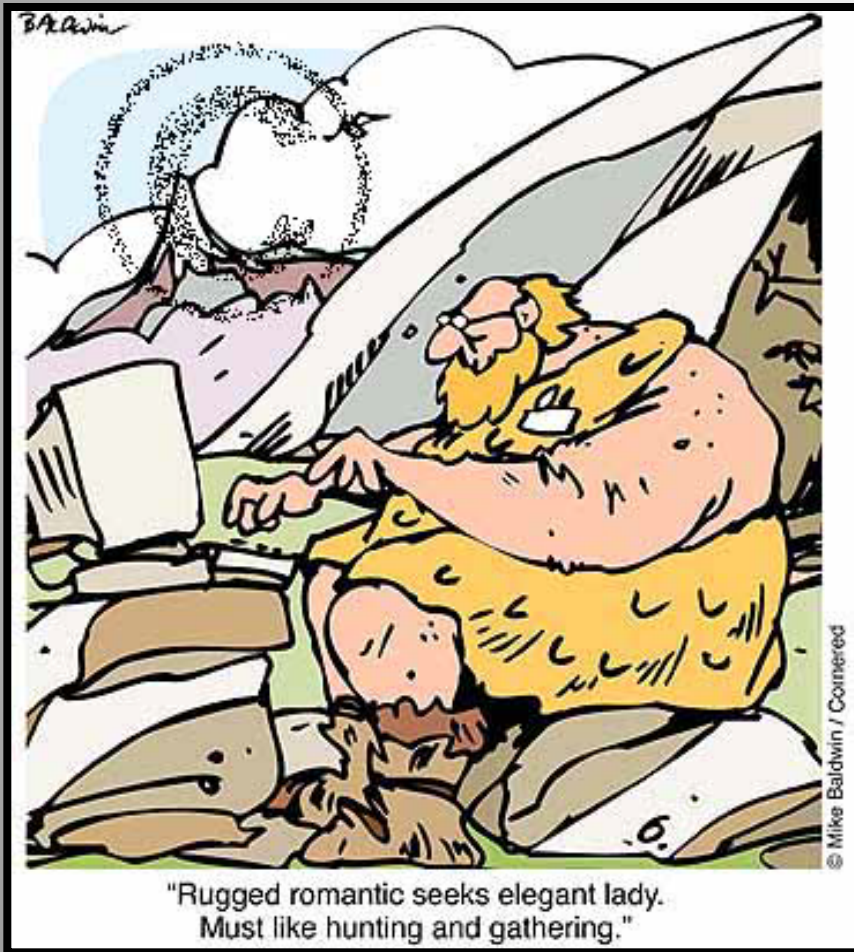
NATURE FEARING

-nature respectful
-nature aware

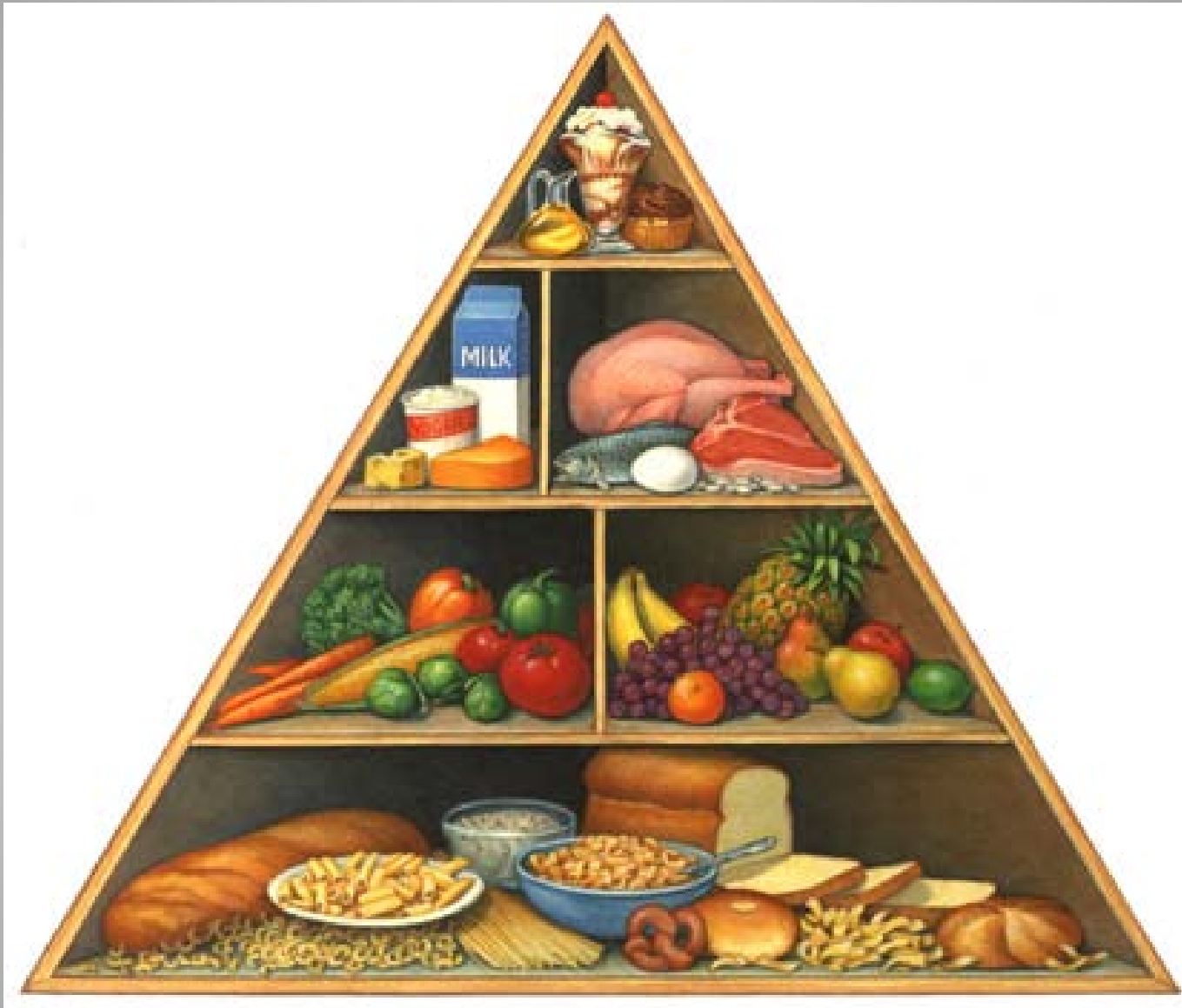
What does this mean?

