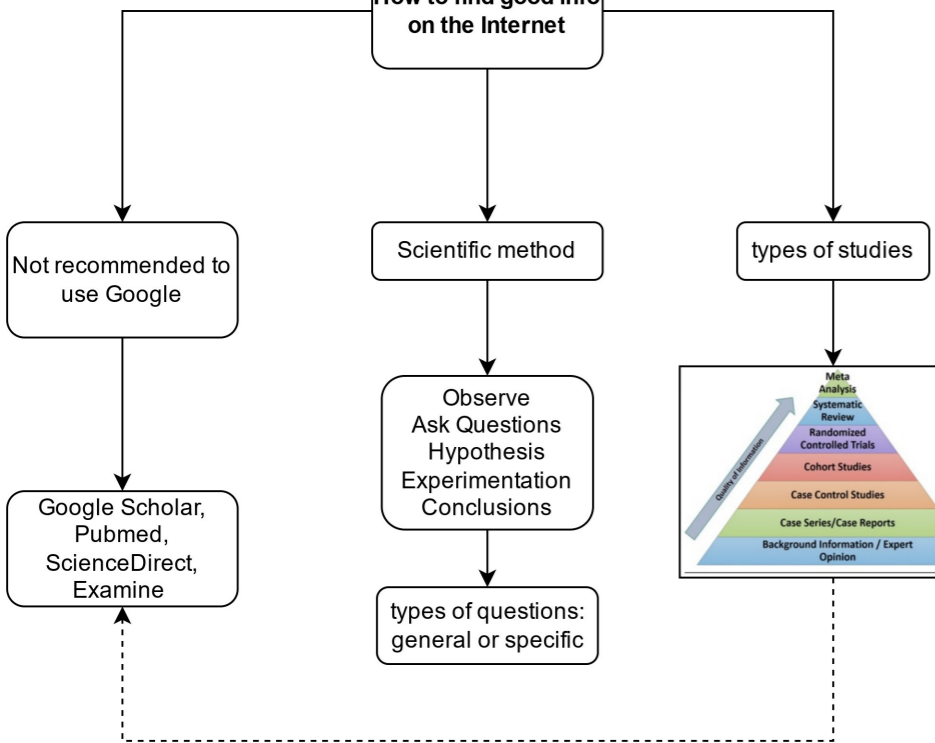
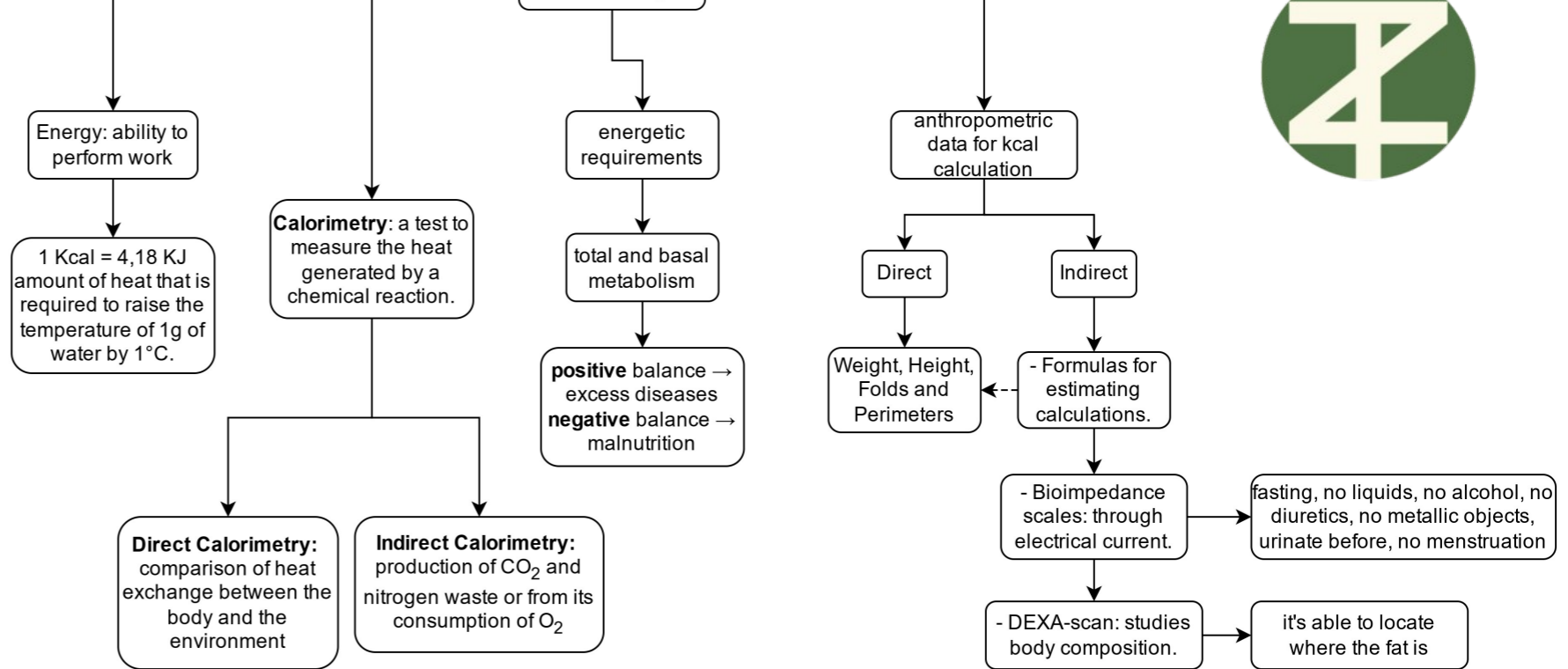




