EFBW Water & Hydration Lessons

The Scientific Basics of Water & Hydration

EFBW Health Working Group 2011

Disclaimer

This presentation is produced by the EFBW Health Working Group. Its content is based public scientific information about water and related health benefits.

The information here mentioned should be used to explain the basics of water and hydration to the members of EFBW exclusively. The information should not be used to make claims on commercial products.

EFBW Health working group:
Chair : Dr L. Le Bellego
Members:
Dr F. Constant, Dr J. Bontemps, Dr. Jésus Roman, Y. Kaderbhoy

Table of Contents

1. Water: Facts & Figures

Importance for life

Water, after oxygen is the most critical element for life on earth

We cannot live more than…

- 9-10 days without water
- 45-65 days without food

Water is the main constituent of our body

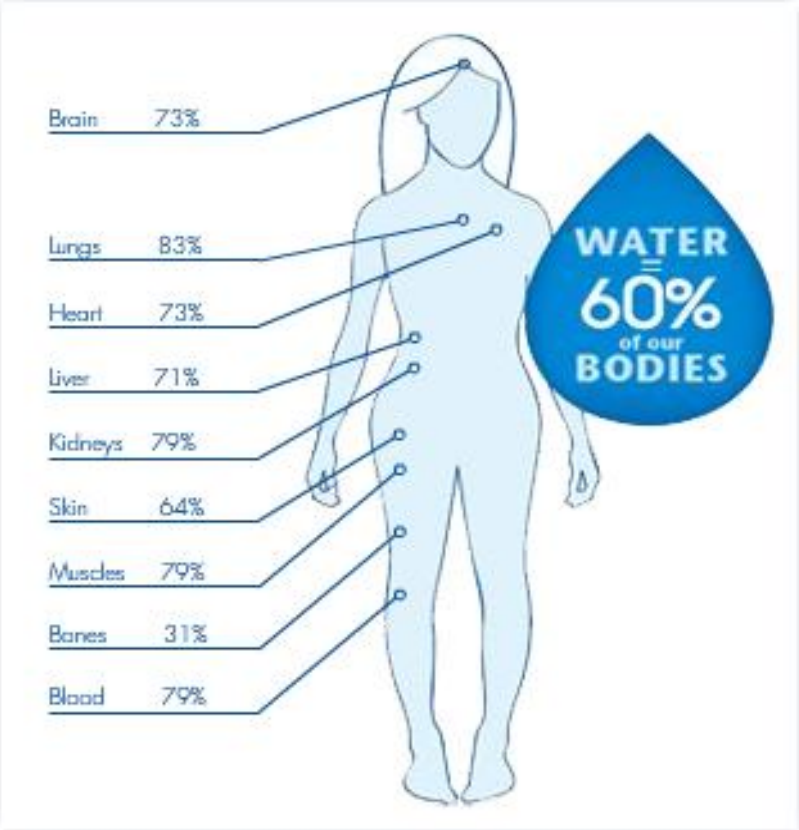
- On average 60% of an adult's body is composed of water

Water is the most important nutrient for our body

- Water represents the largest part of our food content and therefore occupies the largest segment (i.e.: the base) of the food pyramid
- We will consume almost 1 tonne (1000 litres) of water every year

1. Water: Facts & Figures

Main constituent of an adult's body



On average 60% of an adult's body weight is composed of water

Our body parts contains various amounts of water from:

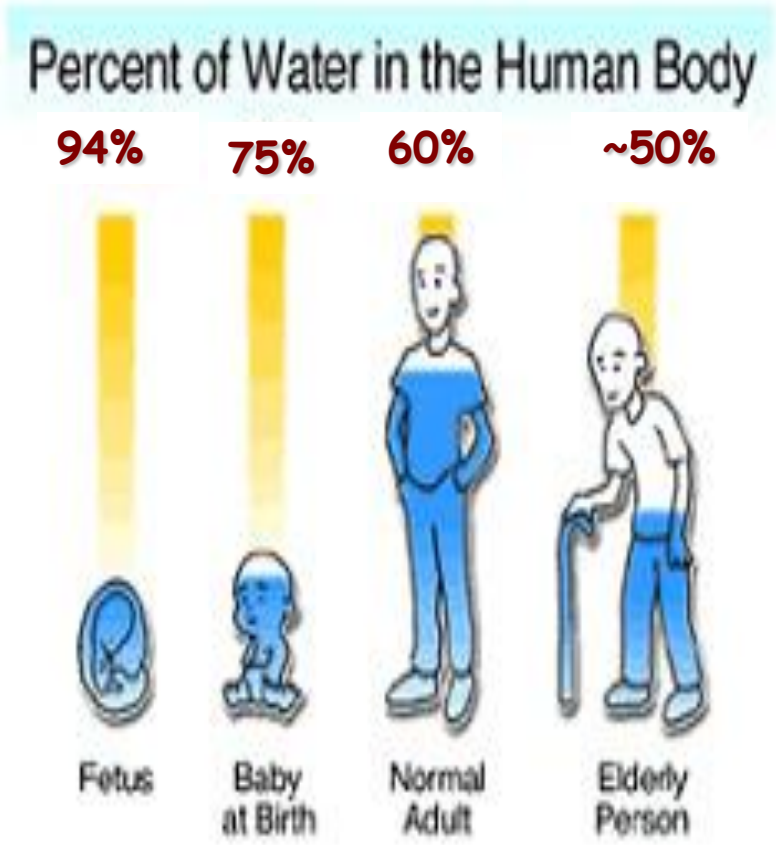
31% in bones

to

83% in lungs

1. Water: Facts & Figures

Main constituent of our body but decreases with age



Body water content decreases with age

More than 75% at birth

to less than

50% in old age

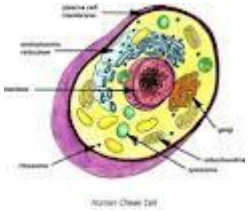
1.Water: Facts & Figures

Water is Life – Man is a Waterman

2. The various roles of water in our body

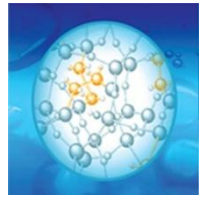
Building material: cells and fluids

Building material for cells



- Water is present in each cell of our body, in tissues and organs
- Each cell contains on average 60% water
- Water is important during growth and cellular regeneration

Building material for fluids



Water in combination with other elements forms:

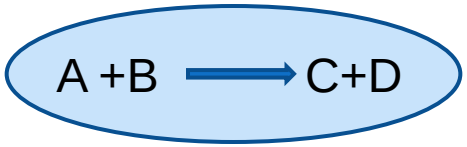
- Lubricating fluids for joints
- Saliva, gastric and intestinal mucus secretion in the digestive system
- Mucus in airway secretion in the respiratory system: nose, trachea and lung
- Water also protects key body tissues against shock: ie: brain and fetus

2.The various roles of water in our body

Reaction medium and solvent

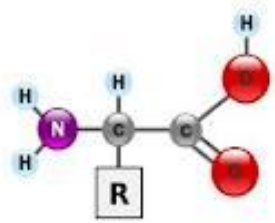
Reaction medium

- In our body, biochemical reactions occur in and with water

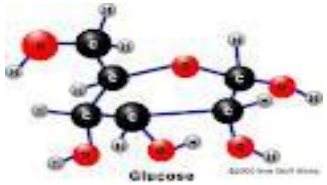


Solvent

- Water dissolves minerals, vitamins, amino acids, glucose and many other vital substances



amino acid



glucose

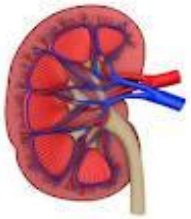
Vitamin C

2. The various roles of water in our body

Transporter and temperature control

Transporter

- Water in our body carries nutrients throughout the organism down to the cells
- Brings to each cell the ingredients it requires
- On the way back, water carries metabolic waste to the kidney for excretion



Temperature Control

- Sweat is the body's coolant which is mostly made of water
- Water evaporating at the skin's surface decreases body's temperature
- This happens under higher external temperatures and/or during physical exercise

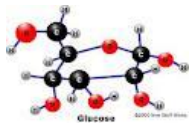
2. The various roles of water in our body

Conclusion

Water is essential for practically all functions of the body as it plays multiple roles, among which :

- Building material for cells and fluids
- Reaction medium and solvent
- Transporter of nutrients and waste material
- Control of body temperature