- Dietary and supplemental Intervention
- In order to enhance performance
- Nutritional Philosophy
- No absolutes

Modern Choices



- If it ain't natural don't eat it
- Modern food production and selection is a minefield
- If its not how nature intended it to be then it may be an idea to avoid it



Don't Eat like this if you want to succeed in power based sports

Balanced Sports Nutrition

Ergos

Supplements

High quality diet

Principle 1; Preparation Principle

- Trying to build a healthy, optimally functioning body out of poor ingredients is like trying to put icing on an unmade cake
- Adding performance nutrients to an unmade cake is worthless
- Take time to choose, prepare and cook your food – you are what you eat.....

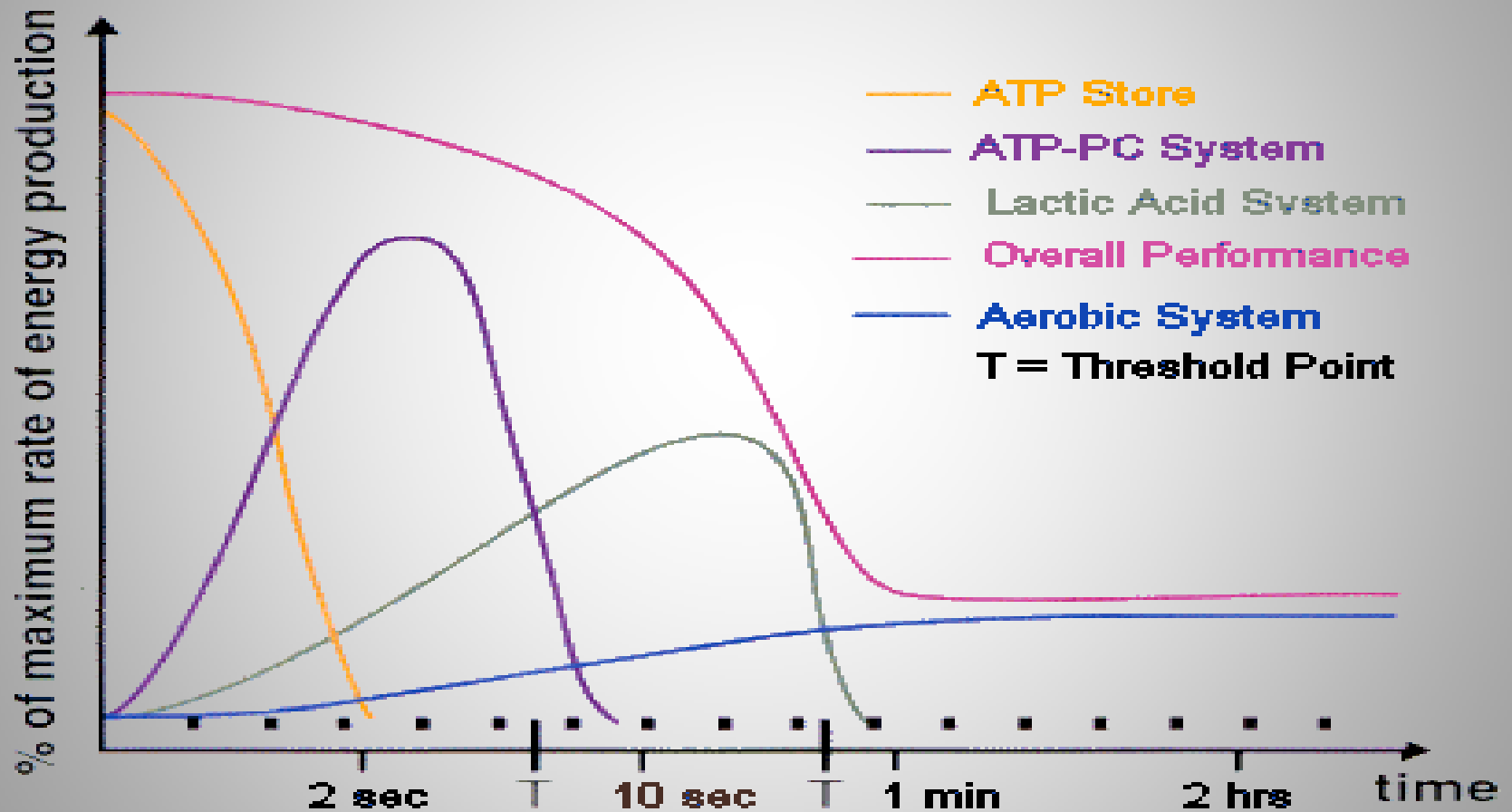
Proper preparation prevents piss poor performance.....

Physiological and Metabolic Changes During Intense Exercise

Description	Change		Description	Change
ATP levels	Depleted		Muscle damage	Increased
Muscle glycogen	Partially depleted		Immune system	Suppressed
Cortisol levels	Increased		Inflammation	Increased
Protein degradation	Increased		Fluid loss	Increased

You are what you eat, and what you ate, just ate.....

Energy Systems



Principle 2; Biochemical Individuality

- Each person has a different set of variables which make up their biochemical individuality, knowing what these are is critical to success
- There are however some common traits which everyone should aim to get right
- Get the bottom line right; Blood sugar, hydration and basic supplementation
- Then individualise afterward

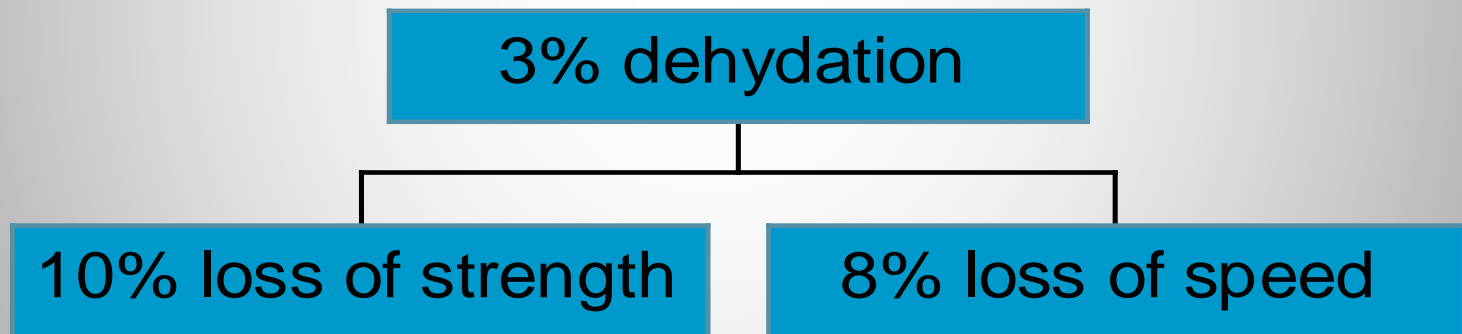
Macronutrient Manipulation – the Tools

- **Water:** hydration cellular function
- **Protein:** structure, growth & repair
- **Carbohydrate:** fuel, short term energy
- **Fat:** energy storage, fuel & structure