How to find good info on the Internet



Direct and Indirect Calorimetry



Nutritional state valuation

it differs from the healthy individual and the sick/pathological one

anthropometric values



direct

weight and height

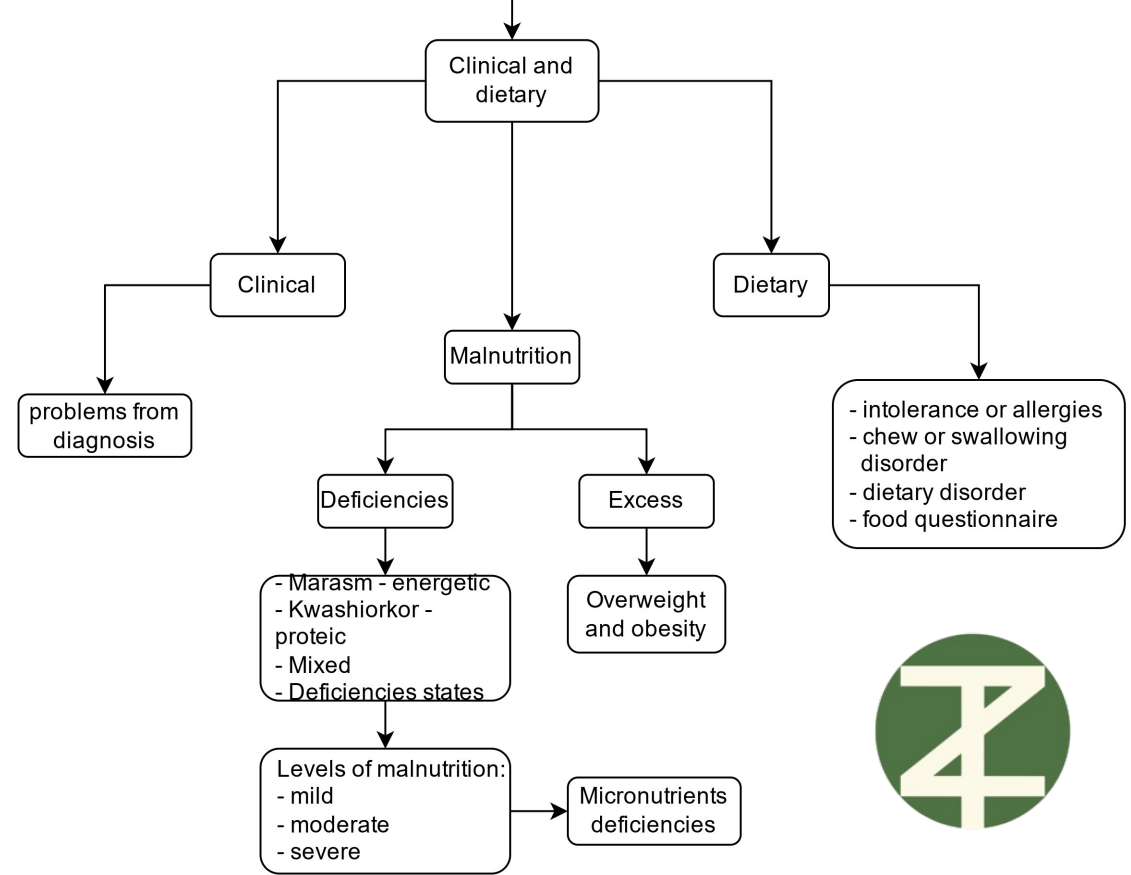
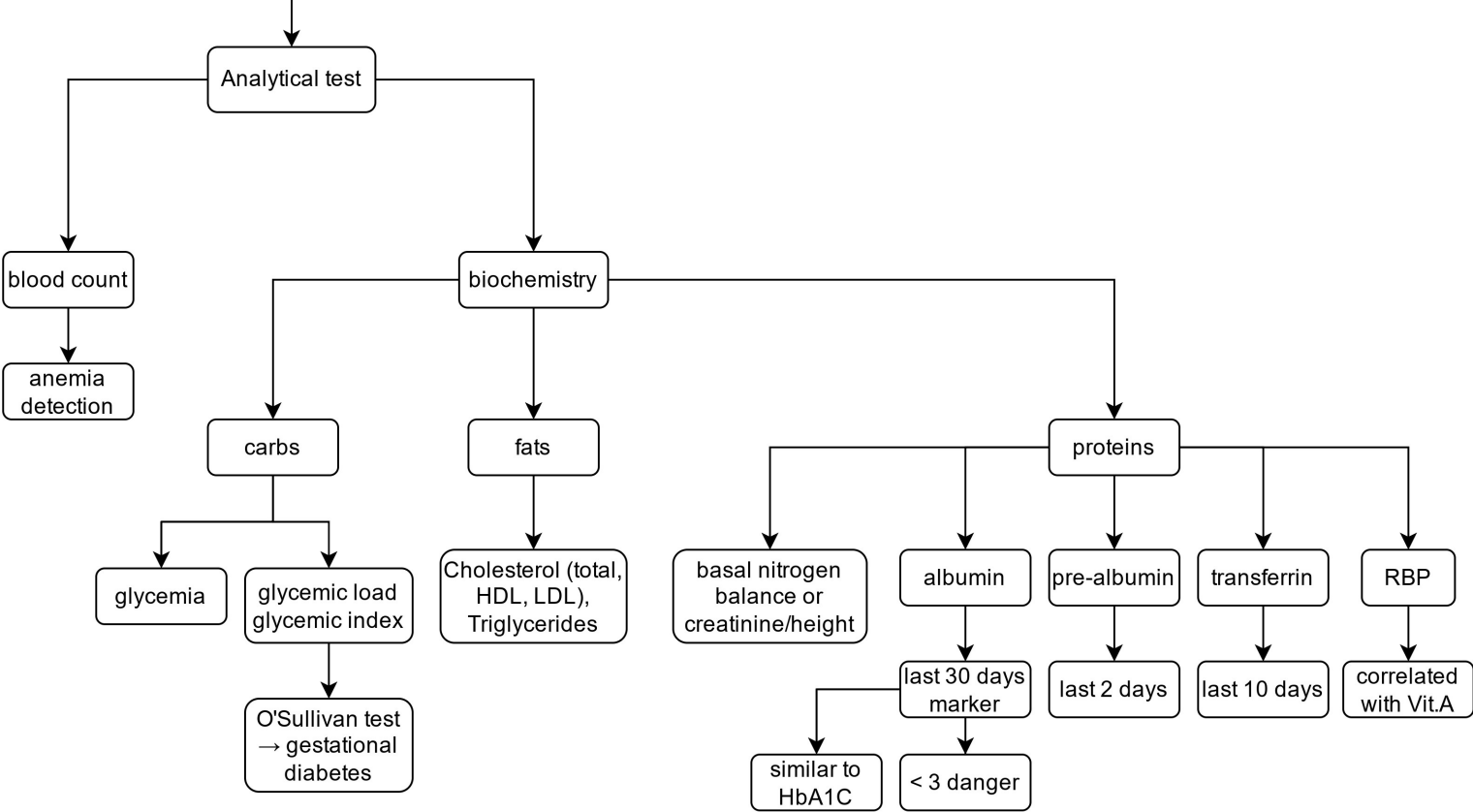
ideal weight
ex: height (cm) -100

