


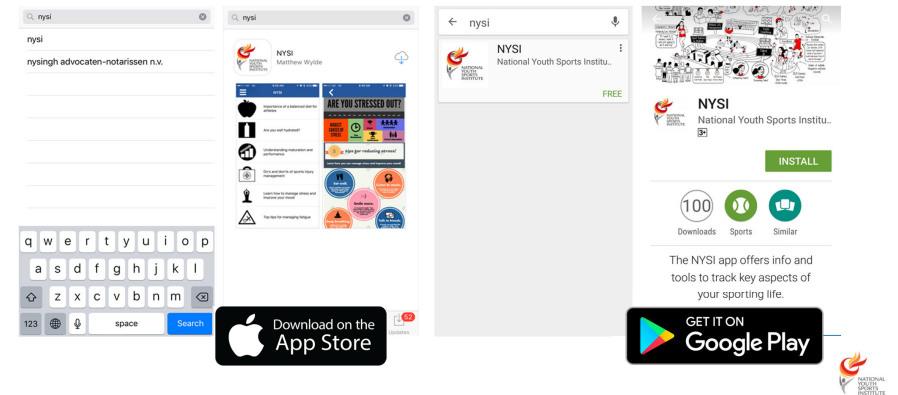


## Sports Science Workshop: Nutrition and Hydration

Ng Ee Ling

NYSI Sport Nutritionist

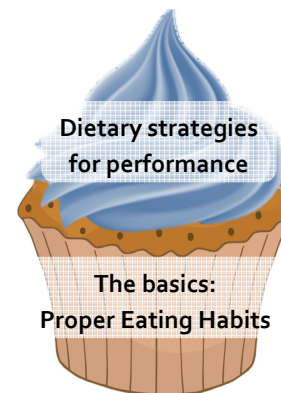
Download  NYSI app for an activity later



TRAIN BETTER EAT BETTER REST BETTER



## What we will cover today



Let's talk about ...



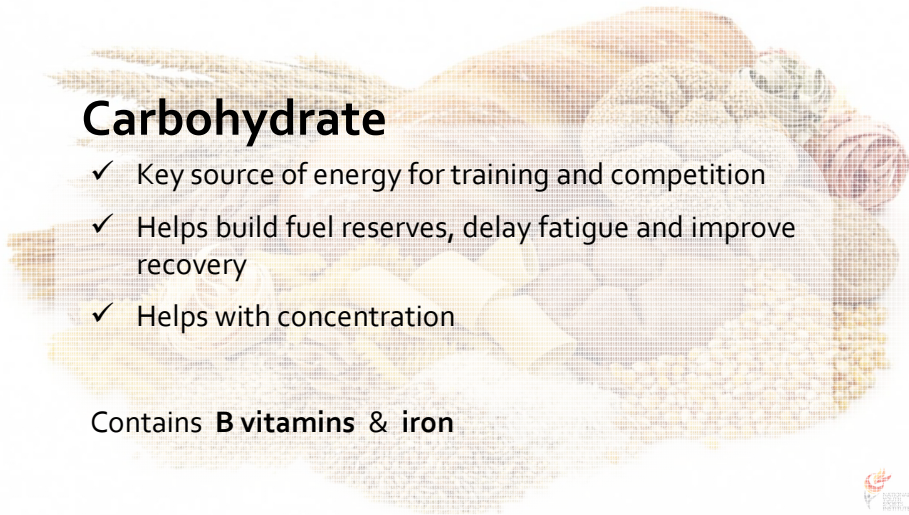
What do athletes need to eat to give them energy?



## Carbohydrate

- ✓ Key source of energy for training and competition
- ✓ Helps build fuel reserves, delay fatigue and improve recovery
- ✓ Helps with concentration

Contains **B vitamins** & **iron**



What do athletes need to eat to help build and repair muscles?