Hydration

Poor hydration is a major issue for athletes



AND MORE

- Dehydration reduces mental functioning:
 - decision making
 - reaction times
 - concentration
 - anticipation
 - skill delivery
 - task inaccuracies

ENERGY
Memory
STRESS

CRAMPING PROTOCOL

- Dehydration
- Salt - increase
- Magnesium
- Electrolytes
- Lack of fitness CNS fatigue
- Muscular imbalances
- How many single legged calf raises can you do?

Hydration Protocols

- On going Hydration – build good habits
- It takes 10-14 days to become fully hydrated
- Pre Hydration – start the day hydrated
- Hydration During the event – don't become dehydrated if possible
- Rehydration – rehydrate fully for maximum benefit

Hydration

PRACTICE:



Training 2nd - 4th Oct	02/10/05		03/10/05		04/10/05	
	Sun		Mon		Tues	
	p.m.	a.m.	After Lunch	Pre Dinner	a.m.	After Lunch
Player name	600	820	240	130	770	750
Player name	430		730			
Player name	680		380			
Player name	410	190	170	420	630	230
Player name	390	630	720	420	660	230
Player name	960	980	330	240	890	
Player name	350	790	60	660	330	350
Player name	320	530	420		540	510
Player name	950	760	390	860		
Player name	700	390	140			
Player name	370	610	180	370	610	590
Player name	490	450	810	510	390	
Player name	590	390	240		480	280
Player name		730	850			
Player name	860	420	370		850	
Player name	920	920			230	850
Player name	280	680	850		500	
Player name	780	130	310	140	480	610
Player name				460	590	
Player name			500	240	370	150
Player name	670	530	340	290	600	400

Dehydrated	Warning	Good
>800	600-799	200-599

Base Hydration Requirement

- On Going Hydration –
- 85kg = 2 litres
- 100kg = 2.5 litres

- Plus 1 litre for each hour of exercise
- High temperatures, high humidity and unsuitable clothing will increase fluid losses

Goal: Competition Hydration

- Pre Hydration:
- Take additional fluids in 24 hours lead up
- Use electrolytes
- During competition 0.5-1.0 litre @ Break Time
- Drink at every available opportunity

Re-hydration

- The amount of re-hydration will depend on the amount of fluids lost
- More than 2% (2kg) = fluids before powders
- Fluid lost can be best estimated by pre and post workout or event weights
- Aim to will be to replace each kg lost with 1-1.5 litres of fluids

Water sources

- Thames and Northampton tap water
 - Cryptosporidium hominis, lead, phosphates
 - » Thames Water draws >60% water from rivers treated with ozone and chlorine
 - » 2005: 1 in 40 taps produced lead above EU limits
- Plastic or glass
 - Endocrine disrupters, shelf life
- Reverse osmosis
 - Pure H₂O

Principle 3; Water Principles

- Drink clean water – reverse osmosis
- Drink alkaline water
- Front load hydration
- Aim to supply adequate electrolytes
- You'll need 75% of the water with the right electrolytes – fireman study
- Cellular hydration is key to recovery

Rehydration protocol

To become fully hydrated you must follow these simple steps:

Drink *at least* **5L of fluid on training days** & *at least* 3L on rest days;

- Drink **500ml of fluid on waking** (before breakfast);

- Have a **drink with every meal**;

- Always replace 1.5 x the fluid lost following exercise:

1.1 hour of moderate to high intensity exercise leads to sweat loss of 0.5L in **15°C**, thus you need to drink **0.75L** in this temperature;

1.1 hour of moderate to high intensity exercise leads to sweat loss of 1.5L in **25°C**, thus you need to drink around **2.5L** in this temperature;

- Add a **pinch of salt to all meals**;

- Add electrolytes sachets with 500ml of water **three times per day**;

- Aim to **consume all fluid by 4pm** to limit sleep disturbances;

- **Avoid diuretics** such as caffeine and alcohol;

- Aid heat loss by **limiting clothing layers/** head gear and reducing time in hot environments (**limit temperature at home, avoid saunas**).

It takes 2 weeks to become fully hydrated

5% decrease in body mass due to hydration leads to a 30% decrease in endurance performance

Protein

- “Of great importance”
- Roles; building blocks
- Nitrogen retention; protein synthesis
- Protein synthesis (PS) Protein degradation (PD) $PS > PD$ to increase muscle