arm circumference
less than 22,5 = BMI lower than 18,5

skin folds
body fat caliper

waist circumference
88cm max ♀
102cm max ♂

hip circumference
androide → apple
ginoide → pear





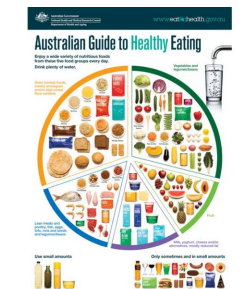
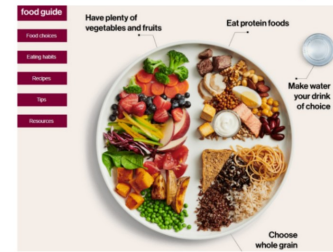
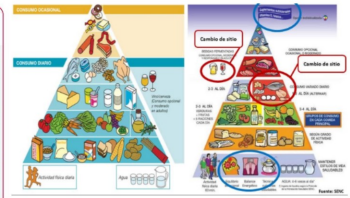
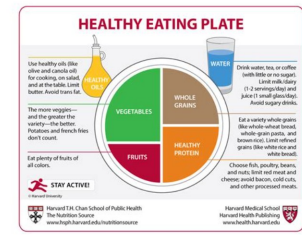
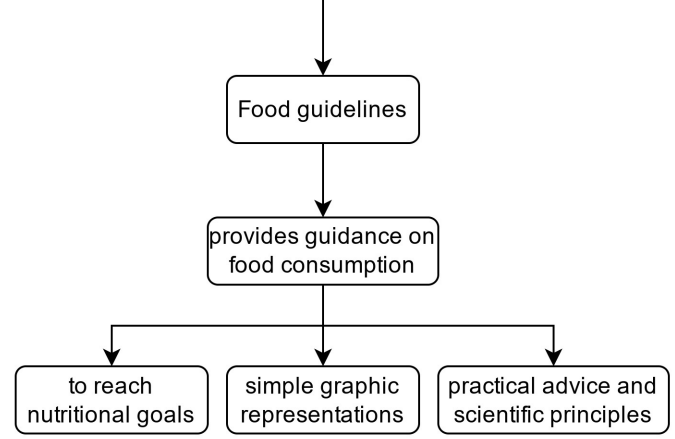
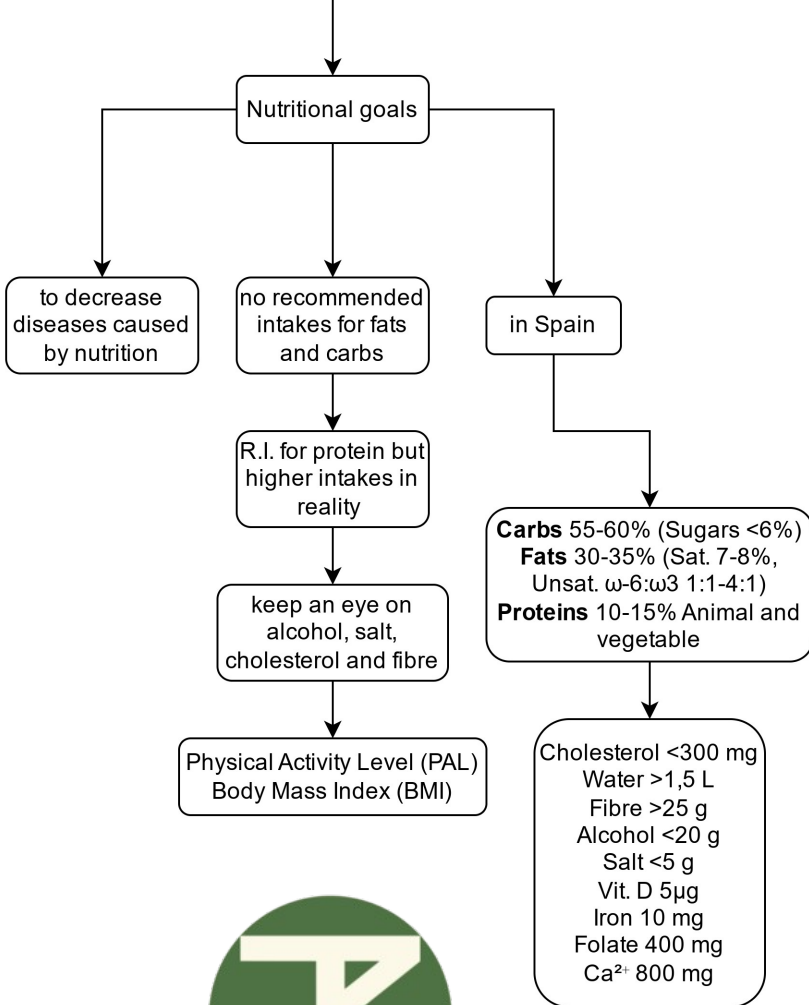
Introduction	Healthy adult	Infant nutrition	Childhood nutrition	Adolescent nutrition	Elderly nutrition	Gestational nutrition	Lactation nutrition
	<p>Optimal Health: Nutrition, Lifestyle, Exercise. Physiological, Area, Culture</p>	<p>- Organs and tissues immaturity - Accelerated growth Milk: Breast, Cow, Formula</p>	<p>↑Energy, ↑Growth, Balanced diet (avoid diseases) Organs & tissues immaturity</p>	<p>"Change". Puberty. ↑Growth, Body composition, Lifestyle (Autonomy Body concern, Drugs...)</p>	<p>"Aging" Nutrition: Psychosocial & Physiological factors (body composition, ↓digestion)</p>	<p>↑Anabolism (New tissues) & ↑Catabolism (↑energetic needs, Diabetes) +11-13 kg</p>	<p>↑BMR → Nutrients synthesis (Breast Milk) Lactation → lose the weight gained + union</p>
Energy	<p>TDEE = BMR * PAL BMR → Henry formula PAL → 1,4 / 1,6 / 1,8 / 2,0 ♂ 2340 - 3224 kcal ♀ 1887 - 2579 kcal Every Move Counts!</p>	<p><6 months: 570 kcal >43 kcal/kg >6 months: ♂ 600 - 880 kcal ♀ 550 - 667 kcal</p>	<p>↑BMR ↑PAL Pre-school age: 750-1200 kcal School age: 1700-1900 kcal</p>	<p>11-14y: 2600 kcal 15-17y: 2800 kcal Exercise: 60 min/day, vigorous >3 days/week</p>	<p>↓BMR ↓PAL ♂ 2000 kcal ♀ 1700 kcal Exercise: 75-150 min/week at 60% MHR</p>	<p>Quarter increase: 1st: +69 kcal/day 2nd: +263 kcal/day 3rd: +500 kcal/day Moderate soft exercise</p>	<p>1st semester: +500 kcal/day Exercise recovery activity Breastfeed: ↓weight (back to normal)</p>
Proteins	<p>0,83 g/kg/day ♂60 g/day ♀48 g/day <0,45 Marasmus and Kwashiorkor >3 Kidney problems, ↑urea ≈ gout, acidosis</p>	<p><6 months: 1,52 g/kg/day 9 g/day >6 months: 1,1-1,3 g/kg/day</p>	<p>Pre-school age: 0,92 - 1 g/kg/day School age: 0,91 - 0,92 g/kg/day</p>	<p>11-14y: ♂0,90 g/kg/day ♀0,88 g/kg/day 15-17y: ♂0,87 g/kg/day ♀0,84 g/kg/day</p>	<p>0,83 → 1 g/kg/day 15 → 25% calories 30 → 40% animal protein avoid sarcopenia and protein malnutrition</p>	<p>+25g = 1,1 g/kg/day (real weight) 1st: +1 g/day 2nd: +9 g/day 3rd: +28 g/day combine vegetable and animal protein</p>	<p>1,3 g/kg/day (real weight) 1st sem: +19 g/day 2nd sem: +13 g/day vegetable+animal</p>