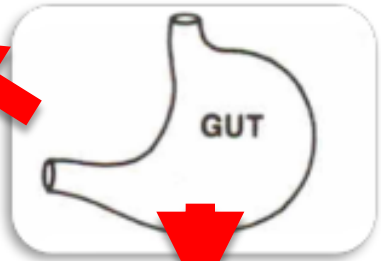
A +B ⟶ C+D



3. Distribution of body water

Water flows in our body

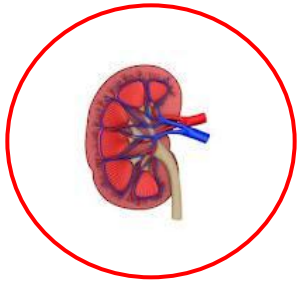
Feces



Breathing

Plasma

~3 L



Blood pressure & Osmosis

Sweating

Interstitial Water

~11 L

Osmosis

Intra-Cellular Water

~28 L

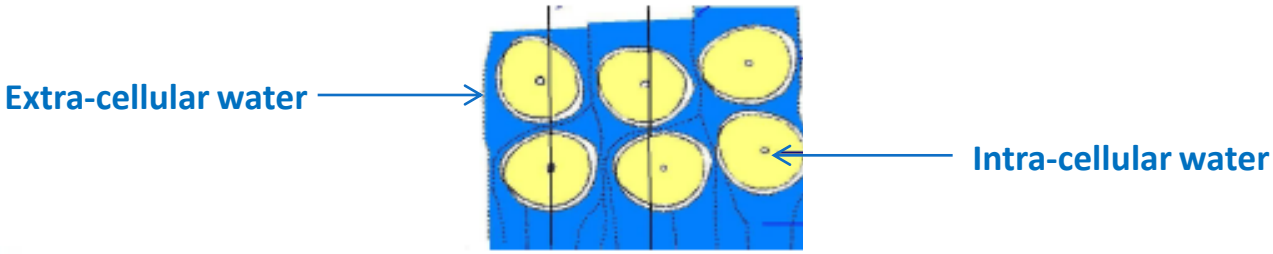
3. Distribution of body water

Intracellular and Extracellular compartments

Water is everywhere in the body!

Illustration of the distribution of water for an adult man (weight 70 kg)

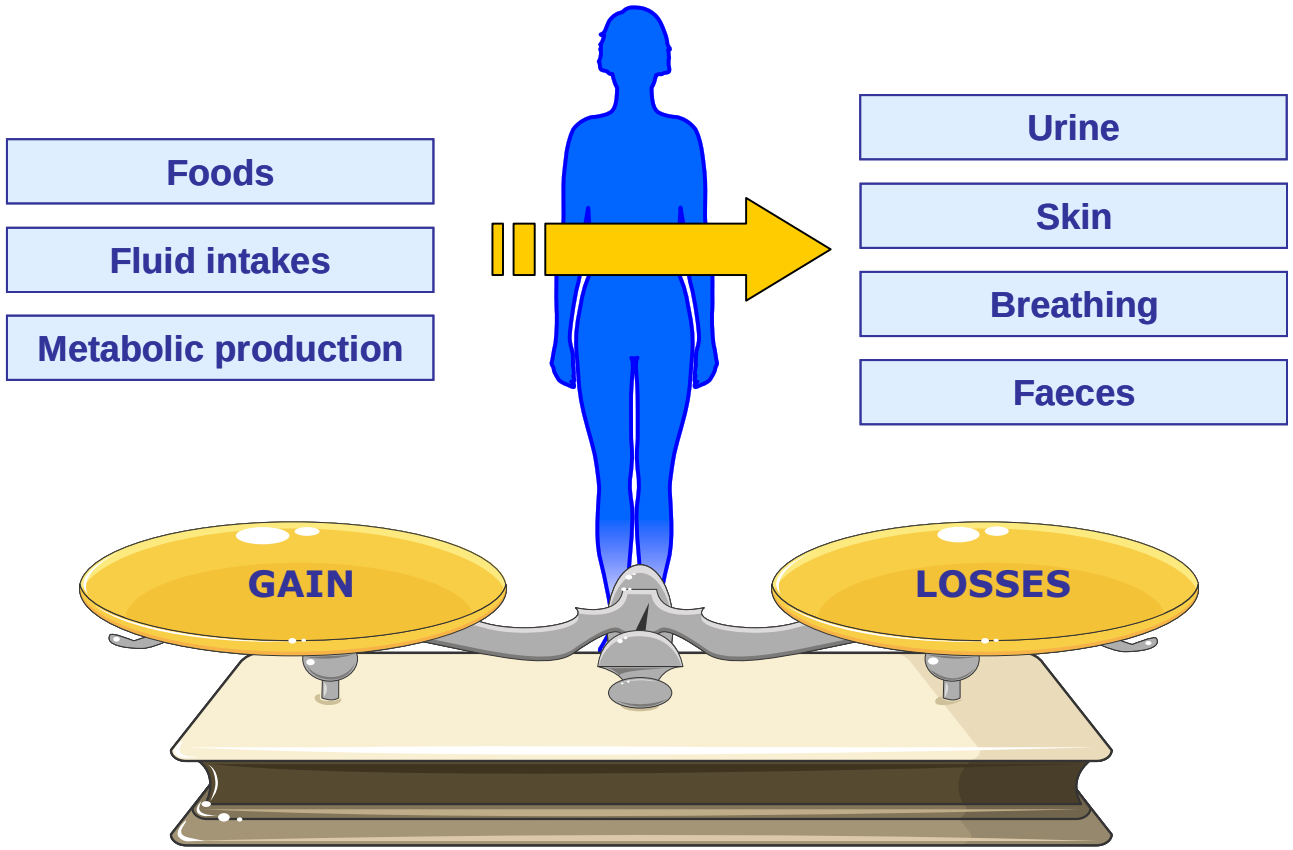
Total Body Fluid	**60% of body weight**	**(42 litres)**
Intra-cellular Fluid	**40% of body weight**	**(28 litres)**
Extra-cellular Fluid	**20% of body weight**	**(14 litres)**



