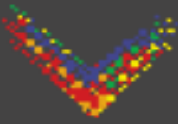


Introduction to Performance Nutrition in Swimming

Alex Popple



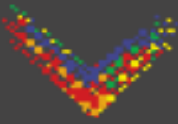
Aims & Objectives

Aims

- To develop an understanding of performance nutrition and why YOUR son/daughter/swimmer needs to use it.

Objectives

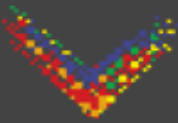
- To introduce some of the different components of sports nutrition
- Cover the importance of macronutrients, micronutrients, and fluids for swimming
- Establish appropriate feeding strategies for swimming performance

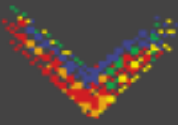


Take Home Messages

Appropriate Foods & Fluids for son/daughter/athlete

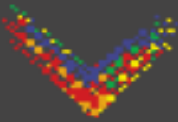
- For hydration
- For Re-fuelling for training
- For Recovery from training
- Correct types of carbohydrates for different times?





Food for Success

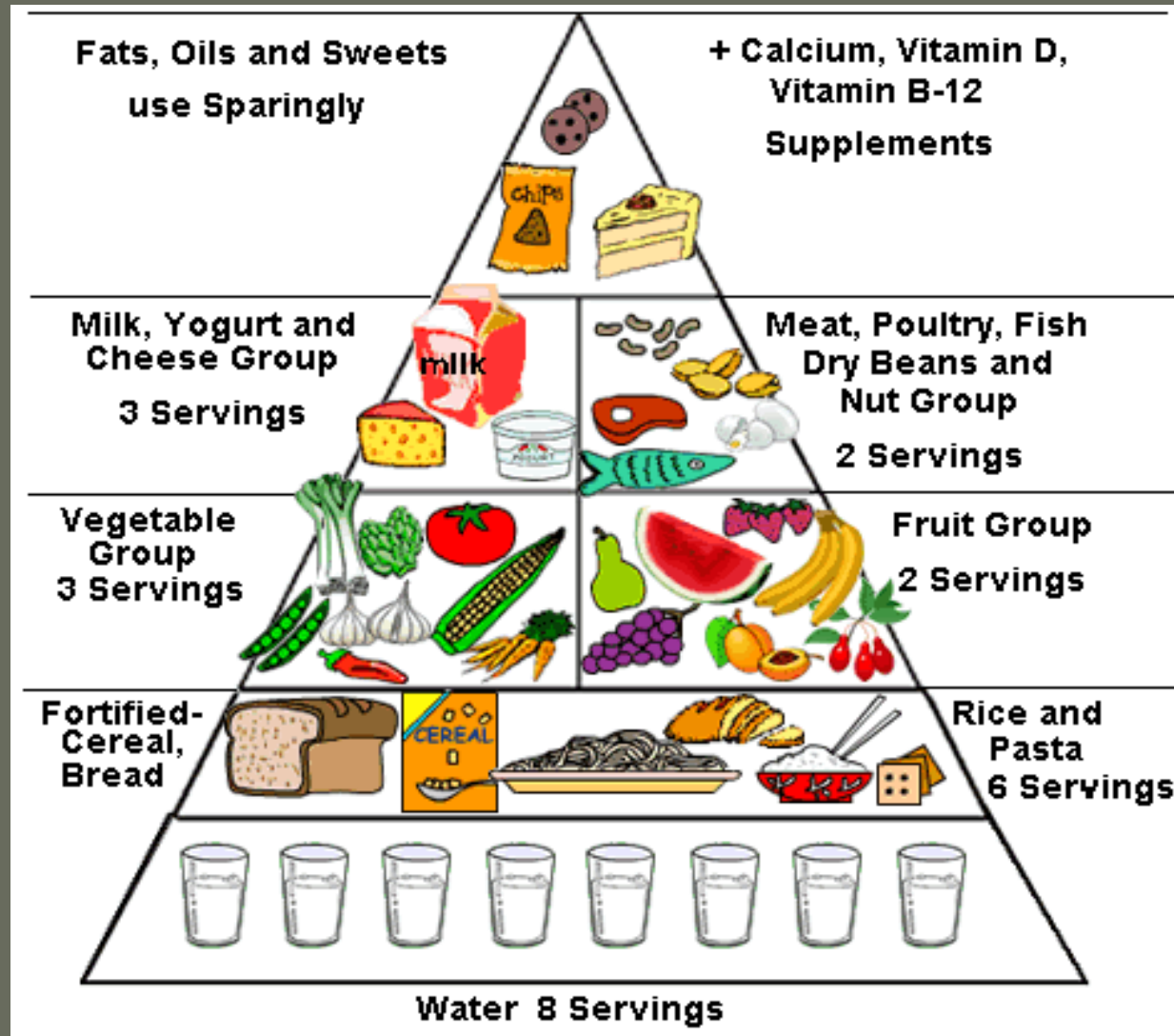
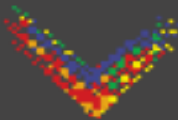