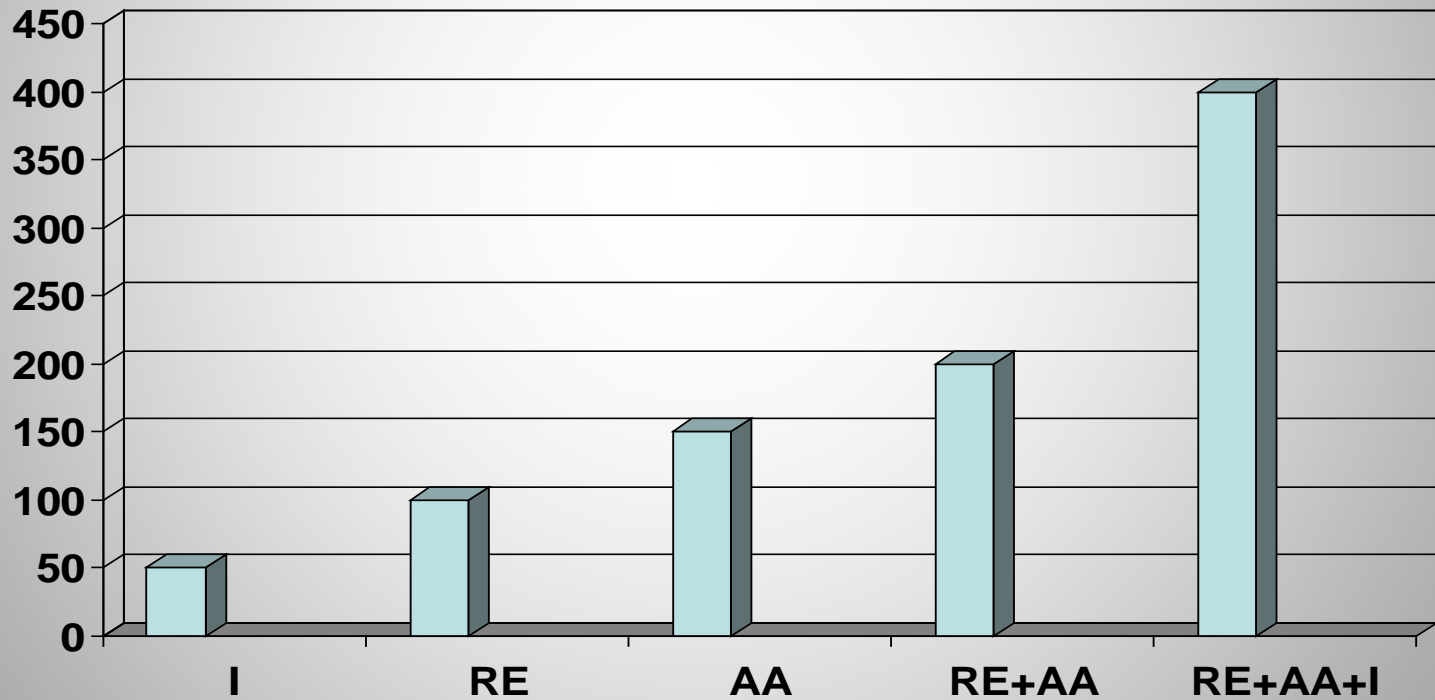
Not just about muscles;

- Slows down carbohydrate absorption
- Builds neurotransmitters
- Stimulates sympathetic ANS
- Builds hormones
- Sustains immune function
- Builds energy

Protein

- Amounts; 1.4 – 2.8g / kg LBM
- Average consumption 187g – 238g per day
- Amount in one sitting (Guyton M.D 1992)
- Protein pulses (Arnal MA et al 1999)

Protein Synthesis



(Rasmussen, et al. 2000)

Timing of Amino and Carb Ingestion

- An essential amino acid and sucrose combination taken prior to resistance exercise results in a greater anabolic response than when taken after resistance exercise (Tipton, et al. 2001)
- So take both pre and post workout enhancing nutrition



Functional Proteins

- Meat in the diet is preferable in terms of favourable body composition changes (Campbell et al 1995, 1999)
- Fish may help increase glucose sensitivity more than soy or casein protein, independent of it's EFA profile (Lavigne et al 2000)
- Eating a diet high in meat may raise T levels through lowering SHBG (Franco Berrino et al 2001)

Protein

- Flex your protein requirements according to need
- Training & muscle growth will increase needs
- Needs vary depending on state of recovery
- 1.4-1.8g/kg
- 1.8-2.2g/kg
- 2.2-2.8g/kg

Intense training for intermediate sports increases protein turnover

PRAL

- Potential renal acid load
- Ash analysis limited
- Remer and Manz;
- Net acid load
- Composition, bioavailability and sulfur content
- Low grade metabolic acidosis
- Tool to encourage vegetable consumption

PRAL SCORES

- Meats average: 9.5
- Fish average: 7.9
- Confectionary: 4.3
- Vegetable average: -2.8
- Grain products: 3.5
- Fruits average: -3.1

Adapted from Remer and Manz study (1995, 2001)

PROTEIN EXAMPLES

Body Weight	Minimum Protein Needed at 2.2g/kg	Example foods
85kg	187g	4 x egg whites, 2 x chicken breasts, 1 x tuna steak = 112g
	75g	Shakes, Recovery and Smoothies
90kg	198g	5 x egg whites, 2 x chicken breasts, 2 x tuna steaks = 138g
	60g	Shakes, Recovery and Smoothies
100kg	220	5 x egg whites, 3 x chicken breasts, 2 x tuna steaks = 168g
	52g	Shakes, Recovery and Smoothies

Protein Can make you fat!

- Breakfast; scrambled eggs, sausage, bacon and beans – lowish carbs, high sat fat – don't eat carbs on top of this
- Choose lean cuts of meat
- Have red meats as a treat 2-3 times per week, e.g. 2 x beef, 2 x lamb, 2 x pork
- Limit red meat consumption towards competition
- Conversion at around 30% of protein calories

Animal Protein and Cancer

- Eat organic or wild meats, fish, fowl and dairy
- Avoid processed meats
- Avoid excessively burnt meats
- Make sure you take pro biotics
- Make sure you eat plenty of fiber
- Consider a fiber supplement
- Balance your meat and protein intake with an equal amount of vegetables and fruits

Principle 4; Protein Principles

- Choose organic or free range where possible
- Establish a protein base for each player
- Choose types of protein according to functional needs
- Vary the types of protein according to the time of day and required hormonal response
- Vary the type of protein towards competition day



Fats

- Structure and classes
- Functions
- Timing and amounts
- Bloods

Correct Selection of Fats

- Promotes lipid peroxidation
- Replenishes muscle triglycerides
- Enhances immune function
- Improves hormonal environment – T levels
- Improves insulin sensitivity (Luo J Nutr 1996; 126: 1951-8)

Ratio n-6 : n-3

- Paleo diet close to 1:1 (Eaton., et al 1992, 1998)
- Modern diet 20:1 to 50:1 (Hibbeln JR, et al 1997)
- Total dietary fat intake 90g example;
- 30g sats, 30g Monos, 30g Polys of which 25g n-6, 5g n-3 = 5:1 ratio
- The addition of 3 tablespoons flaxseed takes Polys up to 75g of which 40g n-6 and 35g n-3 = 1:1 ratio
- fish oils decrease size and number
- corn oil and canola increase size
- trans and lard increase number

Fat Types

- Trans and hydrogenated fats decrease membrane fluidity (Field J Biochem 1998; 253: 417)
- Saturated - may have some use in lean mass acquisition
- Monounsaturated – Inert, decreases cholesterol (Mattson J Lipid Res 1985 26: 194)
- Polyunsaturated – performance focused get ratio right!
- CLA – potential ergogenic, immune supportive & anti-inflammatory
- MCT's – thermogenic, easily metabolised – functional as coconut oil (Enig, M 2004)



Testosterone and Timing of Fat Intake

- Additional fat from animal protein may enhance testosterone production if taken after exercise
- Mechanism may be reduced SHBG levels
(Reed, M., et al 1987)
- Or increase cholesterol combined with LH drive for T production

Fat can make you fat!

