

Minerale majeure



Minerale

- **Minerale: elemente chimice natural, anorganice**
 - **Componente structural si functionale in multiple procese vitale din organism**

Similaritati cu vitaminele

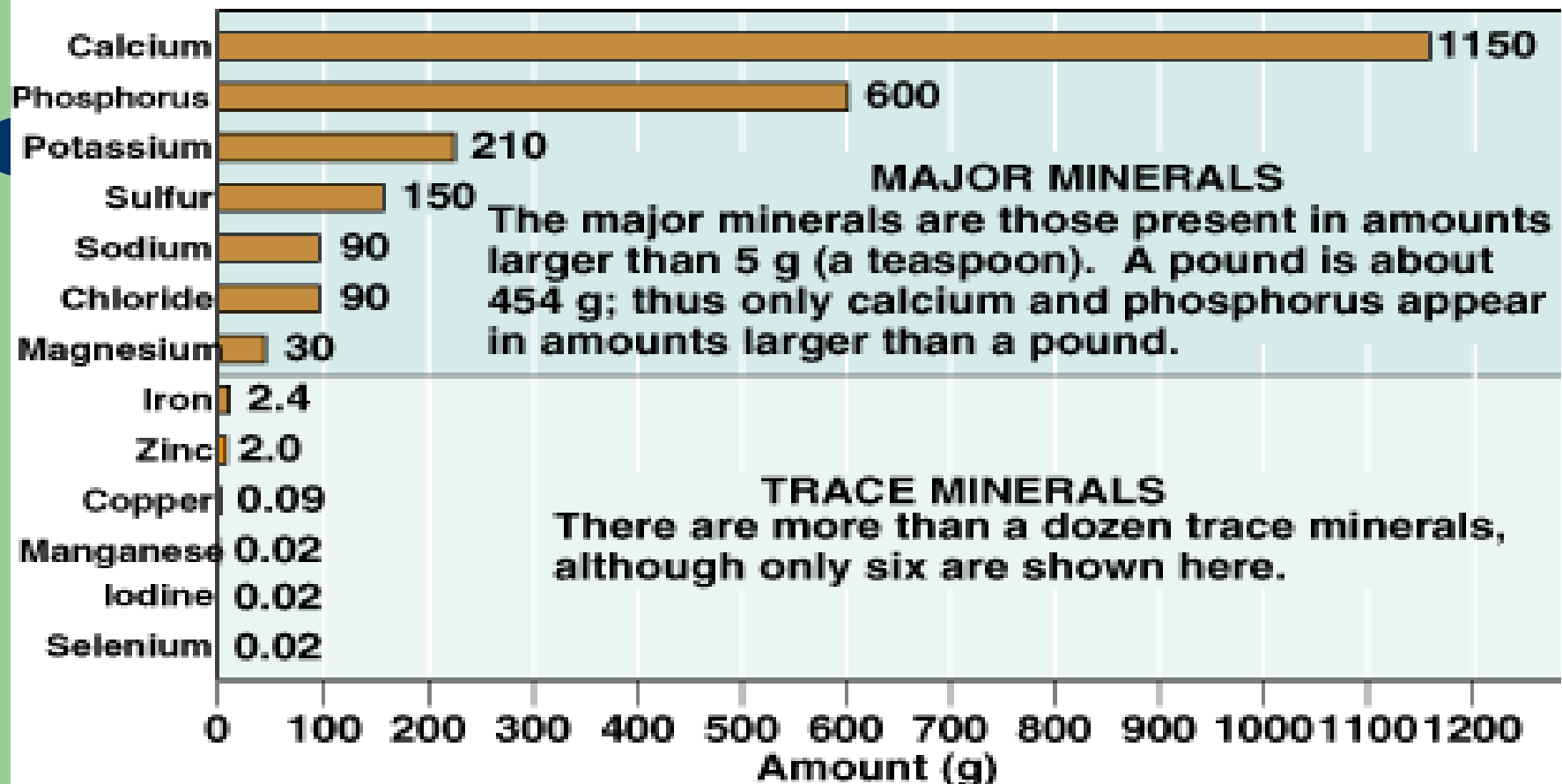
- Nu aduc aport caloric dietei
- Functii diverse in organism
- Combinatii cu enzimele pentru facilitarea reactiilor chimice
- Necesare in dieta in cantitati foarte mici

