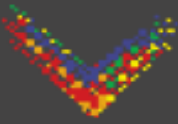


# Introduction to Performance Nutrition in Swimming

Alex Popple



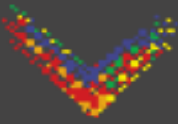
# Aims & Objectives

## Aims

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

## Objectives

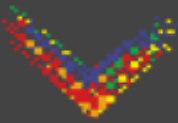
- To introduce some of the different components of sports nutrition
- Cover the importance of macronutrients, micronutrients, and fluids for swimming
- Establish appropriate feeding strategies for swimming performance



# Take Home Messages

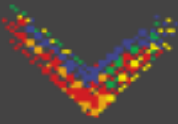
## Appropriate Foods & Fluids for son/daughter/athlete

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



# Food for Success

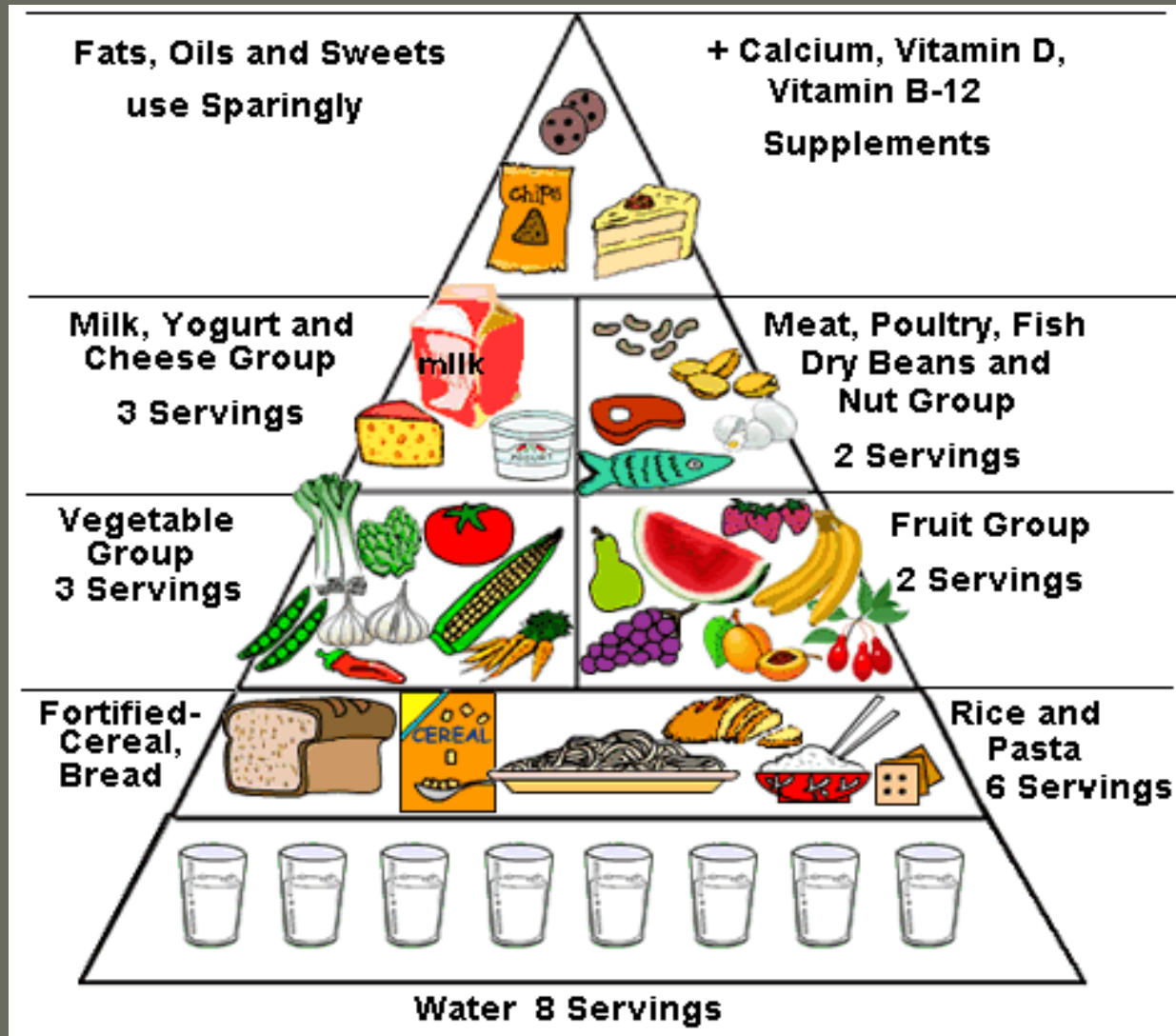
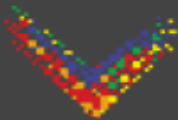