- Raw nuts = 1 handful a day
- Avocado = 1 per day
- Egg yolks = 2 per day
- Aim for 1/3rd saturated
- 1/3rd monounsaturates
- 1/3rd polyunsaturated; fish oils, oily fish

Guidelines for Fat Intake 100kg

- 33-50g saturated fat =
- 33-50g monounsaturated =
- 33-50g polyunsaturated =

- 2 tablespoons olive oil = 30g mono
- Small Handful of nuts = 20g
- Large Handful of nuts = 50g
- 4 eggs = 20g saturated
- 1 tablespoon coconut oil = 15g
- Teaspoon of oil = 5g

Principle 5; Fat Principles

- Low fat foods are normally very high in sugar
- Higher fat diets are better for testosterone production
- Fat has no impact on insulin
- Fat supplies anti-inflammatory hormone building blocks
- Increase omega 3 sources avoid omega 6
- Never eat high fat high carb in your 90% block
- Functional fats include; coconut oil, fish oils, CLA, flax
- The safe % of trans fats in the diet is 0%
- Fats are heat sensitive – be aware of this
- If you eat high fat, eat low carbs and vica versa

Images



Carbohydrates

- Structure vs function
- No correlation between simple and complex classification and functional aspects of ingestion
- Glycemic Index
- Insulin Index – Jelly babies and recovery drinks

Low GI Diet Benefits

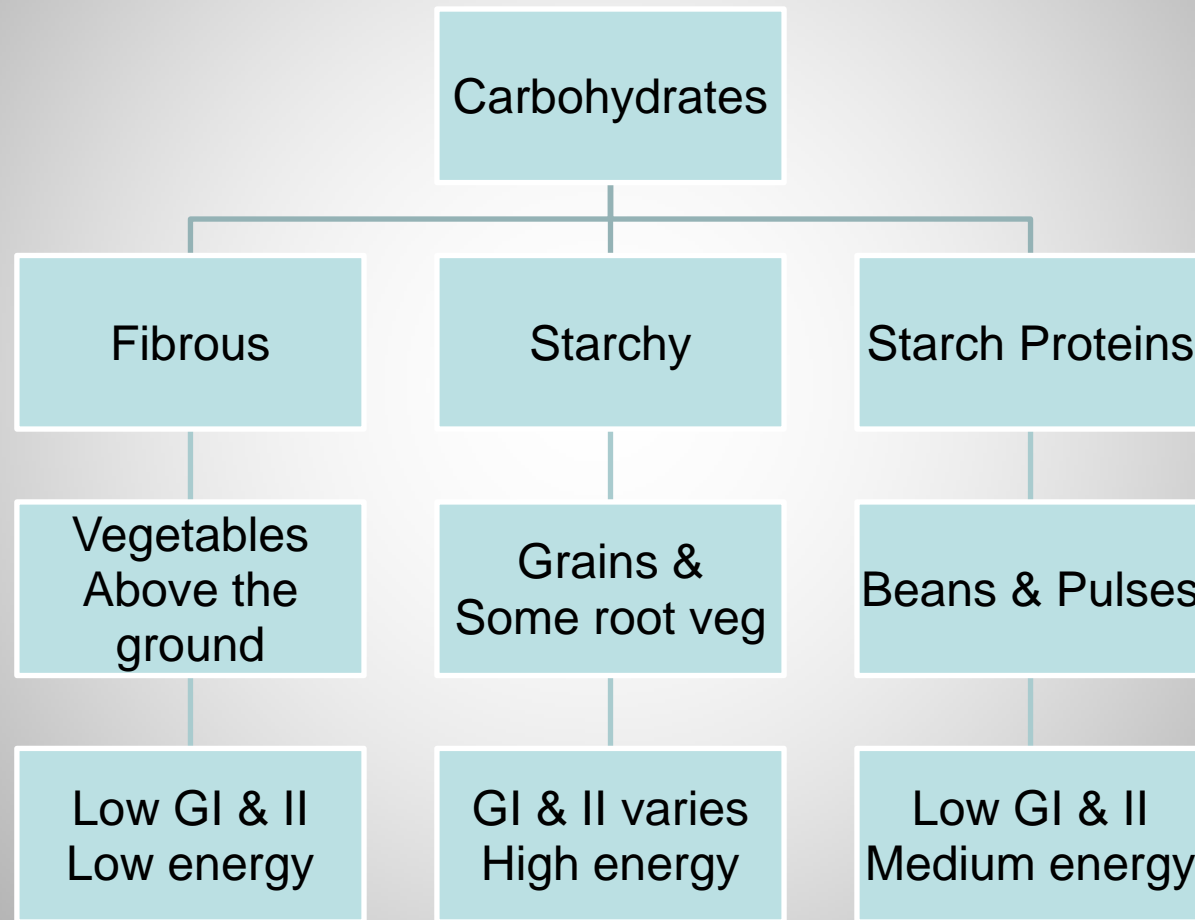
- Higher nutrient density
- More stable blood sugar
- Minimises fat deposition
- Promotes lipid oxidation
- Increased satisfaction
- More stable insulin glucose levels