4. Water Balance

Homeostasis aims at keeping our water balance constant

Our body water content is an equilibrium between gain and losses



4. Water Balance:

The principles of total water intakes

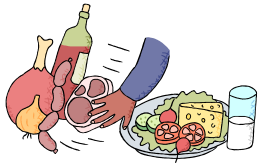
Equilibrium is met when water inputs equals water outputs

- At every moment our body loses water throughout the kidney, the gastro-intestinal tract, the lungs and the skin: water outputs.
- Our body doesn't store extra water.
- Therefore we must imperatively replace the losses to equilibrate the water balance.
- Beyond the water contained in food : we need to drink in order to fully compensate for our losses

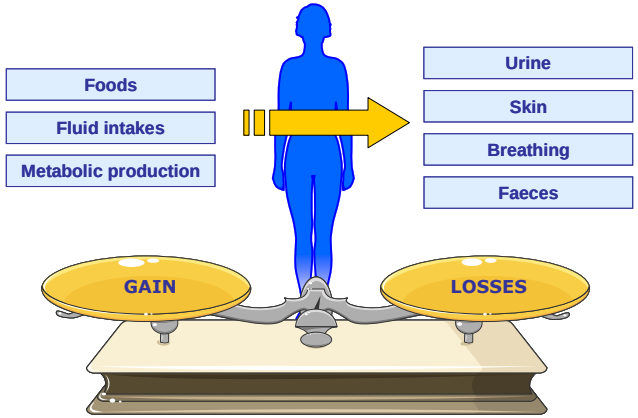
4. Water Balance:

Factors affecting the equilibrium

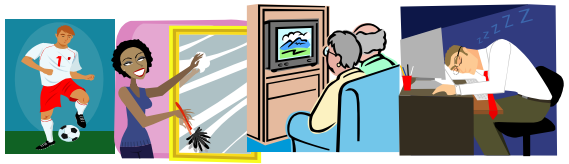
Diet and Fluids



Clothing



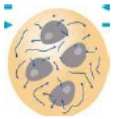
Activity: length & intensity



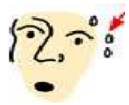
Weather and climate: temperature & humidity

4. Water Balance

Inputs/outputs for healthy sedentary adult living in temperate climate



⇩	Average water inputs (ml/day)		⇧	Average water outputs (ml/day)	
Fluids	1575 ml		Urine		1600 ml
Foods	675 ml		Skin		450 ml
Metabolic Water	300 ml		Respiration		300 ml
			Feces		200 ml
Total	2550 ml		Total		2550 ml



Total water intake should be at least covered by 1.6 L per day

4. Water Balance

Active adults need more water!

Physical activity is a major factor impacting water losses depending on length and intensity.

Examples of sweat losses of an adult male during one hour of physical activity in summer*

-Cross Country Running	1.8 L
-Swimming	0.4 L
-Soccer	1.5 L
-BasketBall	1.4 L
-Tennis	1.6 L

American College of Sports Medecin 2007*

4. Water Balance

Regulation of body water content

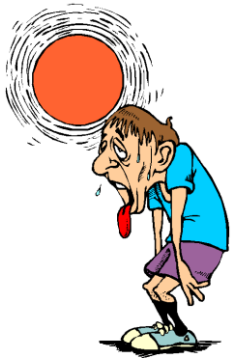
What happens if we drink more than we need?

- Excess water intake vs. losses are quickly regulated by the kidneys (i.e.: water excretion in urine) in a normal healthy subject

What happens if we don't drink enough?