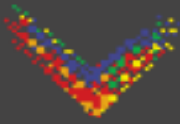


Poor Dietary Habits vs. Appropriate Dietary Habits

Cause:

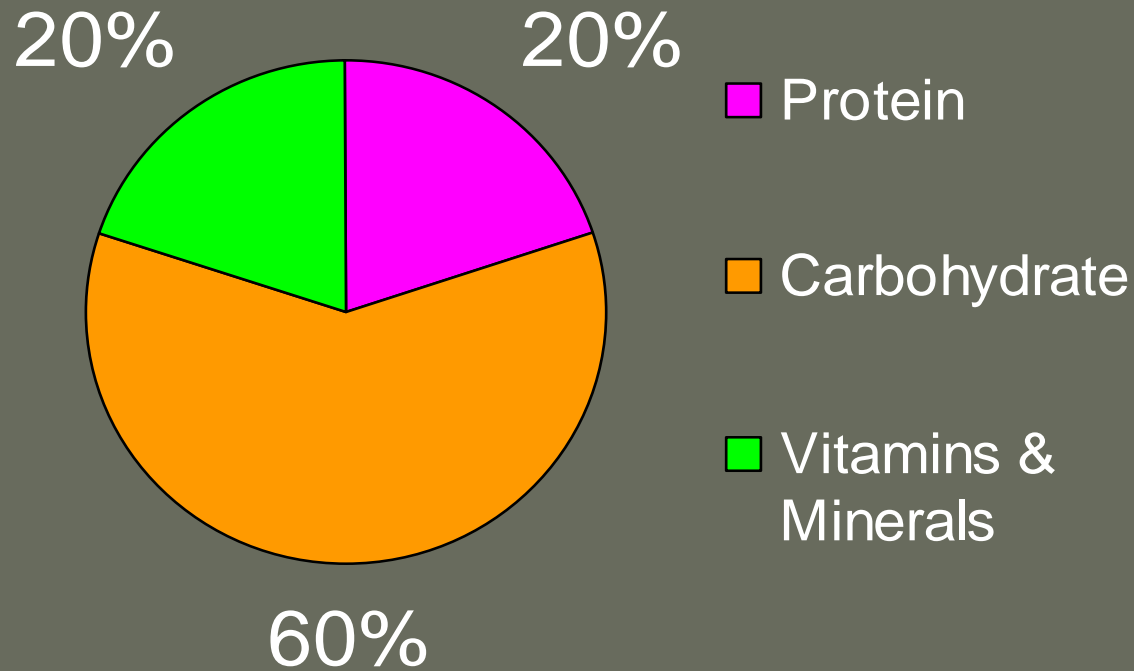
- **Fatigue** vs. **Optimized energy stores**
- **Poor performance** vs. **Improvements in performance**
- **Inadequate recovery** vs. **Training Adaptations**
- **Injury** vs. **Reduced risk of injury**
- **Illness** vs. **Strong immune system**
- **Unwanted weight loss or gain** vs. **Supported weight loss or gain**
- **Poor mental function** vs. **Improved concentration**

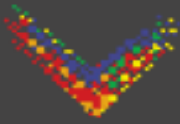




The Food Pyramid in the Daily Diet

Portion sizes – On the plate





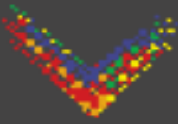
Getting the balance right



✓ Supporting Performance

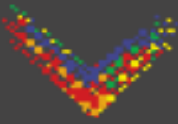
x Detrimental to Performance





Macronutrients, Micronutrients, & Fluids

- **Carbohydrate – TO GO**
 - Swimming Fuel (muscle and liver glycogen stores)
- **Protein – TO GROW**
 - Building blocks (growth & repair of body tissues)
- **Fat**
 - Brain and Muscles work (Cellular function)
- **Vitamins and Minerals – TO GLOW**
 - Healthy body functions (homeostasis, cellular function)
- **Water**
 - Transport and Cooling system (homeostasis)