## We recommend

That athletes eat their normal nutrient requirements  
+ extra for their training and competition

Protein contains essential amino acids to build and  
repair muscle cells

## What do athletes need to eat to keep their bones strong?

## We recommend

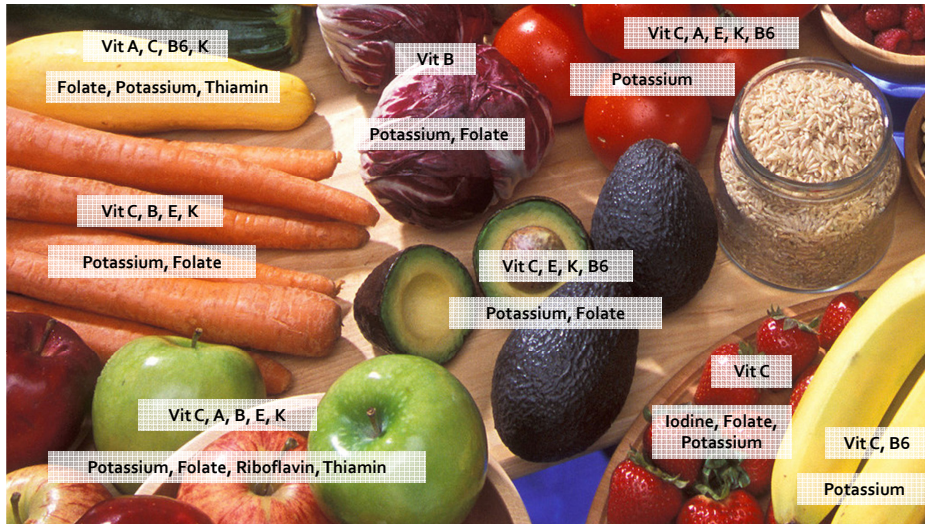
encouraging athletes to have calcium rich food such as  
**low-fat milk, cheese, yogurt, calcium-fortified soymilk,**  
**sardines, ikan billis, tofu**



1. Pritchett K, Pritchett R. Chocolate milk: a post-exercise recovery beverage for endurance sports. Med Sport Sci. 2012;59:127-34.