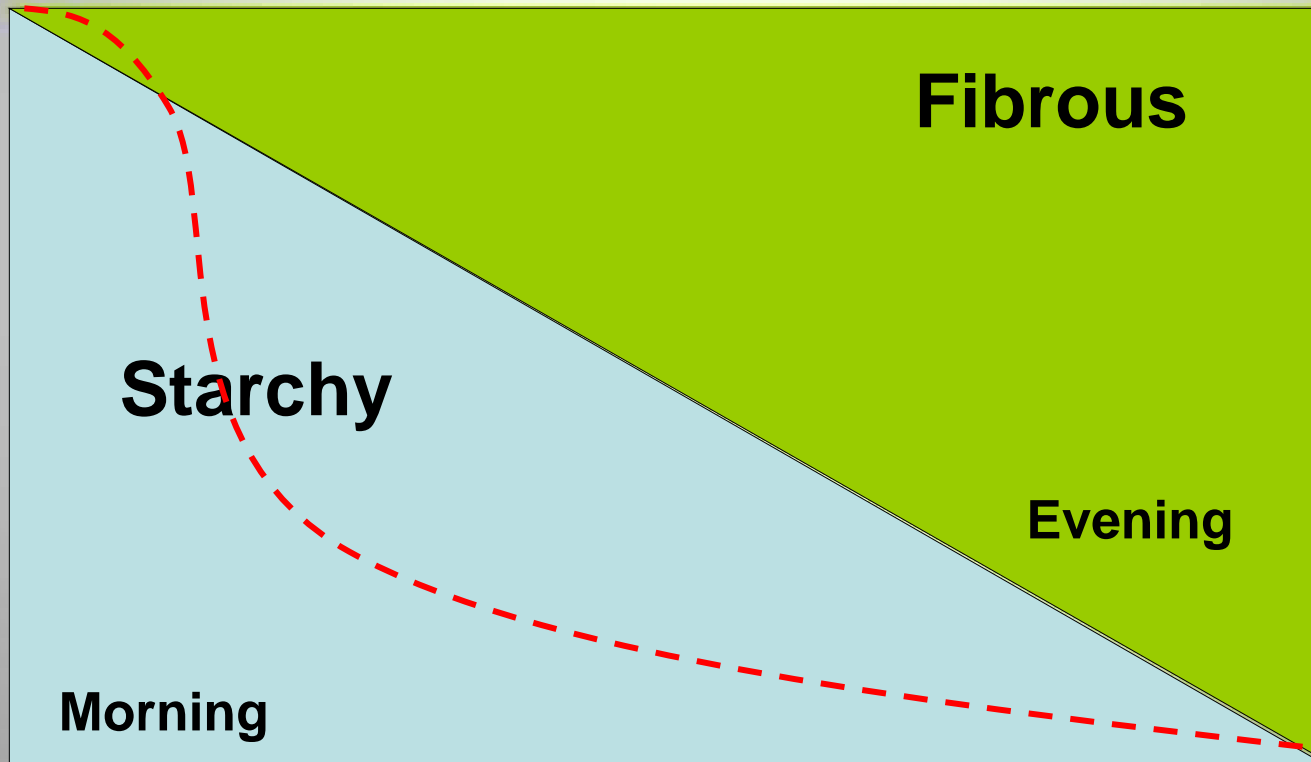
Coca-Cola

TRADE-MARK®
CLASSIC

Classes of Carbohydrates



Timing of Carbs



ENERGY INTAKE MATCHES ENERGY EXPENDITURE



Timing

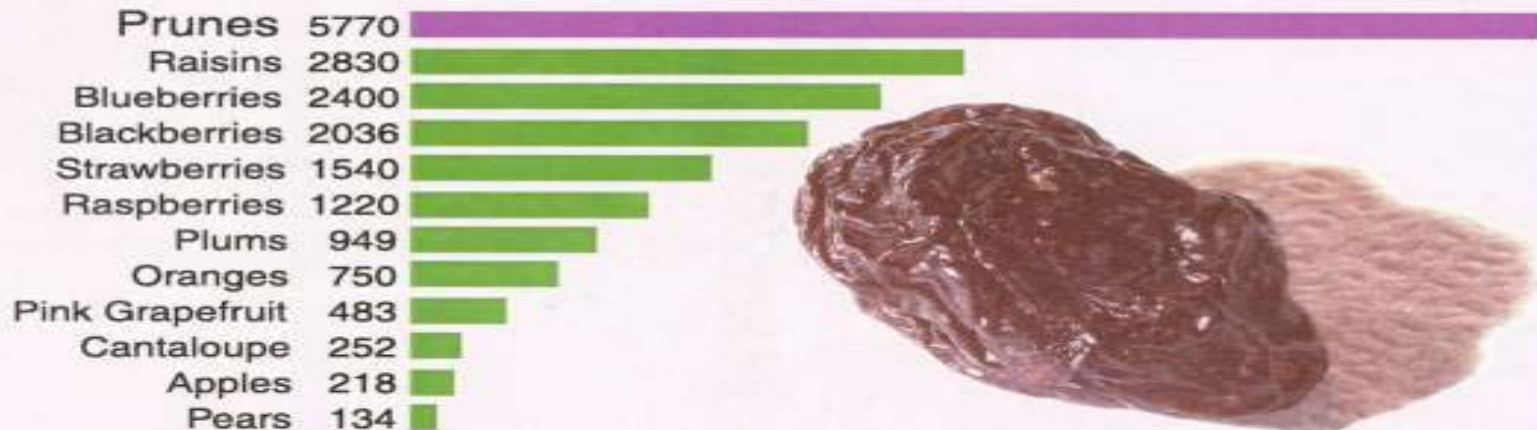
- Glucose tolerance is worse in the evening (Grabner, W., et al. 1975)
- As FFA increase they can have a negative effect on carbohydrate tolerance (Frapa, D., et al 1997)
- Carbohydrates are generally not as well metabolised at night (Lee, A., et al. 1992) (Wu, M., et al 1986)
- Appetite for carbohydrate tends to be higher at night

Antioxidant Content of Fruits

Prunes Score Highest in Antioxidants

U.S. Department of Agriculture scientists at Tufts University have ranked fruits by their anti-oxidants levels. Many researchers believe anti-oxidants slow the aging process.

Fruit anti-oxidant score*



*Oxygen Radical Absorbance Capacity is a test tube analysis that measures the total anti-oxidant power of foods and other chemical substances, per 100 grams.

Source: U.S. Department of Agriculture

GRAPHIC BY SAN JOSE MERCURY NEWS

ENZYMES

Enzyme preservation is the secret to health.

Enzymes are the spark plugs that make biochemical engines in every one of our cells fire properly. They spark every significant process that goes on in our bodies: digestion, nerve impulses, detoxification, the workings of DNA and RNA, repairing and healing, thinking and remembering, and, among others, the making of all hormones.