Diferente fata de vitamine

- Vitaminele - compusi organici,
minerale – compusi anorganici
- Unele minerale contribuie la structuri
ale organismului

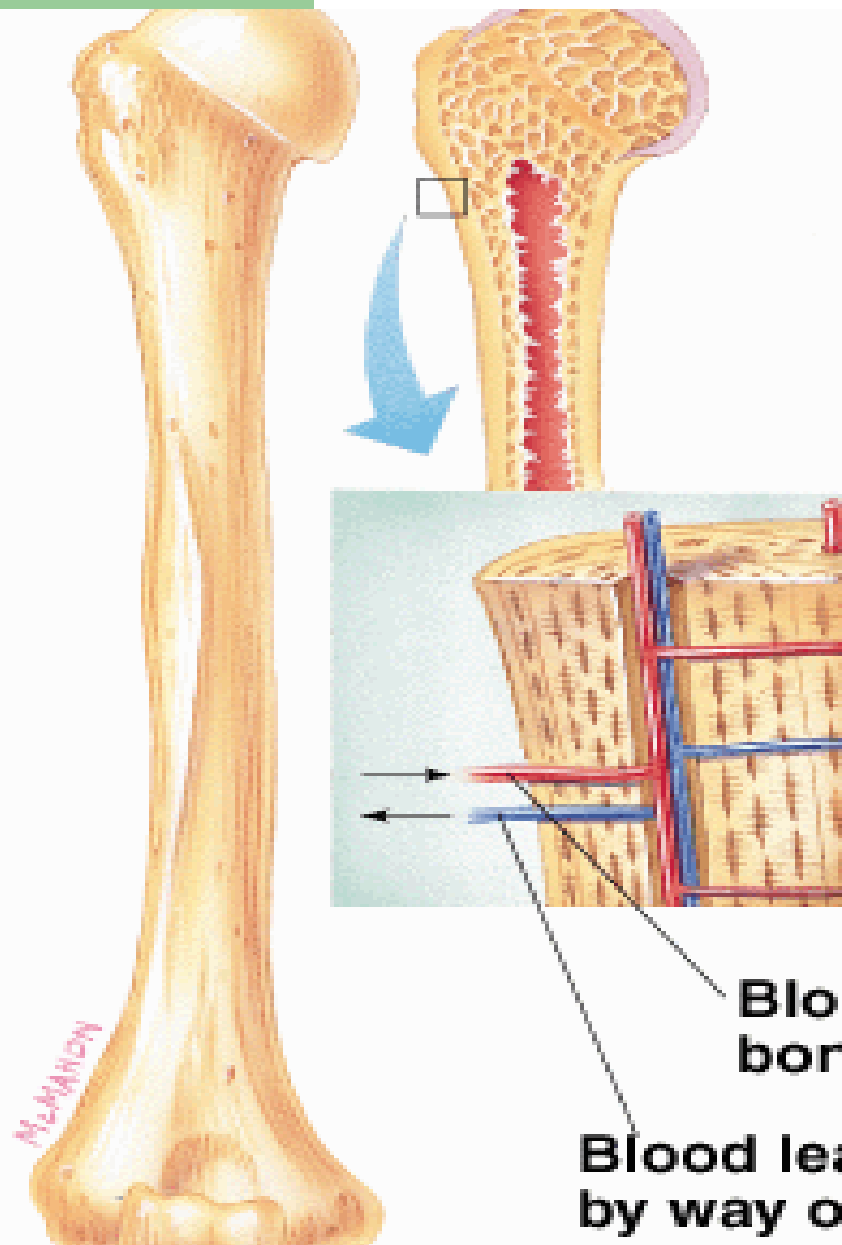
I. Minerale majore

- **Minerale majore: mineral essential care se gaseste in organism in cantitati mai mari de 5 g**