## What else do athletes need to eat to stay healthy?





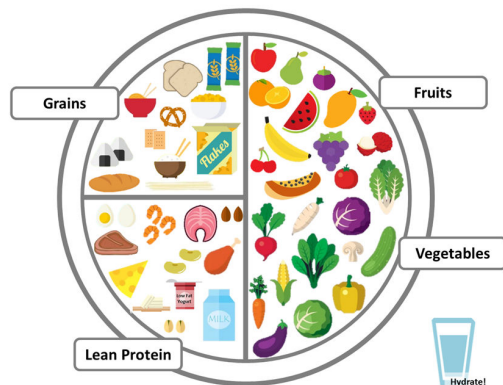
## KEY MESSAGE



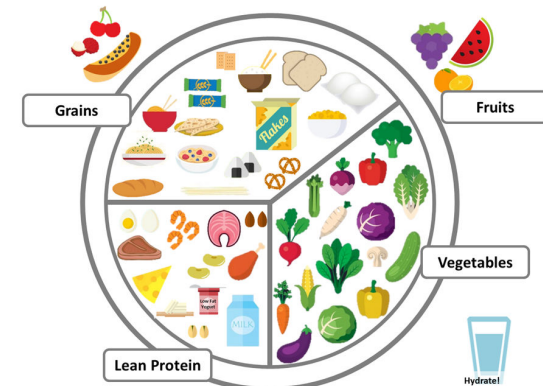
Eat a  
**RAINBOW!!**



## Off-season / Easy Training

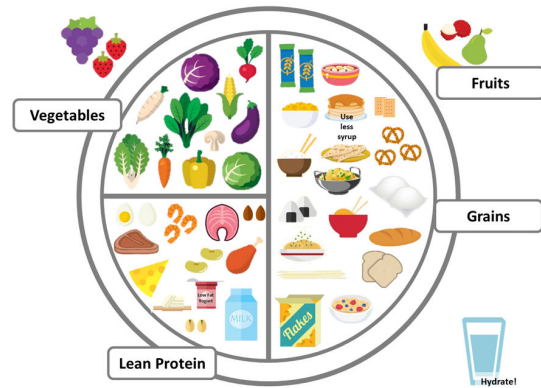


## Moderate Training





## Competition Day / Hard Training



**Time for hydration!**



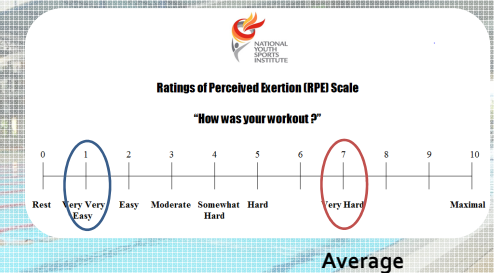
## NYSI Hydration Project



### % Body Weight Loss

**Low Intensity**  
Average: 0.57%  
Highest: 2.51%

**High Intensity**  
Average: 0.31%  
Highest: 1.40%





# DO YOU KNOW?

MORE THAN 2% ↓ IN BODY WEIGHT

Concentration

Strength

Endurance

Power

## Urine Colour Chart



### METHODS TO CHECK ON HYDRATION STATUS

As a coach or P.E. teacher, reminding athletes on the importance of hydration is important. The hot and humid climate in Singapore, due to its positioning at the north of the equator, may adversely affect the performance of the youth athlete, especially if they are not well-hydrated. Here's an easy to follow guide to monitor your athletes' hydration status to ensure optimal performance.

Weigh athletes before training\*

Record the amount of water athletes consume during training

After training, athletes are to wipe off perspiration and dry themselves off

Weigh athletes after training

Download NYSI app on Apple App Store or Google Play

\*For sports like swimming, ensure that athletes wet themselves and dry themselves as much as possible prior to weighing

#### Hydration strategy

1. Encourage athletes to check the colour of their urine with the NYSI Urine Chart
2. Work with athletes to develop a hydration plan
3. For training and competition that lasts for >90 minutes, isotonic sports drinks are recommended
4. Replace 125-150% of the fluid lost during the training / competition over the next 4-6 hours post-training / competition. Continue monitoring the hydration status using NYSI Urine Chart



- #### How to use the NYSI app
1. Enter weight before exercise (kg)
  2. Enter weight after exercise (kg)
  3. Click **CALCULATE**

#### How much fluid to replace?

$$\left[ \begin{matrix} \text{Pre-training weight (kg)} & \text{Post-training weight (kg)} & \text{Fluid intake during training} \end{matrix} \right] \times 1.25$$



## Activity



Let's calculate the amount of water required!



Possible strategy to help to keep hydrated



Makes the strong base



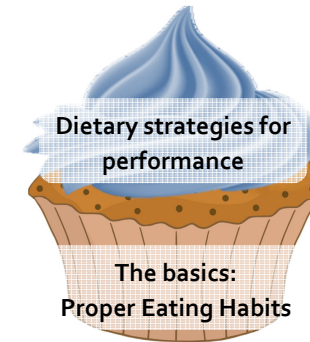
## Food First

- Proper eating habits
  - 5 food groups
- Optimal body functions

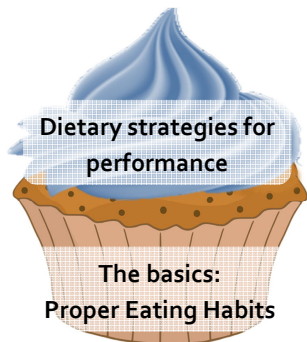




## NYSI's Nutrition Philosophy – Food First



## Dietary Strategies



Dietary strategies are dependent on the purpose

- Training adaptation?
  - Recovery?
  - Refueling/ energy?
- and so on...



## Dietary Strategies

Nutrient timing

Hydration strategies





## Nutrient Timing



## Definition

### After training/ competition (Also known as Recovery)

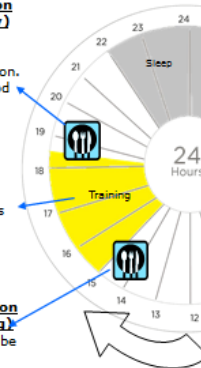
Definition: Meals/snacks that are consumed zero to four hours after training/competition. The best time to consume food is immediately after training/competition.

### Food/ beverages during training/ competition

Definition: beverages/food needed to sustain long periods of Training/ competition.