Macronutrient availability during swimming

Carbohydrate

- 4 Kcal per gramme
- Stored as glycogen with 3 times its own weight in water within the muscle & liver.
- 60% of daily energy

Fat

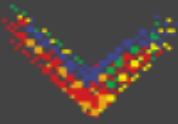
- 9 Kcal per gramme
- Stored in adipose tissue in muscle, around organs & under skin.
- 25% of daily energy

Protein

- 4 Kcal per gramme
- Only a potential energy source. Found in muscle & tissue.
- 15% of daily energy

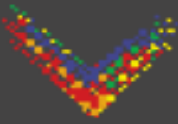
Alcohol

- 7 Kcal per gramme



Water

- Contained within all cells in the body.
- Vital for all cellular function.
- **Transport system**
 - Makes up 50-60% of blood
 - Take oxygen and energy to muscle
 - Takes waste away from the body
- **Cooling system**
 - Stops you from getting too **hot**



Hydration Status

Urine Chart

- Dark colour and small amount = Dehydrated
- Light colour and large amount = Hydrated
- Caffeine and alcohol mask the colour of urine.

1



2



3



4



5



6

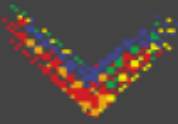


7



8





Post-Training/Event Re-hydration Strategy

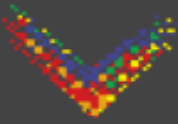
Poolside Weighing

- Weigh swimmers pre-training.
- Weigh swimmers post-training.
- The difference in mass will be due to fluids loss through sweating.

$\text{pre-mass (kg)} - \text{post-mass (kg)} = \text{fluid loss (kg)}$

- $1 \text{ kg} = 1 \text{ L}$
- Drink $1.5 \times$ the amount of fluid lost in kg.

Re-hydration fluid amount (L) = $1.5 \times$ fluid loss (kg)



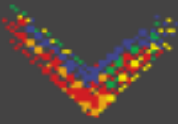
Appropriate Fluids to Drink

During training

- Water
- Cordial and water mix
- Fruit juice and water mix
- Commercial Products (Use not supported by British Swimming)

Post-training/event

- All of the above
- Milk (Protein, carbohydrate, electrolytes)



Homemade Sports Drinks

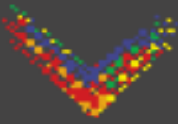
Carbohydrate/Electrolyte Training Drink

Ingredients

- 300 ml concentrated fruit juice
- 700 ml water
- 2-3 tea-spoons sugar
- ½ tea-spoon salt

Recipe

- Add the sugar and salt to the fruit juice in a 1 L drinks bottle with 200 ml of water and shake well.
- Once happy all the granules have dissolved add the rest of the water.

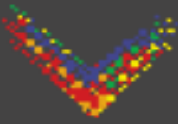


Pre-Training/Event Feeding

Why is it Important?

Carbohydrate

- Helps to top up the bodies energy stores
 - Liver
 - Muscle
- Helps to maintain blood sugar (glucose)
- Blood sugar is the only source of energy for the brain.
- The brain controls everything!!
- Therefore eating before you train is important



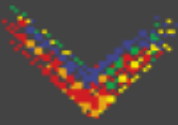
Appropriate Pre-training/event Foods

Breakfast (1 hr before event)

- Cereals
- Toast with scrambled eggs
- Yoghurts/yogurt drinks
- Fruit
- Fruit Juices
- Milkshakes

Pre Event Meal (2 - 4 hours before event)

- Pasta with chicken & sauce
- Jacket potato with tuna & beans
- Cereal & toast
- Noodles & bolognaise sauce
- Sandwiches
- Rice maybe better option than pasta (Gastrointestinal Distress)
- Rice pudding



Post-Training/Event Feeding

Why is it Important?

Optimizes adaptations from training

Protein

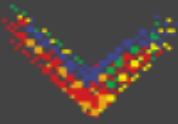
- Prevents muscle damage
- Reduced catabolism
- Increased anabolism

Carbohydrate

- Restores muscles energy stores - Optimal training capacity

Both

- Enhanced recovery
- Enhanced immunity
- Improved body composition



Appropriate Recovery Foods

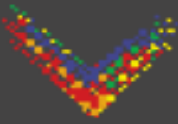
Feeding 1. Immediately after event (Poolside)

- Milkshakes
- Yogurt Drinks
- Sandwiches/wraps with lean meat, egg or fish
- Commercial Products (Use not supported by British Swimming)

Feeding 2. 1- 1.5 hr after event

- Lean Beef, Rice and Sauce
- Fish, Potatoes and Vegetables
- Sandwiches
- Baked potato, salad, and cottage cheese
- Chicken, pasta and sauce

Gala Guidelines?