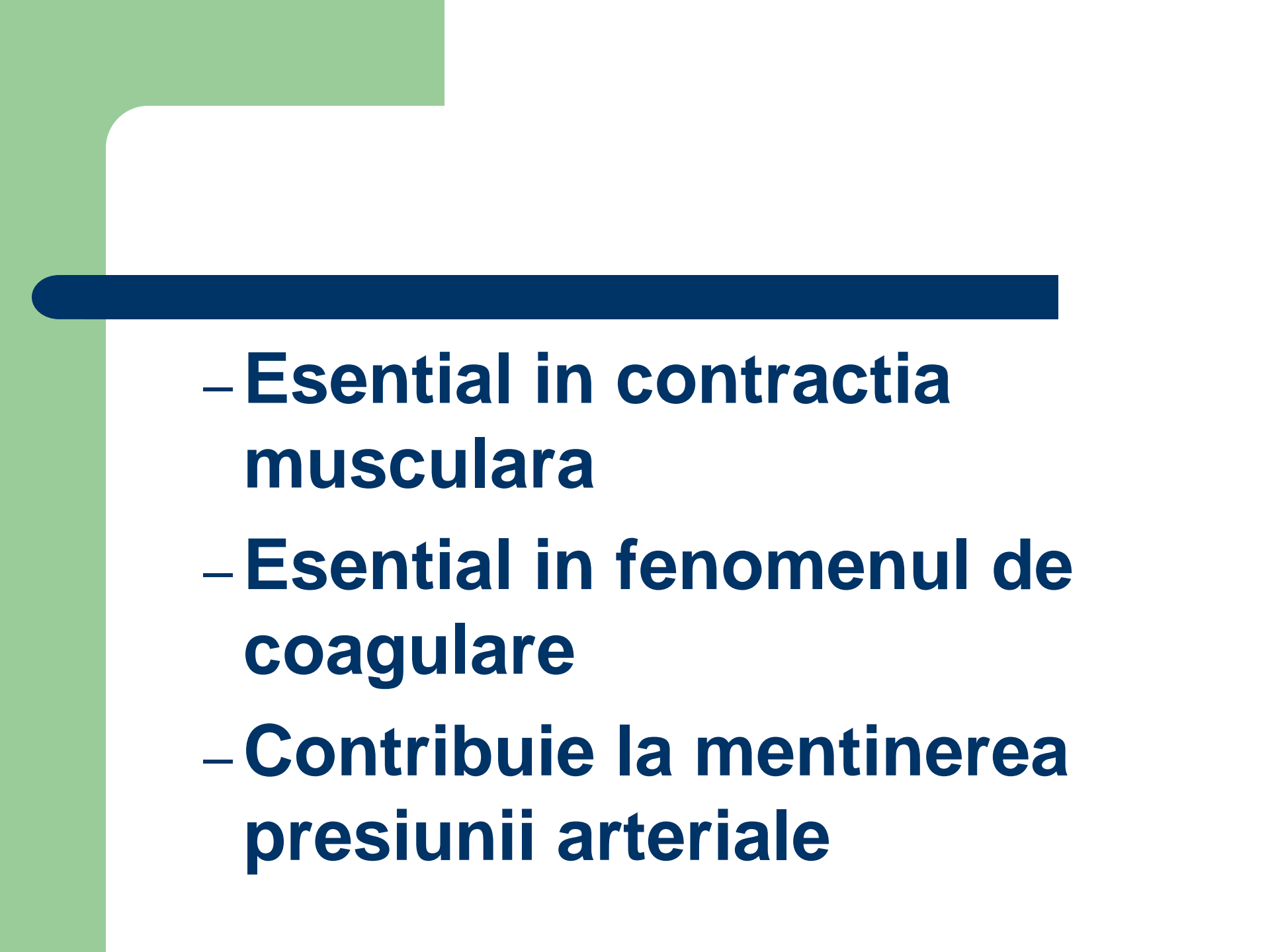
A. Calciu

- **Cel mai abundant mineral in organism**
 - **99% stocat in oase**
- **Functii:**
 - **Rol structural in oase si dinti**
 - **Transmisia impulsurilor nervoase**
 - **Mentinerea structurii celulare**



Blood enters the bone in an artery here.