### Before training/ competition (Also known as Pre-training)

Definition: food that needs to be consumed one to four hours before training/ competition



## Purpose

Training/ competition	Before	During	After
Stay hydrated	√	√	√
Replenish/ maintain energy	√	√	√
Repair	√	X	√
Training adaptation (only applicable for training)			



## Before training/ competition



## Purpose

Training/ competition	Before	During	After
Stay hydrated	✓	✓	✓
Replenish/ maintain energy	✓	✓	✓
Repair Training adaptation (only applicable for training)	✓	X	✓



## Nutrients Required

Training/ competition	Before
Stay hydrated	Fluid
Replenish/ maintain energy	Carbohydrates, vitamins and minerals
Repair Training adaptation (only applicable for training)	<b>Repairs:</b> Protein, vitamins and minerals <b>Training adaptation:</b> Protein and Carbohydrates



## Pre-exercise meal / snacks



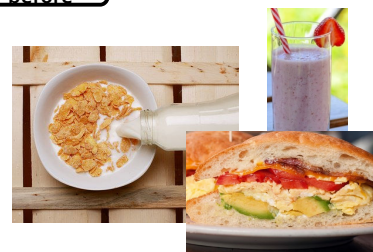
- ✓ Have your main meals
- ✓ Best to accompany your meals with water to help with hydration



## Pre-exercise meal / snacks



- ✓ Snacks\*
- \*Only when hungry / did not fuel enough







## During training/ competition



## Purpose

Training/ competition	Before	During	After
Stay hydrated	√	√	√
Replenish/ maintain energy	√	√	√
Repair Training adaptation (only applicable for training)	√	X	√



## During - Hydration

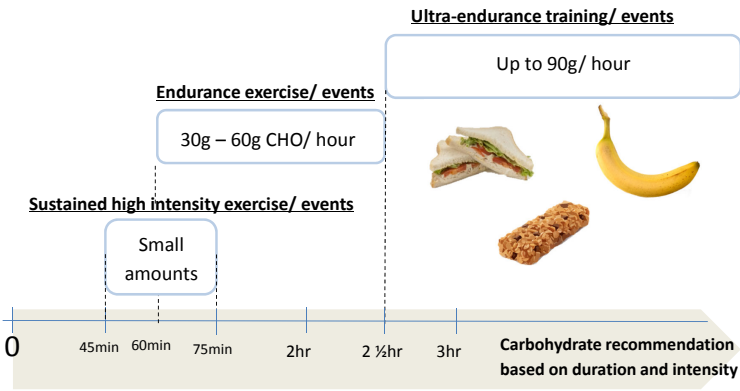


### Hydration strategy

1. Check athletes' hydration status prior training and competition (See handouts)
2. Give athletes enough water breaks
3. Remind athletes to take sips of water throughout the day
4. Work with the athletes to develop a hydration plan
5. For training and competition that lasts for >90 minutes, isotonic sports drinks are recommended
6. Speak to a NYSI nutritionist if athletes are constantly dehydrated



## During – Carbohydrates Intake





## After training/ competition



## Purpose

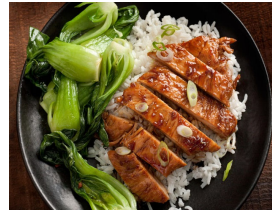
Training/ competition	Before	During	After
Stay hydrated	√	√	√
Replenish/ maintain energy	√	√	√
Repair Training adaptation (only applicable for training)	√	X	√



## Post-exercise meal / snacks

### Window of Opportunity

Within 45 minutes post training and competition



## More recovery food ideas...

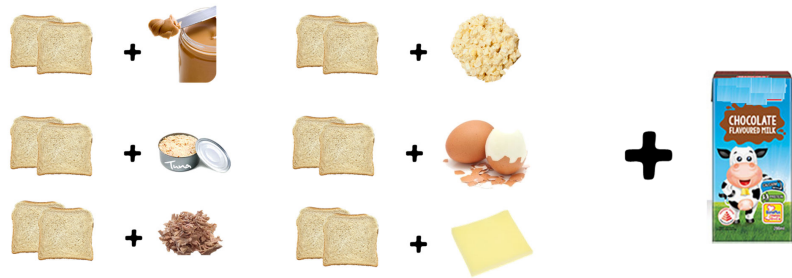



Store perishable food in a cooler bag + ice pack if left out for more than 1 hour





## More recovery food ideas...




 Store perishable food in a cooler bag + ice pack if left out for more than 1 hour



## More recovery food ideas...



 Store perishable food in a cooler bag + ice pack if left out for more than 1 hour



## Activity



Try to think of one competition event or training sessions within a day.