Anti-Nutrients and Empty Calories

- All refined foods
- Sugar (except post training)
- Excess Caffeine
- Alcohol
- Cakes, biscuits and pastries
- Crisps and confectionary

- Soda Pop
- Refined Wheat
- Chips
- Fast and junk foods
- Snack a jacks
- Doughnuts
- Breakfast cereals
- All chemically assisted foods

Principle 6; Carbohydrate Principles

- Different carbohydrates have different energy density and rate of absorption
- Carbs influence insulin more than other commonly consumed nutrients
- Controlling insulin is the key to 80% of performance diet and health issues
- Carbs like other foods can contain allergic elements
- Veggies are best, then berry fruits, then root veggies, then whole-grains – construct the diet accordingly
- Enzymes are a key stone to health

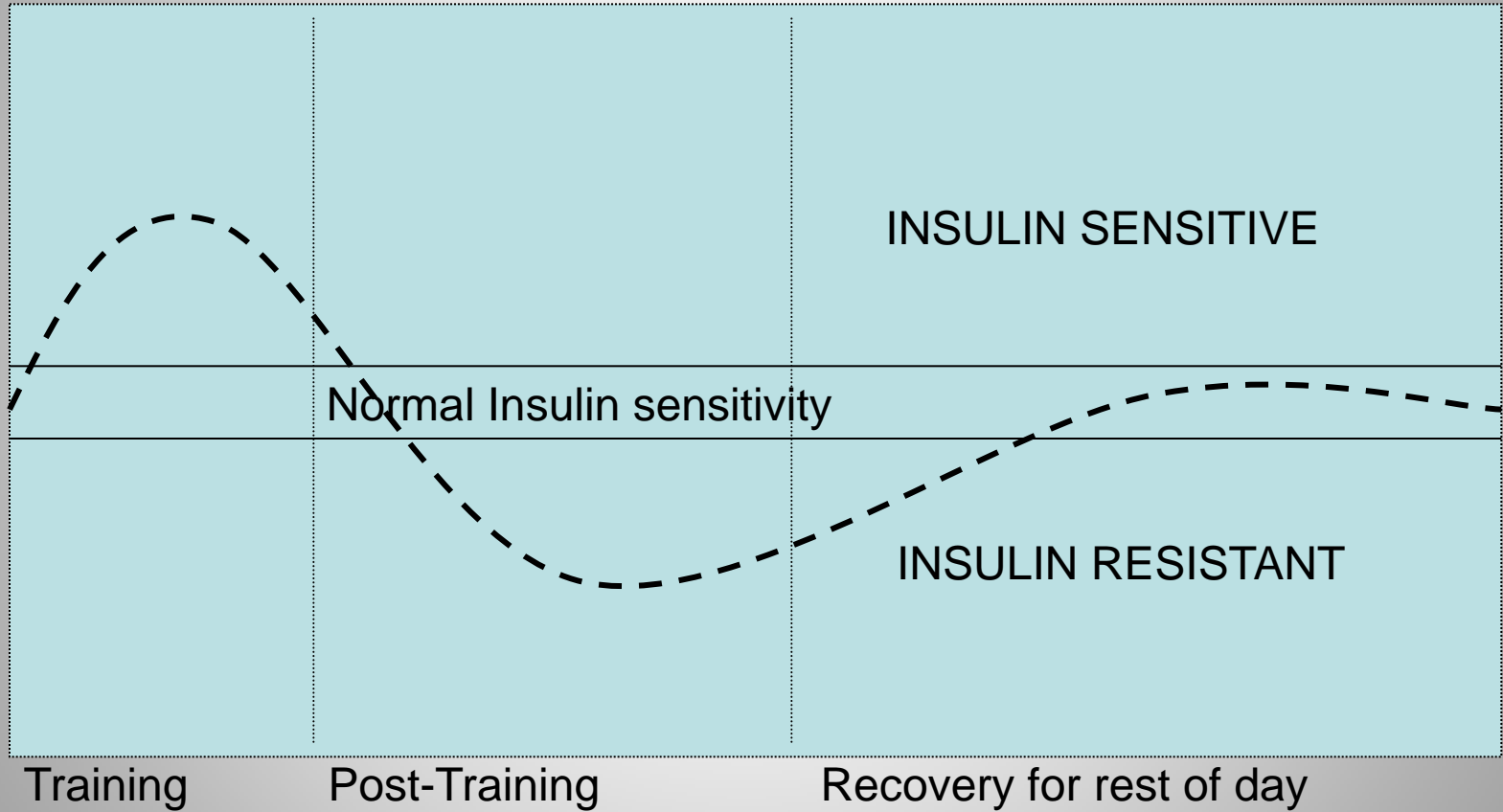
Match Recovery & Muscle Damage

- Training process
- Time between sessions
- Liquid recovery is best

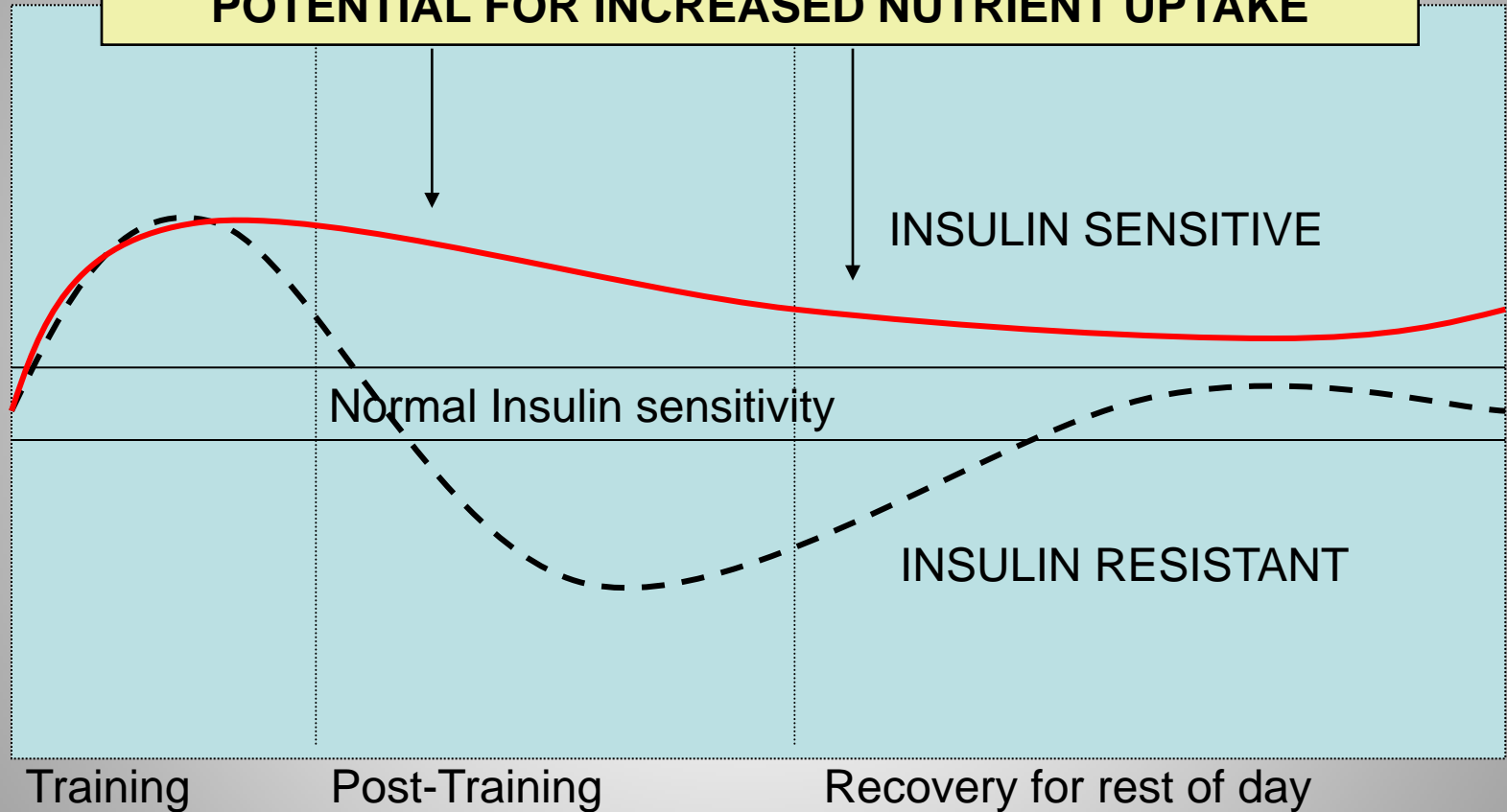
Advanced Recovery

- Specific to Weight
- Specific to Intensity
- Intensive CHO Loading
- Increased Intensity = Increased number of high CHO feedings
- Needs to be high GI
- Needs to be:
 - Immediately post exercise
 - Within 2 Hours
 - Again 4 Hours later

**FAILURE TO PROPERLY RECOVER RESULTS IN POOR
INSULIN AND GLUCOSE TOLERANCE**



**PROPER RECOVERY RESULTS IN IMPROVED
INSULIN AND GLUCOSE TOLERANCE
POTENTIAL FOR INCREASED NUTRIENT UPTAKE**



Doyle, J., et al (1993)., Sherman, W., (1992) Widrick, J., et al (1992)

LOW / MEDIUM INTENSITY RECOVERY – 100kg

- LOW INTENSITY=fairly light to somewhat hard in nature
- E.g. Drills, strides
- To recover from a low intensity session:
- 25g CHO 40g+ Protein

MEDIUM / MODERATELY HARD INTENSITY RECOVERY-100kg

- MEDIUM INTENSITY =somewhat hard to hard in intensity
- E.g. sprints, higher intensity weights sessions
- To recover from a medium intensity session:
- 35g CHO, 40g+ Protein

VERY, VERY HIGH INTENSITY RECOVERY-100kg

- HIGH INTENSITY = Hard to very, very hard in nature
- E.g. matches and extremely hard weight sessions
- To recover from a high intensity session:
- 50g CHO 40g+ Protein

Recovery Matrix

TRAINING INTENSITY	Immediately	Within 1-2 hours	Within 3-4 hours
LOW	1 scoop of recovery powder in 300mls water		
MEDIUM	2 scoops of recovery powder in 350ml of water	A Medium sweet potato with lunch in addition to routinely consumed foods	
HIGH	3 Scoops of recovery powder in 400ml of water	A banana and bowlful of blueberries and yoghurt in addition to.....	A large slice of date and walnut cake with fruit smoothie

Principle 7; Recovery Principles

- You must recovery aggressively and appropriately after each session
- Recovery should be graded to intensity, duration, body weight, body fat and body type
- Period of recovery should be lengthened according to intensity and duration of the session
- Intensity = degree of metabolic disturbance