Blood leaves the bone by way of a vein.

- 
- Esential in contractia musculara**
 - Esential in fenomenul de coagulare**
 - Contribuie la mentinerea presiunii arteriale**

Probleme in nutritie

Deficit

- Crestere defectuoasa la copii
- Pierdere de masa osoasa (osteoporosis) la adulti

Toxicitate

Excesul este in general excretat



toxicitatea este rara

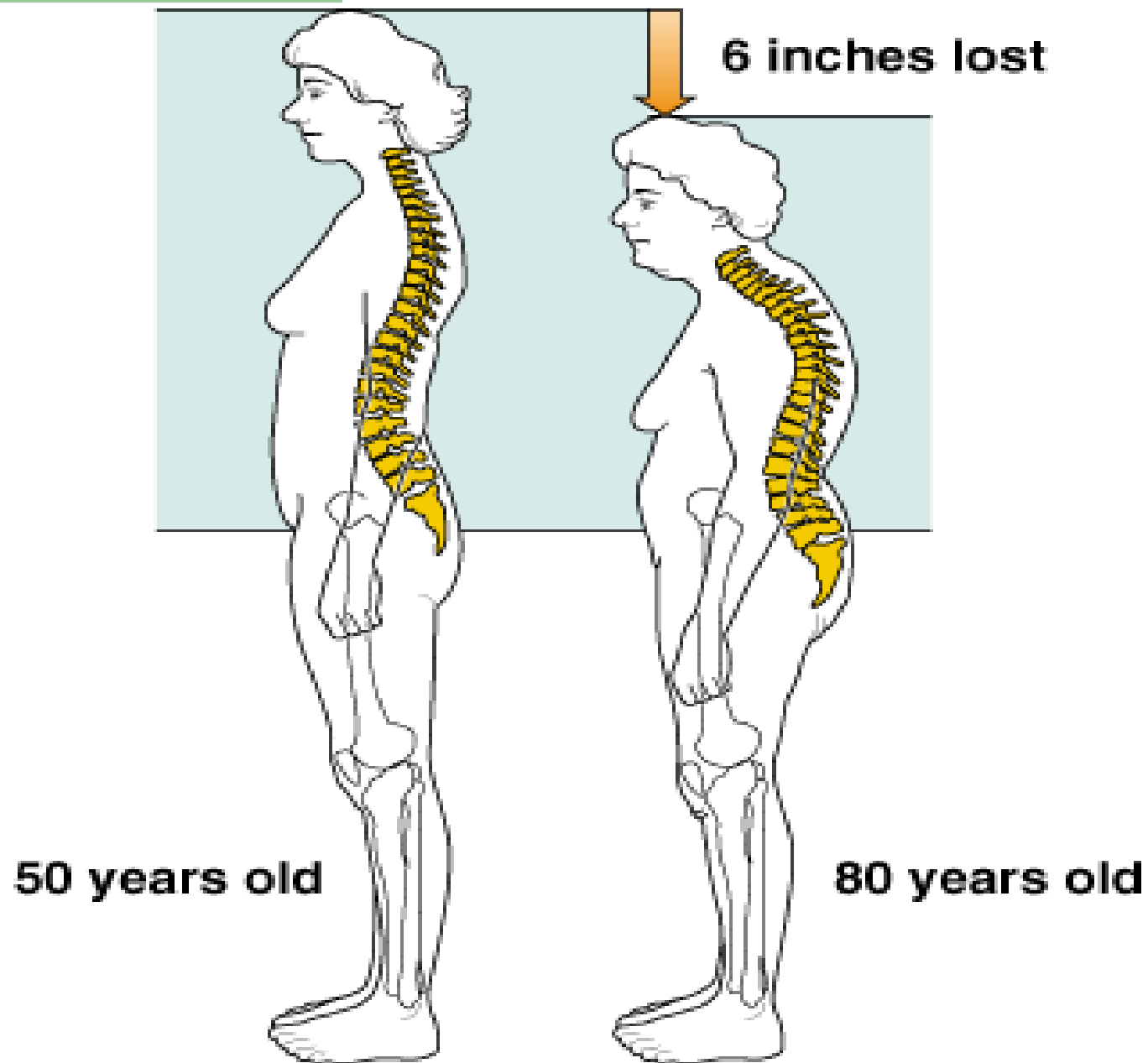


Table 23.2

Risk factors for osteoporosis. 8,10,11

- **Female**
- **Menopause**
- **Deficient calcium intake**
- **Caucasian or Asian heritage**
- **Thinness (“small bones”)**
- **Cigarette smoking**
- **Excessive alcohol intake**
- **Ovarectomy (ovaries removed) before age 45**
- **Physical inactivity**
- **Deficient vitamin D status**
- **High animal protein intake**
- **Genetic factors**

DZN & Surse

- **DZN = 1000 mg – 1300 mg**
- **Alimente**
 - Lapte / produse lactate
 - Vegetale verzi
 - Unii pesti
 - Tofu & alte legume
 - Alimente fortificate (i.e.: juices)



"Regular exercise and a healthy diet with enough calcium help maintain good bone health and may reduce the risk of osteoporosis later in life."

Nutrition Facts

Serving Size: 1 cup (240ml)

Servings per Container: 16

Amount per Serving