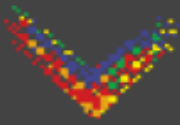


# Poor Dietary Habits vs. Appropriate Dietary Habits

## Cause:

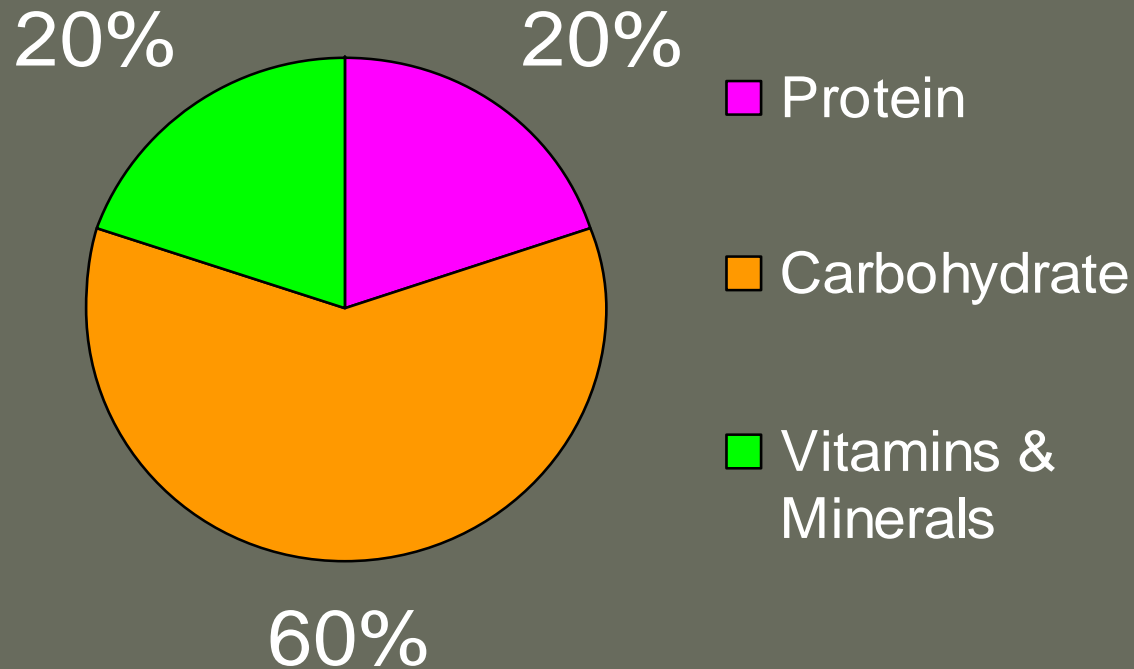
- **Fatigue** vs. **Optimized energy stores**
- **Poor performance** vs. **Improvements in performance**
- **Inadequate recovery** vs. **Training Adaptations**
- **Injury** vs. **Reduced risk of injury**
- **Illness** vs. **Strong immune system**
- **Unwanted weight loss or gain** vs. **Supported weight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



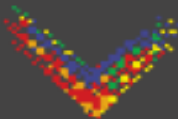


# The Food Pyramid in the Daily Diet

## Portion sizes – On the plate







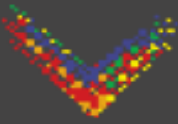
# Getting the balance right



✓ Supporting Performance

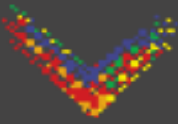
x Detrimental to Performance





# 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

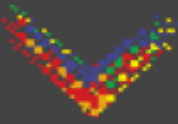
- 9 Kcal per gramme
- Stored in adipose tissue in muscle, around organs & under skin.
- 25% of daily energy