Let's plan when meals and snacks should be consumed.



## Case Study: Football Competition

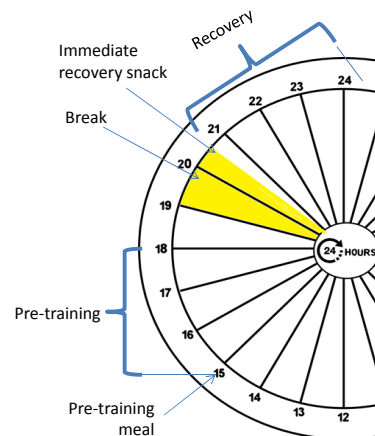


Competition starts at 7pm and ends at ~8:30.

Game is played:

- 90 min game with 45min halves
- Half time: 15min break





What you need when planning:

Definition of pre-, during and post- training

The practical needs of the event/ individual



**Does a youth athlete need supplementation?**



## Supplementation

Sports Foods



Dietary supplements



~~Performance Supplements (i.e. ergogenic aids)~~



- Youth athletes have the **potential** to have greater performance enhancement through **maturation and experience** in their sport.
- As youth athletes are yet to be seasoned and well-trained, performance supplements **should not be encouraged**.

Performance supplements (i.e. ergogenic aids)



Sports Foods



Dietary supplements



- Should be **medically warranted**.
- Used to **treat clinical issues** but cannot compensate for poor food choices and inadequate intakes



Sports Foods



Only use in specific situations in sports using evidence-based protocols.  
Case by Case basis

- Specialized products used to provide a practical source of nutrients **when it is impractical to consume** at that point in time.
- Requires **individual assessment**



## Summary....

- Claims on the label may not mean it contains or not contain certain substances/ ingredients.
- Blends do not have to list the amount of each ingredients so unable to determine how much of the ingredients are in the product.
- Look out for ingredients ending in - ol, -diol or -stene or ingredients that contain a lot of numbers – these may be steroids, stimulants, etc.







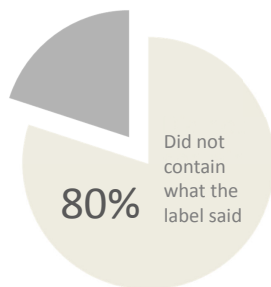
If something seems to  
be too good to be true,  
it usually is



Did you know....

**10 – 15%** Of the dietary/ performance supplements contain prohibited substances

Outram, S., & Stewart, B. (2015). Doping through supplement use: a review of the available empirical data. *Int J Sport Nutr Exerc Metab*, 25(1), 54-9.



**Large %** Not backed by evidence

**80%** Of the sports supplements have high levels of Estrogenic Disrupting Chemicals (EDC)

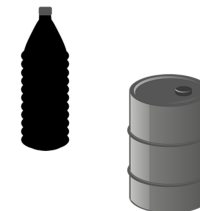
Plotan, M., Elliott, C. T., Fitzell, C., & Connolly, L. (2014). Estrogenic endocrine disruptors present in sports supplements: A risk assessment for human health. *Food Chemistry*, 159, 157-165.

NYTimes <http://well.blogs.nytimes.com/2015/01/05/new-york-attorney-general-targets-supplements-at-online-retailer/>



What are EDCs?

- Substances that can interfere with normal functioning of the body's endocrine system
- Endocrine system controls the way the body develops and functions
- Examples:
  - BPA
  - Dioxin
  - Lead
  - Arsenic
  - Mercury, etc...