Carbohydrates	<p>>130 g/day 45-65% calories ↑ complex carbs fibre 25 g/day sugars <10% calories glycaemic index & load</p>	<p><6 months: 60 g/day no fibre >6 months: ~50% calories fibre: 10 g/day</p>	<p>same as adults Pre-school age: fibre: 10 g School age: fibre: 14-16 g</p>	<p>same as adults 11-14y: fibre: 19 g 15-17y: fibre: 21 g</p>	<p>same as adults</p>	<p>same as adults</p>	<p>same as adults</p>
Fats	<p>20-35% calories ↓↓↓ Sat & Trans FA ω-6 ♂14 ♀11 g/day ω-3 ♂1,6 ♀1,1 g/day EPA+DHA: 250mg <20% def. >35% CVDs</p>	<p><6 months: 31 g/day 50-55% kcal >6 months: 40% kcal ω-6 4% ω-3 0,5% DHA 100mg</p>	<p>Pre-school age: 35-40% calories same as adults School age: same as adults</p>	<p>same as adults</p>	<p>25-30% kcal preventing hyperlipidemia SFAs <8% MUFAs 10-15% PUFAs 5-10% Cho.<100mg/1000kcal</p>	<p>same as adults</p>	<p>same as adults</p>
Water	<p>water, food water and oxidative reactions ♂ 2,5 L/day ♀ 2 L/day avoid dehydration and water toxicity</p>	<p><6 months: 0,7 L/day → present in breast milk >6 months: 0,8 - 1 L/day</p>	<p>Pre-school age: 1,1-1,3 L/day School age: 1,6-2,1 L/day</p>	<p>11-14y: ♂2,1 L/day ♀1,9 L/day 15-17y: same as adults</p>	<p>same as adults common dehydration → drink even if not thirsty careful with mineral composition → hypertension</p>	<p>+0,3 L/day → 2,3 L/day</p>	<p>+0,7 L/day → 2,7 L/day</p>
Vitamins	<p><u>Fat-soluble:</u> A→ ♂900 µg ♀700 µg D→ 15 µg E→ ♂13 mg ♀11 mg <u>Water-soluble:</u> C→ ♂110 mg ♀95 mg B9→ 400 µg B12→ 4 µg</p>	<p><u>Fat-soluble:</u> A→ 250 µg D→ 10 µg E→ 5 mg <u>Water-soluble:</u> C→ 20 mg B9→ 80 µg B12→ 1,5 µg</p>	<p>highly variable Vit. D: 15 µg Vit. C: 20 mg (1-3 years) 30 mg (4-6 years) 45 mg (7-10 years)</p>	<p>same as adults 11-14y: A→ ♂650 µg ♀600 µg C→ 70 mg 15-17y: A→ ♂750 µg ♀650 µg C→ ♂100 mg ♀90 mg</p>	<p>same as adults ↓amount of food, same requirements → deficiencies</p>	<p>Vitamin A → +50 µg Vitamin C → +10 mg Vitamin B9 → +270 µg Vitamin B12 → +0,5 µg yodocefol supplement 2µg B12 + 400µg B9</p>	<p>Vitamin A → +650 µg Vitamin C → +60 mg Vitamin B9 → +170 µg Vitamin B12 → +1 µg</p>
Minerals	<p>Na 2 g, K 3,5 g, Ca 0,95 g, P 550 mg, Mg 325 mg, F 3 mg Fe 16-11 mg, I 150 µg, Zn 15 mg, Cu 0,9 mg</p>	<p>Na 0,2 g, K 750 mg, Ca 280 mg, Mg 80 mg, F 0,4 mg Fe 11 mg, I 70 µg</p>	<p>highly variable Ca: 450 mg (1-3 years) 800 mg (4-10 years) Fe: 7 mg (1-6 years) 11 mg (7-10 years) I: 90 µg</p>	<p>Ca: 1150 mg Fe: ♂11 mg ♀13 mg 11-14y: I: 120 µg 15-17y: I: 130 µg</p>	<p>same as adults control electrolytes, Ca and Fe</p>	<p>same as adults I: +50 µg yodocefol supplement 200µg iodine</p>	<p>same as adults K: +0,5 g I: +50 µg</p>