Calories 110 Calories from Fat 20

% Daily Value*

Total Fat 2.5g **4%**

Saturated Fat 1.5g **8%**

Cholesterol 15g **4%**

Sodium 135mg **6%**

Total Carbohydrate 13g **4%**

Dietary Fiber 0g **0%**

Sugars 12g

Protein 8g

Vitamin A 10% • **Vitamin C 4%**

Calcium 30% **Iron 0%** **Vitamin D 25%**

Phosphorus 10%

* Percent Daily Values are based on a 2,000 calorie diet.



BIODISPONIBILITATE

- **Absorbția (alimente de legare)**
 - **Acid fitic (calciu, fier, zinc, magneziu)**
 - orz & cereal integrale
 - **Acid oxalic (calciu & fier)**
 - Frunze de sfecla, rubarba & spanac)
 - **Fibre**
- **Excreția**
 - **Proteine**

**$\geq 50\%$
absorbed**

**Cauliflower, watercress,
brussels sprouts, rutabaga,
kale, mustard greens, bok
choy, broccoli, turnip greens**

**$\approx 30\%$
absorbed**

**Milk, calcium-fortified soy
milk, calcium-set tofu**

**$\approx 20\%$
absorbed**

**Almonds, sesame seeds,
pinto beans**

**$\leq 5\%$
absorbed**

**Spinach, rhubarb, Swiss
chard, sweet potatoes**

B. Fosfor

- **Al doilea cel mai abundant mineral in organism (85% combinat cu Ca)**
- **Functii:**
 - **Structura oaselor si dintilor**
 - **Necesar pentru crestere (ADN)**
 - **Metabolismul energetic (ATP)**