- Recovery requirements need to be viewed in terms of requirements of next exercise session

Meal Matrix

Less Active			More Active	
Fat Loss			Performance Energy Lean Mass Gain	
PROTEIN	VEGGIES (above the ground)	EFA's	FRUIT	STARCH
				Veggies below the ground

Basic supplement principles

- Particular Need for **iron, calcium** and other minerals such as zinc during adolescence
- Vitamin D – pandemic deficiency
- Magnesium commonly deficient
- Omega-3 essential fatty acids
- Antioxidants
- A multivitamin & mineral
- Joint care and cartilage support – older athletes

- Adherence

PLAN INTO ACTION PLAN

- Performance Nutrition Summary
- 10 Point Plan and Check List
- Example Day



BACK TO BASICS

- **Golden Rules to be Practiced 80-90% of the time and never forgotten;**
- **Drink enough water / green tea / hydration drinks, never get thirsty!**
- **Eat Frequently, eat every 2-3 hours no matter what, unless you are sleeping**
- **Eat Protein every time you eat**
- **Eat vegetables or fruit every time you eat but eat more veggies than fruit**
- **Eat starchy carbs every time you eat but eat more around time of the day when you are more active (breakfast and lunch) and less or none when you are less active**
- **Recover aggressively and appropriately after every session**
- **Eat whole-foods, low GI all the time except post-training when high GI foods are better for speedy recovery**
- **Eat fat, but eat the right kind of fat – from oily fish, nuts and seeds, olive oil and omega eggs**
- **Avoid ‘empty’ foods which contain calories but no goodness; doughnuts are a good example of these types of food**
- **Remember to enjoy your foods and practice the 80:20 rule or 90:10; this means of 42 weekly meals and snacks, 4 can be whatever you want if you are being strict 90% of the time and 8 can be naughty if you are being strict 80% of the time**

CHECK LIST

- Am I thirsty?
- When did I last eat?
- Did I eat Protein with that?
- Were there veggies or fruit with that?
- Did I eat Starch according to my training?

- Were there 'good' fats with the meal?
- Am I eating sweets all the time even when I have not trained?
- Do I eat wholefoods?
- Am I thirsty?

EXAMPLE DAY

- Porridge & Protein
- Sardine Omelet with red onion
- Eggs and beans on toast

- Cottage cheese & apple
- Fruit / Protein Bar
- Open Tuna Sandwich

- Recovery Shake and fruit
- Spinach Salad with chicken and walnuts

- Rice, Chicken and Peas
- Mackerel, potato and broccoli

- Sugary drink and fruit and a protein bar

- Steak and Spinach
- Salmon and green beans
- Lamb and roasted veggies
- Cold meats and raw veggies
- Cottage cheese

TREAT
FOODS

GRAINS

ROOT VEGGIES

FRUITS; BERRIES

GOOD FATS

PROTEIN

VEGETABLES

WATER

S
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THE IMAGES



Information Resources

- www.sportsnutritionvlog.com
- www.fourweekfatloss.com
- <http://sportsnutritionvlog.com/regenerate.html>
- www.adrenaltest.co.uk