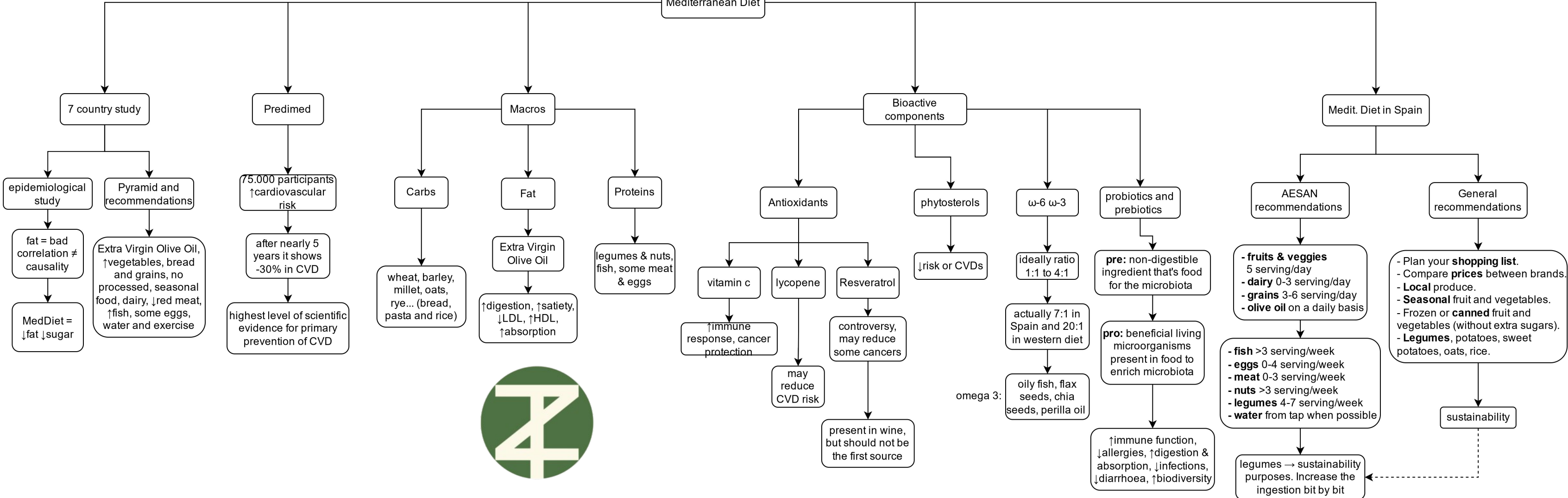
	Breast Milk	Formula 1	Formula 2	Cow Milk
Introduction	The most nutritious one of them all, the perfect food for the infant. It has everything at the right time. It changes as the child grows.	Comes from cow milk. Can <u>satisfy by itself</u> the needs of the infant during first 6 months.	Comes from cow milk. From >6M to 1 year. Need of <u>additional foods</u> in the diet.	Worst option for the infant due to too many caseins, ↑dry extract, inflammatory and too fatty
Energy	65-70 kcal/dL	60-70 kcal/dL	60-80 kcal/dL	65-70 kcal/dL
Proteins	0,9-1,2 g/dL Whey 65% Caseins 35% Biological Value: 100 No inflammatory β-lactoglobulin, 3x Ig, essential aa's	1,1 - 2,1 g/dL Whey 60% Casein 40% Biological Value: 85 +Choline, Taurine, Inositol, Carnitine Optional supplementation	1,1 - 2,5 g/dL Whey 20% Casein 80% Biological Value: 70 +Choline, Taurine, Inositol, Carnitine Optional supplementation	3,5 g/dL Whey 15% Casein 85% Biological value: 70 50% β-lactoglobulin 25% α-lactoalbumin
Carbohydrates	6-7 g/dL Mainly lactose Amino-sugars 1,2-1,4% prebiotics for ↑microbiota growth	5,6 - 8,7 g/dL Malted dextrino flours <30% No sugar, honey or fructose	5,4 - 10 g/dL Lactose >50% Sugar, fructose and honey <20%	5 g/dL Lactose ↓↓ amino-sugars
Fats	3,5-4 g/dL Saturated 40% ↑omega 3 ↑essential FA 75% β-fatty acids 2x cholesterol	2,8 - 3,8 g/dL Saturated 40% Trans <3% Mono (oleic) 40% Poly (ω6 5-6%, linolenic, EPA, DHA, arachidonic)	3,1 - 4,2 g/dL ω6 >2,7% similar percentages as F1	3,5-4 g/dL Saturated 60% ↓omega 3 ↓essential FA ↑butyric acid 33% β-fatty acids
Vitamins	<u>Fat-soluble:</u> A (2x) and E <u>Water-soluble:</u> C (3x) and B ₃ (2x)	<u>Fat-soluble:</u> A and E <u>Water-soluble:</u> C and B ₃	<u>Fat-soluble:</u> A and E <u>Water-soluble:</u> C and B ₃	<u>Fat-soluble:</u> D and K <u>Water-soluble:</u> B complex
Minerals	0,2% of the total kidney development Bioavailability Ca 75% Ca/P ratio 1,5-2,3 Fe 0,07mg/dL Bioavailability Fe 50% (lactoferrin)	Na <12 mE/L, Na+K+Cl <50 mE/L Ca >30 mg/dL P >15 mg/dL Fe 0,07-0,14 mg/dL	Na <25 mE/L, K <34 mE/L Cl <29 mE/L Ca >42 mg/dL P >20 mg/dL Fe 0,7-1,4 mg/dL	0,7% of the total Ca, Mg (3x) P (6x) Bioavailability Ca 20% Ca/P ratio 1,3 Bioavailability Fe 1,3% Zn (2x)