Probleme nutritionale

Deficit

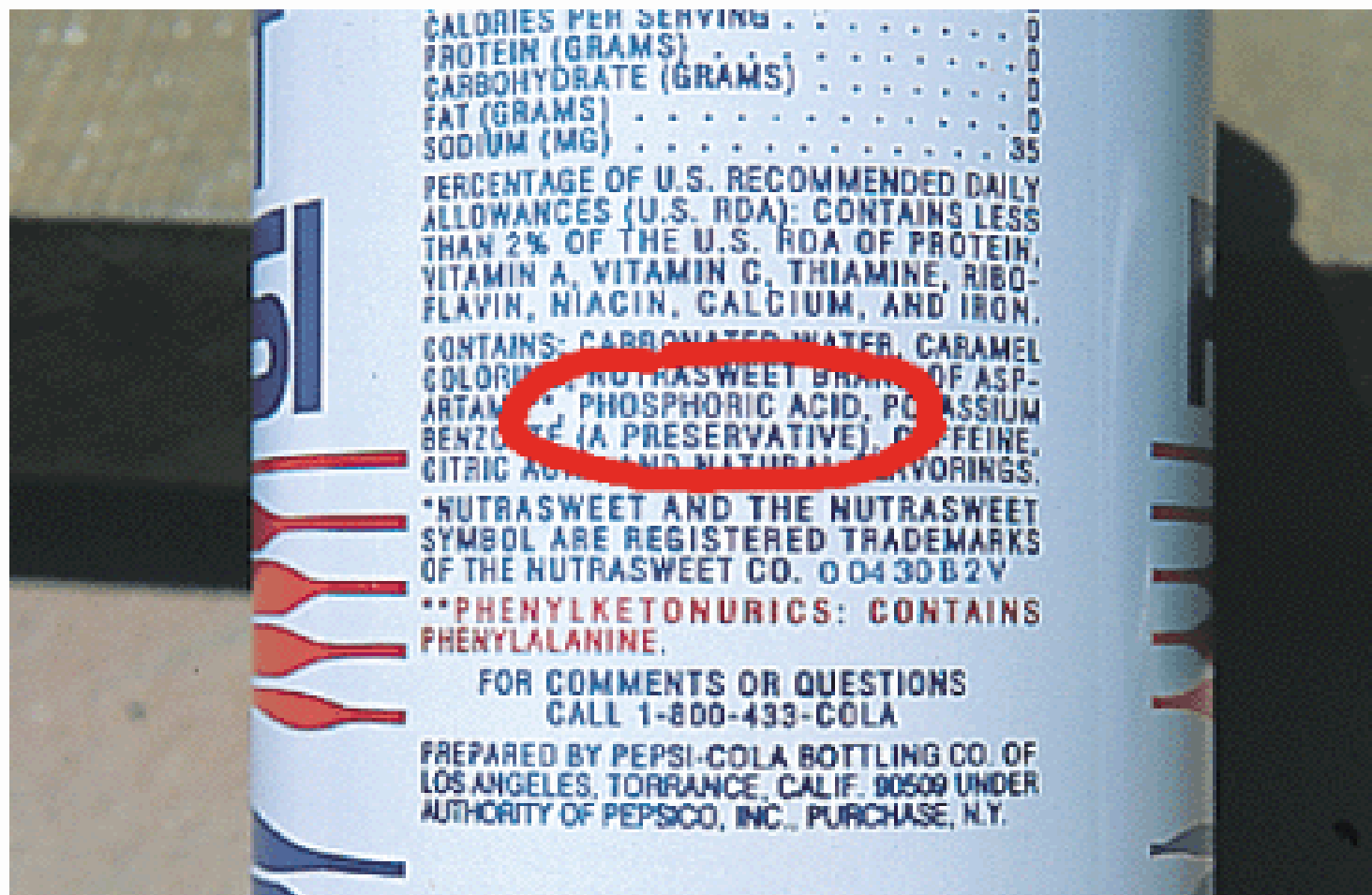
- Slăbiciune musculară
- Dureri osoase
 - Deficiența este rară
 - Abundență în alimente

Toxicitate

- Poate cauza eliminarea calciului și să inhibe absorbția

DZN & Surse

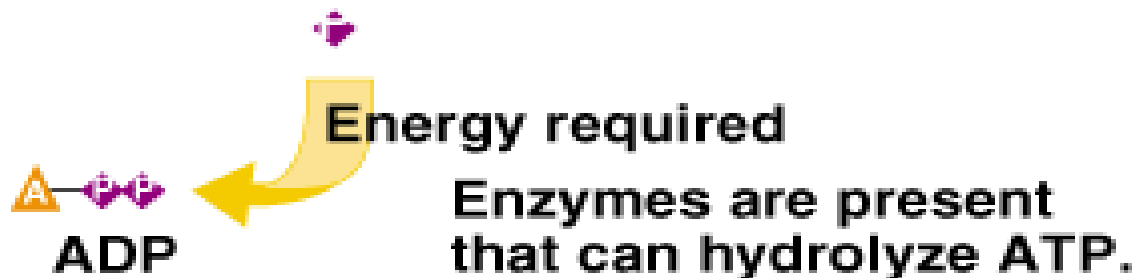
- **DZN = 700 mg**
- **Alimente**
 - **Carne & peste**
 - **Produse lactate**
 - **Alimente procesate**
 - **Apa minerala**