Homemade Sports Drinks

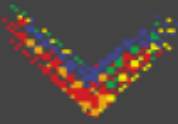
Recovery Shake

Ingredients

- 50 g dried skimmed milk powder
- 500 ml fresh milk
- Fruit juice (to taste)
- Fruit (to taste)

Recipe

- Mix the dried skimmed milk powder into a smooth paste with 100mls of the milk.
- Put all the ingredients into a hand blender and blend until frothy.



Structure of eating for a school day - training day

Example

Snack – Glass of fruit juice or cereal bar

Training Session 1

Recovery snack – Milk & banana

Meal – Breakfast

School

Snack – Milk or yogurt & fruit

School

Meal – Lunch

School

Snack – Milk or Yogurt & fruit

Training Session 2

Recovery Snack - Sandwich

Meal - Dinner

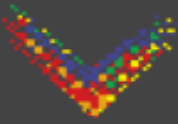
Supper – A glass of milk

Small portions

Essential Small portions

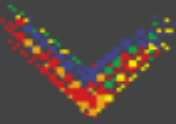
Main meals

Activity



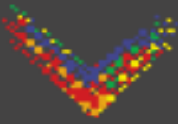
Tips for Success

- Be organised
- 6 P's (Prior Preparation and Planning Prevents Poor Performance)
- Always ensure you have non-perishable pre-event and recovery snacks in your kit bag



Part 2 – Carbohydrate

Introduction to carbohydrate principles



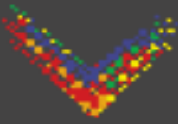
Carbohydrate - Considerations

Carbohydrate use in the body

Main energy source of body – glucose

In diet need to:

- Top-up energy stores – glycogen
- Runs brain and body
- Both set our carbohydrate utilization rate

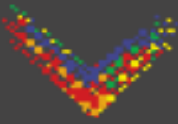


Carbohydrate Structures

Simple or Complex

- Mono-saccharides – single molecules of carbohydrate.
(Glucose)
- Di-saccharides – two molecules of carbohydrate.
(Glucose & Galactose = Lactose)
- Poly-saccharides – a chain of carbohydrate molecules.
(A chain of Glucose = Glycogen)

The structure of the carbohydrate in the foods we eat alters the speed that carbohydrate is absorbed in to the blood