## Protein

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

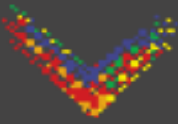
## Alcohol

- 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

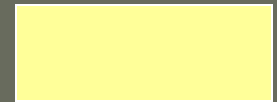
## Urine Chart

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

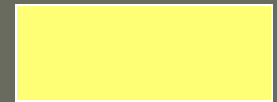
1



2



3



4



5



6

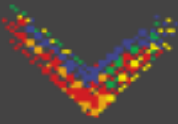


7



8





# Post-Training/Event Re-hydration Strategy

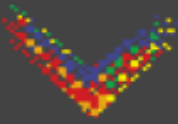
## Poolside Weighing

- 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)**



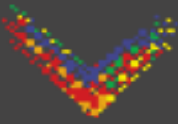
# Appropriate Fluids to Drink

## 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

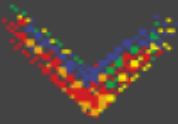
### Ingredients

- 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.



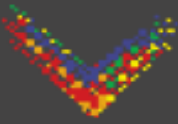


# Pre-Training/Event Feeding

## 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



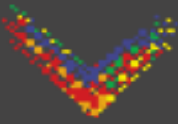
# Appropriate Pre-training/event Foods

## 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

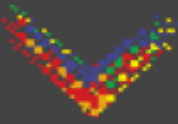
- Prevents muscle damage
- Reduced catabolism
- Increased anabolism

### Carbohydrate

- Restores muscles energy stores - Optimal training capacity

### Both

- Enhanced recovery
- Enhanced immunity
- Improved body composition



# Appropriate Recovery Foods

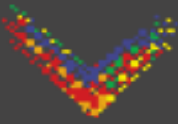
## Feeding 1. Immediately after event (Poolside)

- 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

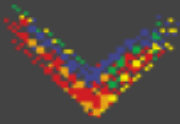
## Recovery Shake

### 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

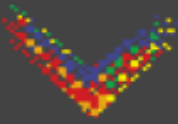
**Supper** – A glass of milk

**Small portions**

**Essential Small portions**

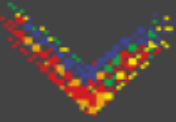
**Main meals**

**Activity**



# Tips for Success

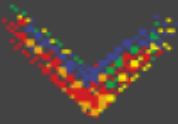
- Be organised
- 6 P's (Prior Preparation and Planning Prevents Poor Performance)
- Always ensure you have non-perishable pre-event and recovery snacks in your kit bag