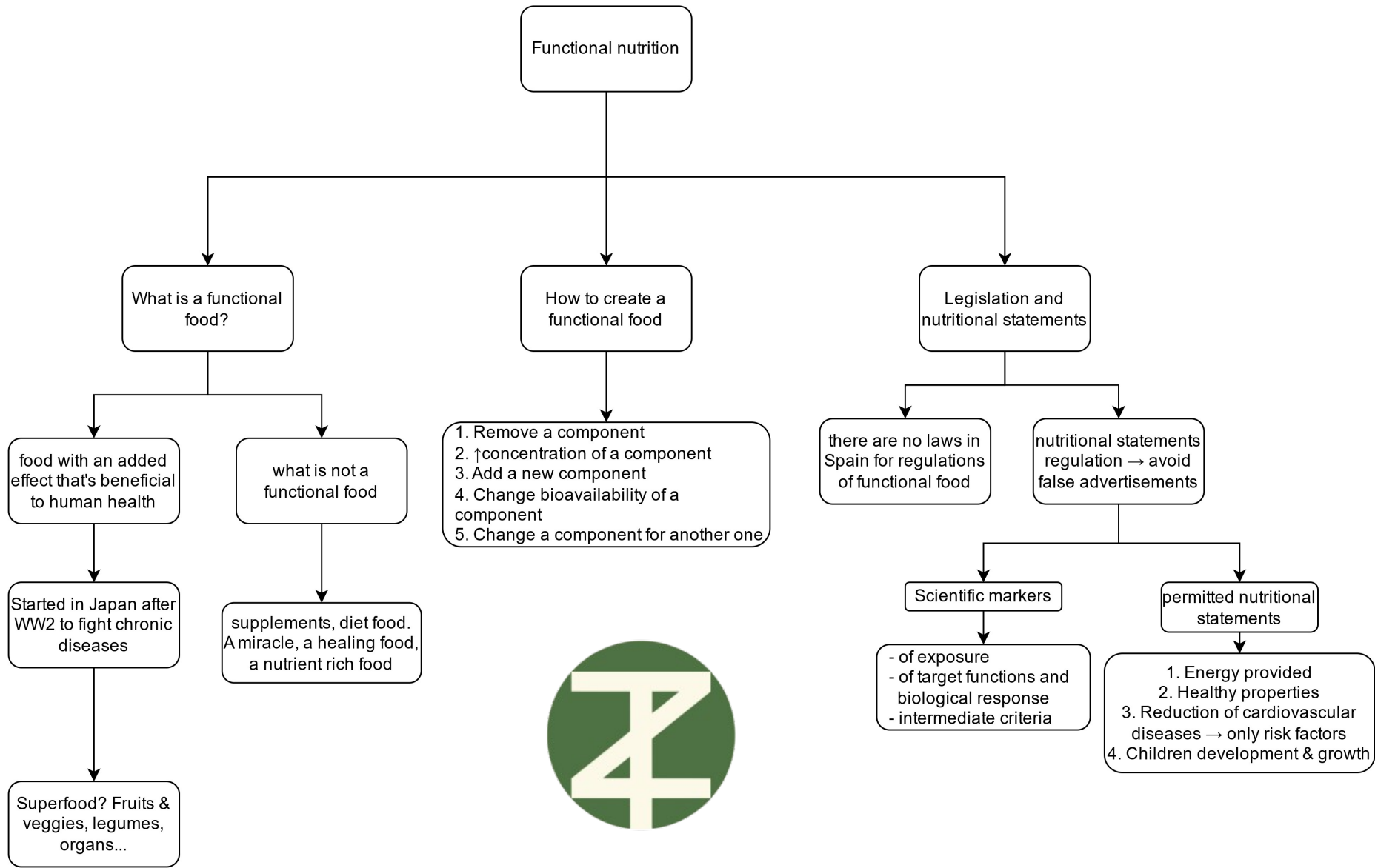
Other Formulas	Adverse Effects of Using Formulas
<p>Premature babies: similar to F1 but "on steroids", \uparrowkcal \uparrowProtein (2g/dL) \uparrowBiological Value (70%Whey) + Micronutrient supplementation = rapid growth</p>	1- Defects in its composition/hygiene
<p>Lactose Free: in case of congenital intolerance or Intestinal mucosal alteration. Exchange lactose or adding lactase. Lactose fermentation \downarrowpH</p>	2- Improper use of the type of formula
<p>Protein hydrolysates: proteins pre-digested = \downarrowallergenicity. They can be \downarrowhydrolysis (hypoantigenic) 8k Daltons or \uparrowhydrolysis (hypoallergenic) 3k Daltons</p>	3- Problems with reconstitution water
<p>Monomeric formulas: everything predigested. Proteins: L aa's CH: Dextrinomaltose Free FA: short and medium chain (40%); essential FA. \uparrowosmolarity</p>	4- Nutritional modification (Sterilisation)
<p>Supplemented with polyunsaturated FA: breast milk has a lot of Polyuns. Fatty Acids which are essential in the first week of life (development)</p>	5- Long term impact???
<p>Soy formulas: for cow milk protein intolerance, lactose free or vegetarian. Problem of antinutrients because of soy, decent quality protein but lacks nutrients.</p>	
<p>Anti-reflux formulas: with thickeners to prevent regurgitation (20% of babies). Postural (no lie down after eating), diet (\uparrowfrequency \downarrowquantity, special milk)</p>	
<p>Anti-constipation formulas: F1 with β-palmitate 70% \approx Breast milk \rightarrow better digestion (pancreatic lipase), better absorption of Ca, Mg. + supplementation</p>	
<p>Anti-colic formulas: Partially hydrolyzed proteins, Lactose \rightarrow maltodextrins; Fat with a higher proportion of short chain FA and β-palmitate, FOS (prebiotics)</p>	
<p>Day-Night formula: From 6am to 6pm (proteins, vitamins A,C,E, \downarrowtryptophan, \downarrowcarbs). From 6pm to 6am (\uparrowtryptophan) \rightarrow mimics human milk</p>	
<p>Metabolism errors formulas: Phenylketonuria (hydroxylase def), Homocysteinuria, Tyrosinemia, <u>Non-essentials:</u> Fructose or Galactose (elimination)</p>	