Glycemic Index and Glycemic Load

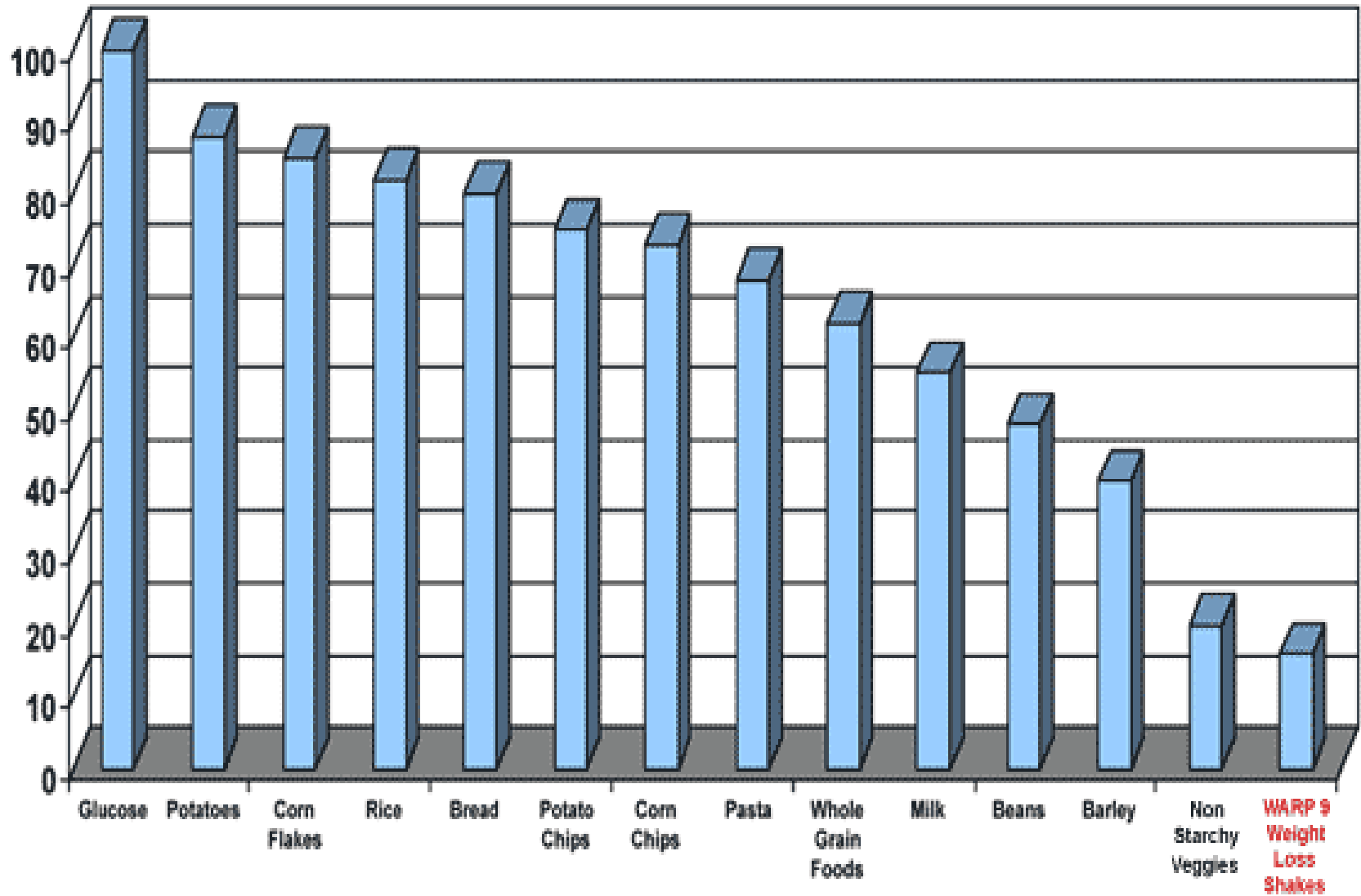
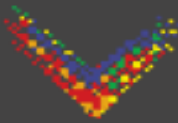
What are they?

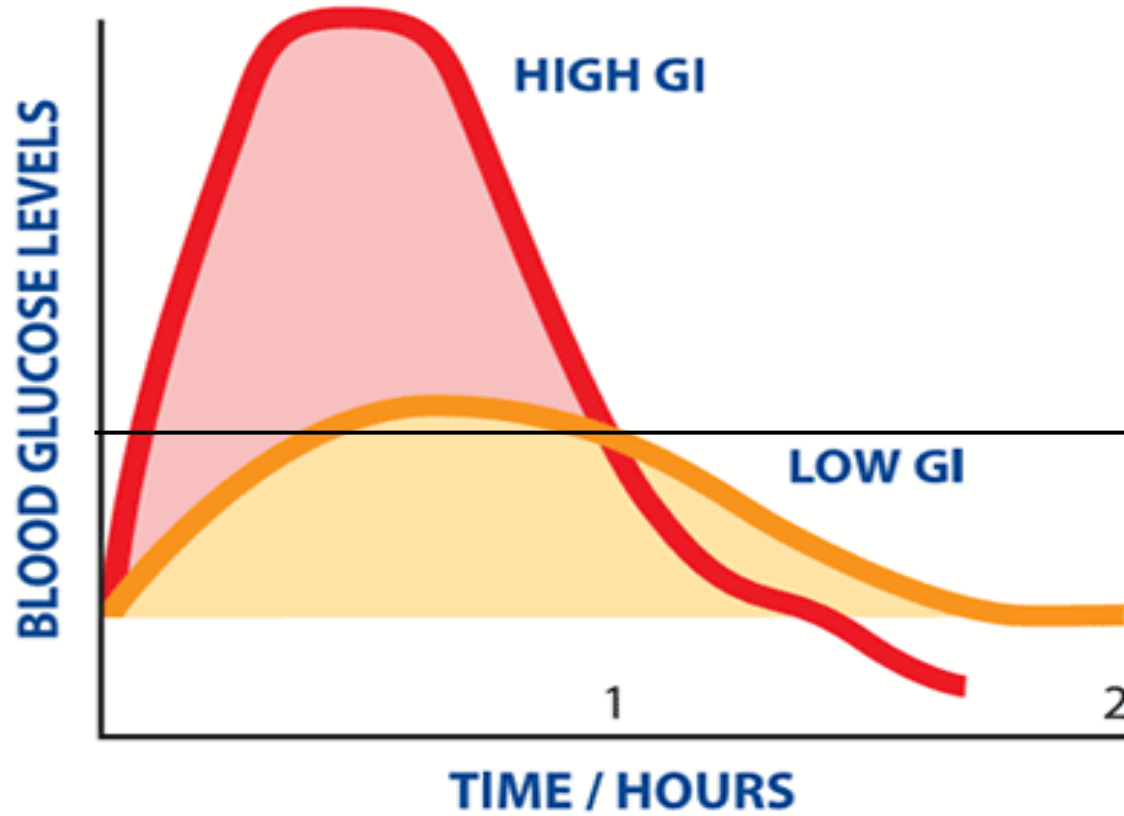
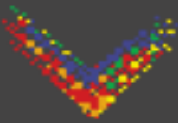
GI – Glycemic Index