## WADA



- The WADA prohibited list is updated every year
- 2017s Prohibited list is out. Please spend the time to look at the updates – just to get familiar

<https://www.wada-ama.org/en/what-we-do/prohibited-list>



## Therapeutic Use Exemptions (TUEs)



TUE Case No. \_\_\_\_\_

### THERAPEUTIC USE EXEMPTION (TUE) APPLICATION FORM

Please complete all sections in capital letters. Athletes are required to complete sections 1, 5, 6 and 7. Physicians are required to complete sections 2, 3 and 4. All legible and incomplete applications will be returned and applicants will need to re-submit a new form.

1. Athlete Information	
Surname:	Given Name:
<input type="checkbox"/> Male <input type="checkbox"/> Female	Date of Birth (dd/mm/yyyy):
Address:	
Country:	Postal Code:
Telephone:	(P) (C) (M)
Email:	
Sport:	Discipline:
National Sports Association (NSA):	
International Federation (IF):	
Please mark the appropriate box:	
<input type="checkbox"/> I am part of Anti-Doping Singapore's Registered Testing Pool / Doped Testing Pool*	
<input type="checkbox"/> I am under Sport Singapore's Sports Excellence Coaching (Specialized) programme	
<input type="checkbox"/> I am participating in a NSCA's National Championship for which a TUE is granted pursuant to the NSCA's rules is required	
Name of Competition:	
<input type="checkbox"/> Other levels, please state:	
If you are an athlete with impairment, please indicate the impairment:	

\*Delete accordingly  
[www.antidoping.org.sg](http://www.antidoping.org.sg)

**TUE application must be made by the athlete to the ADS:**

- carded athletes under Sport Singapore
- Athletes participating in NSA's National Championships (dependent on NSAs' rules)
- Other levels where TUE is required



## Therapeutic Use Exemptions (TUEs)



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[www.antidoping.org.sg](http://www.antidoping.org.sg)

**MUST** submit their applications within **30 days** prior to participating in an event.

- Recommended: submit TUEs as soon as medical condition that requires the use of prohibited substances or methods is diagnosed.



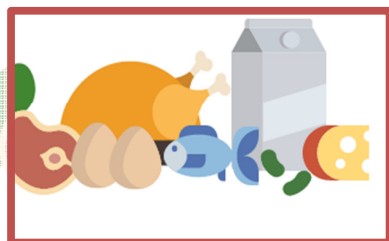
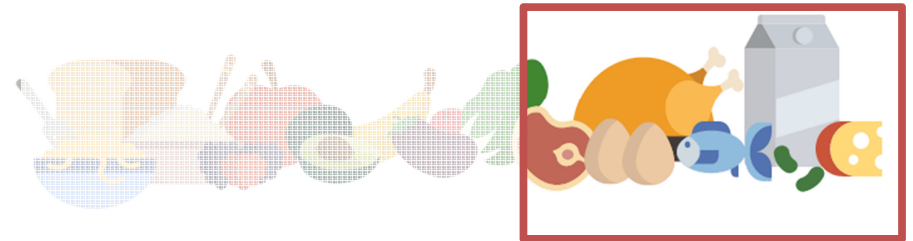
Those that have the  
privilege to know, have the  
duty to act

~Albert Einstein~





## Alternatives to supplements?



Carbohydrates: Protein  
4:1

Fluids

Sodium







## Some of the readily available milk & calcium-fortified soymilk

✓ 4:1 or 3:1  
(Carbohydrates:Protein)



Q & A



## So How much does my athlete need?

### Carbohydrates

- These amounts depends on the intensity, duration and environmental conditions

Activity level	Carbohydrate target
Low intensity or Skilled-based activities	3—5g /kg/ day
Moderate exercise programme ( ~1 hour per day)	5—7g/kg/day
Endurance programme (e.g. 1 to 3 hours per day of moderate to high intensity exercise)	6—10g/kg/day
Extreme commitment (i.e. > 4—5 hours per day of moderate to high intensity exercise)	8—12g/kg/day

## So How much does my athlete need?

### Protein

- Take note that these estimated intakes can be generally be met through diet alone.

Group	Protein intake (g/kg/day)
Sedentary men and women	0.8-1.0
Competitive/ elite Youth athletes	~1.3—1.8
Youth athletes: during periods of intensified training/ reduced energy intakes	Up to 2.5

# The End