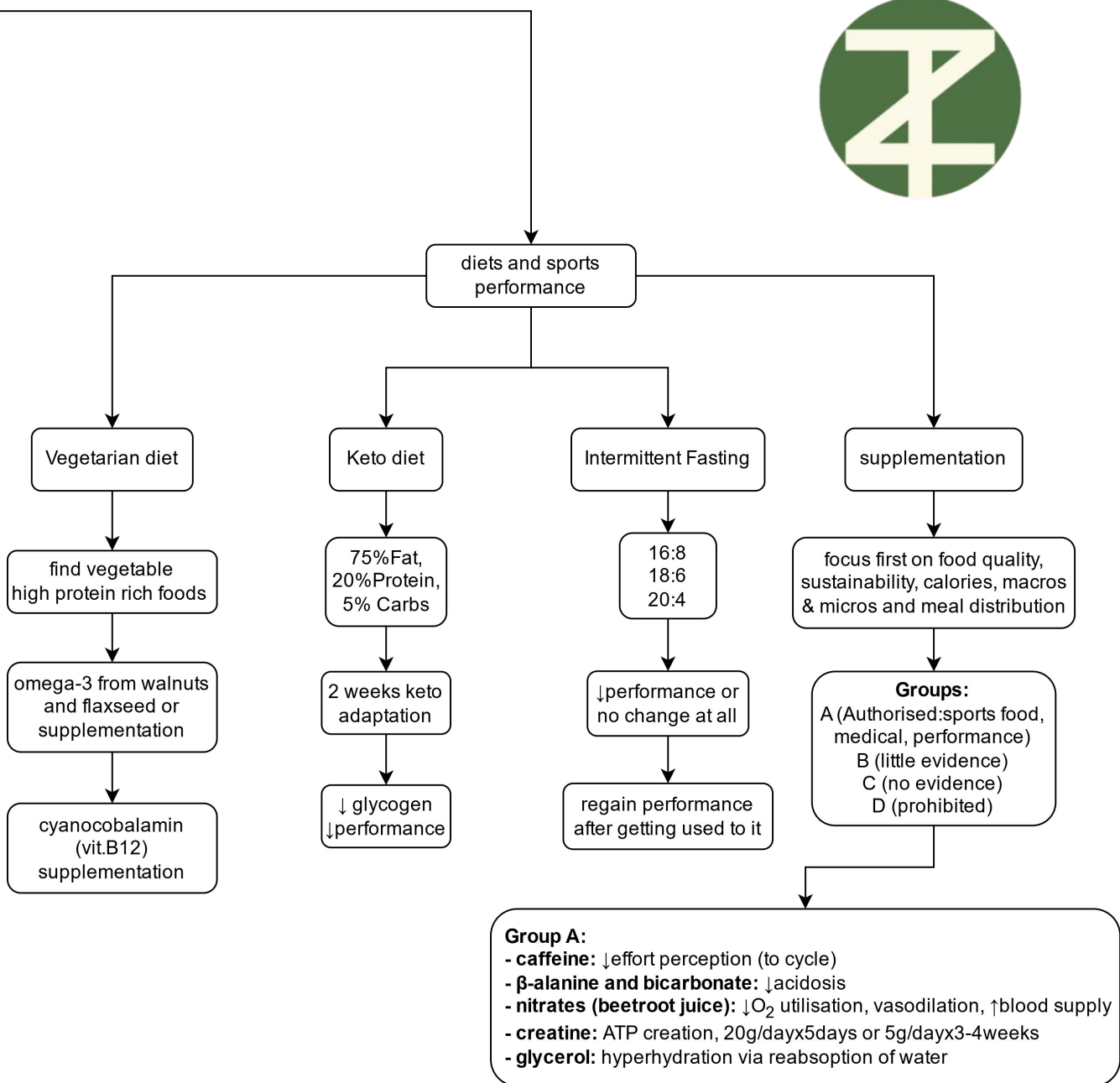




Mediterranean Diet







(Macro)nutrients distribution

Proteins

1,4 - 2,3 g/kg/day

Depends on: exercise volume, age, body composition, total calories, training and physical condition of the athlete

Fats

at least 20% of total calories of the day

3-4 hours away from training

not in the pre or intra-training

omega-3 help reduce inflammation → injury recovery

Carbs

importance of carbs

better performance in the majority of people

3-5 g/kg/day
5-7 g/kg/day
6-10 g/kg/day
8-12 g/kg/day

glycogen overcompensation (unloading and reloading)

pre-training

1-4 h before competition: 1-4 g/kg

↓G.I. if NO intra
↑G.I. if intra load

avoid ↑fibre food 1-2 days before

intra-training

< 30 min → unnecessary
1 hour → mouthwashes

combine glucose and fructose = ↑ absorption = ↑ Insulin peak

mouthwashes: areas of the brain related to motor activity are activated.

post-training

4R Period:
- Restore glycogen
- Replace water & salts
- Reconstruct tissues
- Relaxation (rest)

1,2 g/kg of carbs + 0,4 g/kg of proteins = ↑ protein synthesis

Water

hydration

- **before:** clear urine 4 h before
- **during:** 0.5-0.7 L/h isotonic
- **after:** 150-200% lost weight slightly hypertonic Na⁺ 1-1.2g/L

carbs, Na⁺ and K⁺ help intestinal water absorption

Ice Slurry 1h before competition = ↓temperature ↓exhaustion

dehydration

Rhabdomyolysis: muscle damage → release of contents into the bloodstream.

- Creatine phosphokinase (CPK)
- GOT and GPT
- Myoglobin



energy expenditure calculation

basal metabolic rate

Metabolic Equivalent of Task (MET)

depends on

NEAT

Harris-Benedict

kcal / kg*hour

- Aim of the athlete
- Training: pre-season / season / holidays
- Training period or upcoming competitions

$$\text{BMR} = 66.5 + (13.76 \times \text{weight in kg}) + (5.003 \times \text{height in cm}) - (6.755 \times \text{age in years})$$

$$\text{kcal/min} = \text{MET} * 0,0175 * \text{weight(kg)}$$

- almost no exercise = BMR x 1,2
- light exercise = BMR x 1,375
- moderate exercise = BMR x 1,55
- heavy exercise = BMR x 1,725
- very heavy exercise = BMR x 1,9