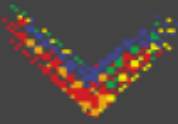
- The rate of carbohydrate absorption of digested foods against the speed of absorption of pure glucose.
- Scale rate from 0-100.
- Glucose = 100
- High GI = 70-100
- Medium GI = 40-70
- Low GI = 0-40

GL – Glycemic Load

- The amount of carbohydrate contained in food



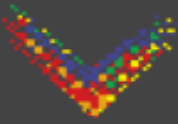




Glycemic Index and Glycemic Load – Continued. .

Using them to our advantage – Performance!

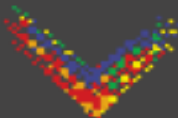
- Low GI / High GL foods before exercise. (slow release of energy throughout exercise)
- High GI / High GL index foods during exercise. (fast release to supply muscles with energy)
- High GI / High GL foods immediately after exercise. (fast release to supply energy for recovery)
- Any other meal should be predominately Low or Moderate GI foods.



Glycemic Index and Glycemic Load – Continued. .

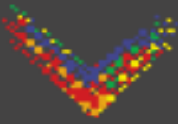
Incorrect Use - negative effects

- Fat Storage and Weight Gain. Eating too much high GI / high GL foods at inappropriate times.
- Rebound Hypoglycaemia during exercise (lowered blood glucose). Eating high GI / high GL foods before training.
- Poor recovery following training. Eating low GI / low GL immediately after training.



Food Values: Glycemic Index/Glycemic Load

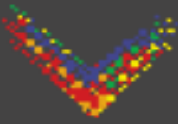
	Low GI	Med GI	High GI
Low GL	All-bran cereal (8,42) Apples (6,38) Carrots (3,47) Peanuts (1,14) Strawberries (1,40) Sweet Corn (9,54)	Beets (5,64) Cantaloupe (4,65) Pineapple (7,59) Sucrose, i.e. table sugar (7,68)	Popcorn (8,72) Watermelon (4,72) Whole wheat flour bread (9,71)
Med GL	Apple juice (11,40) Bananas (12,52) Fettucine (18,40) Orange juice (12,50) Sourdough wheat bread (15,54)	Life Cereal (16,66) New potatoes (12,57) Wild rice (18,57)	Cheerios (15,74) Shredded wheat (15,75)
High GL	Linguine (23,52) Macaroni (23,47) Spaghetti (20,42)	Couscous (23,65) White rice (23,64)	Baked Russet potatoes (26,85) Cornflakes (21,81)



Other factors affecting GI

Things to think about

- **Cooking** – over-cooking food gives food a higher GI e.g. soggy pasta. Under-cooking lowers GI.
- **Mixing** – Eating high GI foods with low GI foods will lower the overall GI of the meal.
- **Adding** sugar increases the GI and GL of foods. Sweeteners don't affect either.



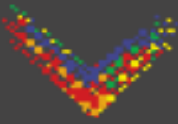
Recap

Aims

- To develop an understanding of Sports Nutrition and why YOU need to use it.

Objectives

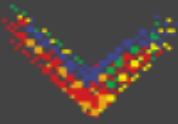
- To introduce some of the different components of sports nutrition
- Cover the importance of macronutrients, micronutrients, and fluids for swimming
- Establish appropriate feeding strategies for swimming performance



Take Home Messages

Appropriate Foods & Fluids for son/daughter/athlete

- For hydration
- For Re-fuelling for training
- For Recovery from training
- Correct types of carbohydrates for different times?



Questions . . . ?

Thanks for your attention & Good Luck!