- Our body will retain water and produce concentrated/ coloured urine:
- When thirst appears, our body is already mildly dehydrated
- Signs of mild dehydration will progressively occur:

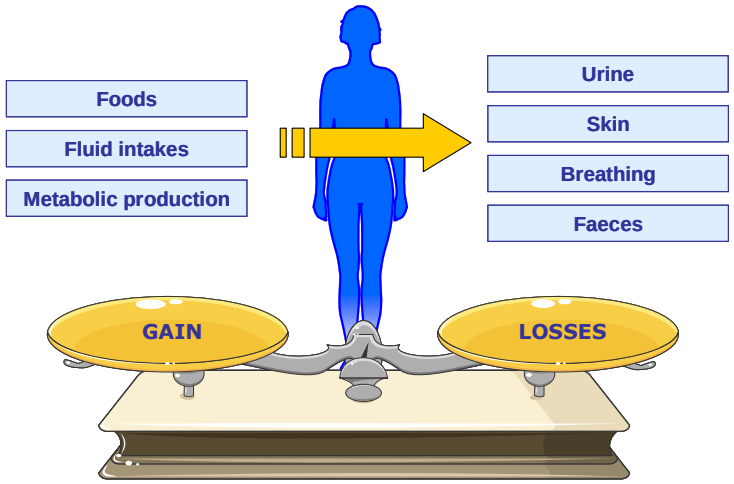
- ✓ Dry mouth
- ✓ Fatigue
- ✓ Thirst
- ✓ Decreased urine volume
- ✓ Reduction of physical and mental performance
- ✓ Headache
- ✓ Dizziness



4. Water Balance

Conclusion

A water intake which balances losses and thereby assures adequate hydration of body tissues is essential for health and life.



It is essential to drink water to stay adequately hydrated !

5. Total water intake (EFSA)

Influence of age and gender

Population Group			Total water adequate intake
Infants	0-6 months		680 mL/d (THROUGH MILK)
	6-12 months		800-1000 mL/d
Children	1-2 years		1100-1200 mL/d
	2-3 years		1100-1200 mL/d
	4-8 years		1600 mL/d
	9-13 years	Boys	2100 mL/d
		Girls	1900 mL/d
	> 14 years		Idem adults
Adults	Men		2500 mL/d
	Women		2000 mL/d
Pregnant women			+ 300 mL/d vs adults
Lactating women			+ 600-700 mL/d vs adults
Elderly			Same as adults

5. Total water intake (EFSA)

The water we drink + the water we eat

The reference values of total water intake include water from drinking water, beverages of all kind, and from food moisture and only apply to conditions of moderate environmental temperature and moderate physical activity.

Intake of water is predominately through consumption of drinking water and beverages (80%) plus water contained in food (20%) *

Total water intake for an adult:
-male = 2500 ml/day ; 80% = 2000 ml /day*
-female = 2000ml/day; 80% = 1600 ml /day*

This represents 8-10 glasses of 200 ml a day

* EFSA Journal 2010; 8 (3): 1459

6. Benefits of water

EFSA health claims related to water

EFSA has recognised the importance of water and its relevance for health, with three water generic claims :

Water contributes to the maintenance of normal physical functions

Water contributes to the maintenance of normal cognitive functions

Water contributes to the maintenance of normal thermoregualtion

The EFSA expert panel considers that in order to obtain the claimed effects, at least 2.0 L of water should be consumed per day.

EFSA Journal 2011; 9 (4): 2075

7. Water is the healthy hydration choice

Various beverages contribute to 80% of the total reference value for water.

Among beverages of all kinds, water is the healthy hydration choice:

- ✓ **zero calories**
- ✓ **no sugar**
- ✓ **without additives**

Clearly, water ought to be the preferred drink for our body's daily hydration all life long!

8. General Conclusion

- ✓ **Water, our main body constituent is an essential nutrient**
- ✓ **Water plays a vital role for life and health**
- ✓ **Consuming water is essential to compensate water losses on a daily basis**

8. General Conclusion

- ✓ **Water needs are defined according to gender and age**
- ✓ **Adults should drink at least 1.5 – 2.0 litres per day**
- ✓ **Water needs are increased by activity and hot weather**
- ✓ **Water contributes to the maintainance of normal physical functions cognitive functions and thermoregulation**

Thank You

Contact us for further information:

EFBW
32 Rue de l'Association
1000 Brussels
+32 2 210 20 32
info@efbw.org
www.efbw.org