# Part 2 – Carbohydrate

Introduction to carbohydrate principles





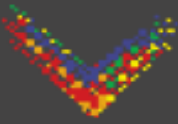
# Carbohydrate - Considerations

## 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

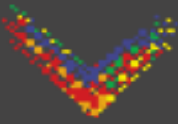


# Carbohydrate Structures

## 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

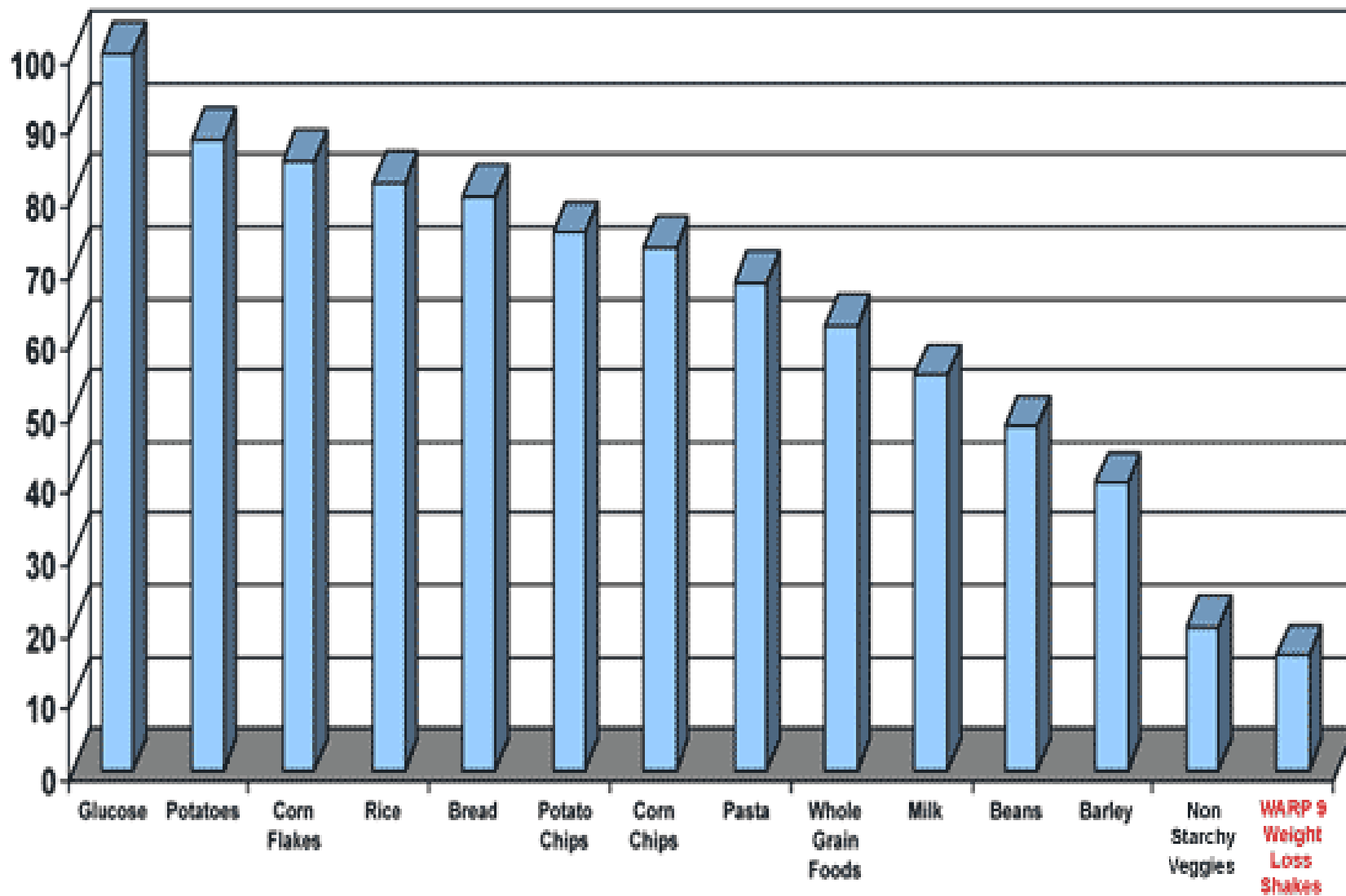
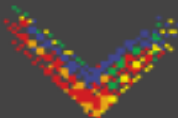
## What are they?

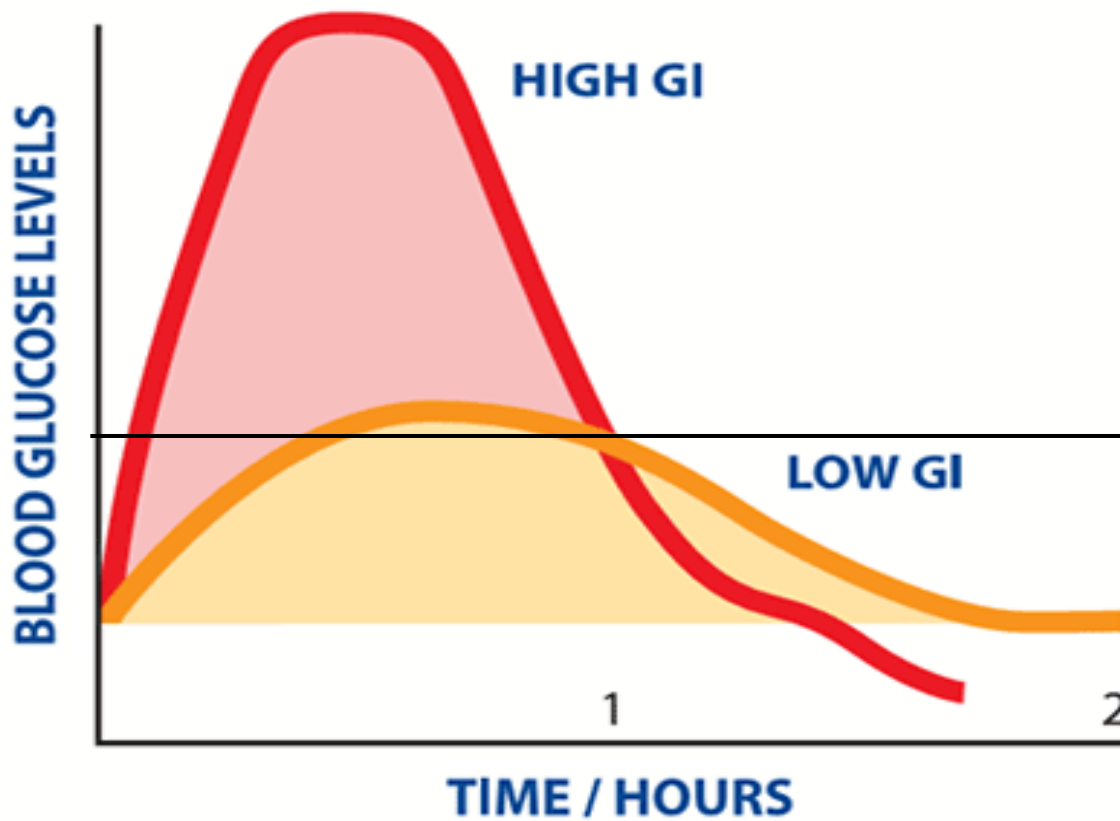
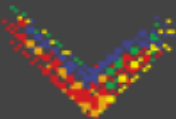
### GI – Glycemic Index

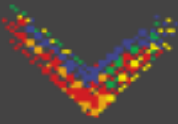
- The rate of carbohydrate absorption of digested foods against the speed of absorption of pure glucose.
- Scale rate from 0-100.
- Glucose = 100
- High GI = 70-100
- Medium GI = 40-70
- Low GI = 0-40

### GL – Glycemic Load

- The amount of carbohydrate contained in food



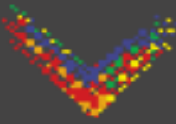




## Glycemic Index and Glycemic Load – Continued. .

### Using them to our advantage – Performance!

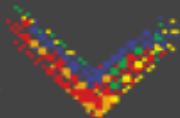
- Low GI / High GL foods before exercise. (slow release of energy throughout exercise)
- High GI / High GL index foods during exercise. (fast release to supply muscles with energy)
- High GI / High GL foods immediately after exercise. (fast release to supply energy for recovery)
- Any other meal should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



## Glycemic Index and Glycemic Load – Continued. .

### Incorrect Use - negative effects

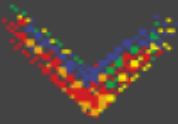
- Fat Storage and Weight Gain. Eating too much high GI / high GL foods at inappropriate times.
- Rebound Hypoglycaemia during exercise (lowered blood glucose). Eating high GI / high GL foods before training.
- Poor recovery following training. Eating low GI / low GL immediately after training.



## Food Values: Glycemic Index/Glycemic Load

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

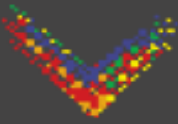




# Other factors affecting GI

## 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.



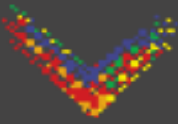
# Recap

## Aims

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

## Objectives

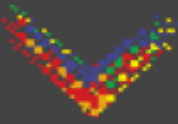
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# Take Home Messages

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# Questions . . . ?

**Thanks for your attention & Good Luck!**