**Phosphates are a common
multipurpose food additive**

Before the transfer of energy:

Glucose and fat have broken down, and some of their energy has been used to attach phosphate groups to molecules of adenosine diphosphate (ADP), building ATP.^a

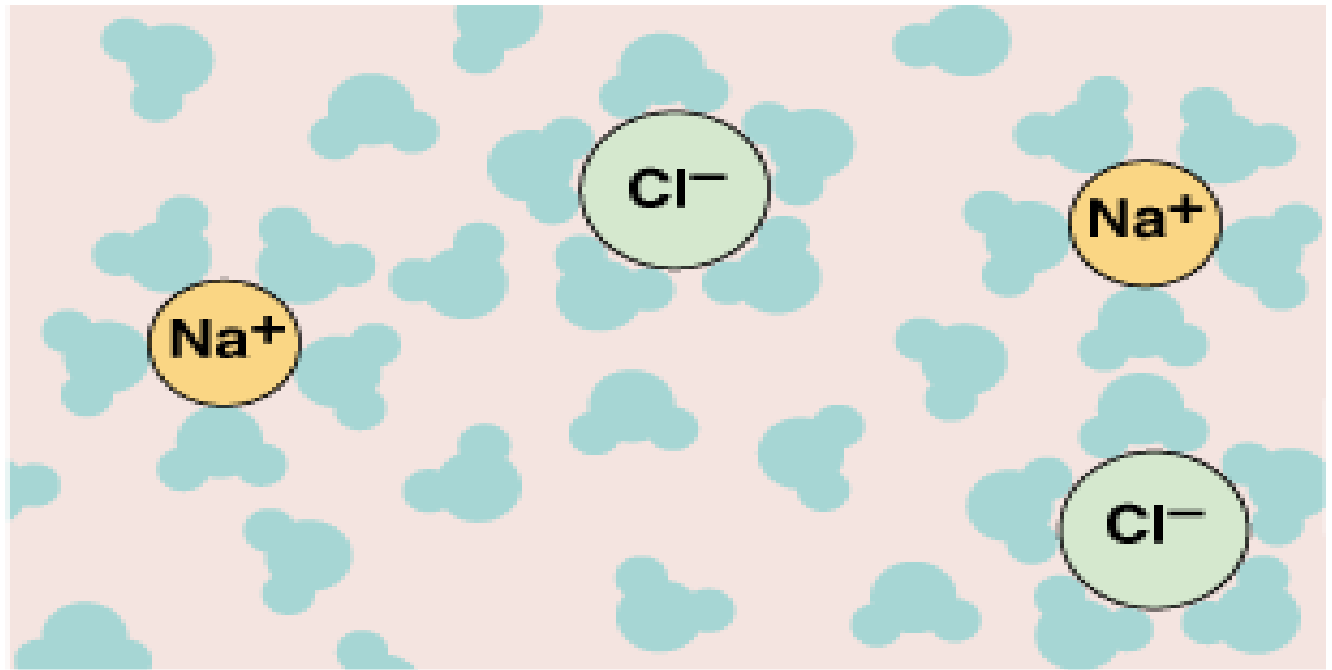
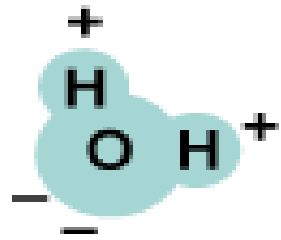


Building blocks are available to build compounds.^b



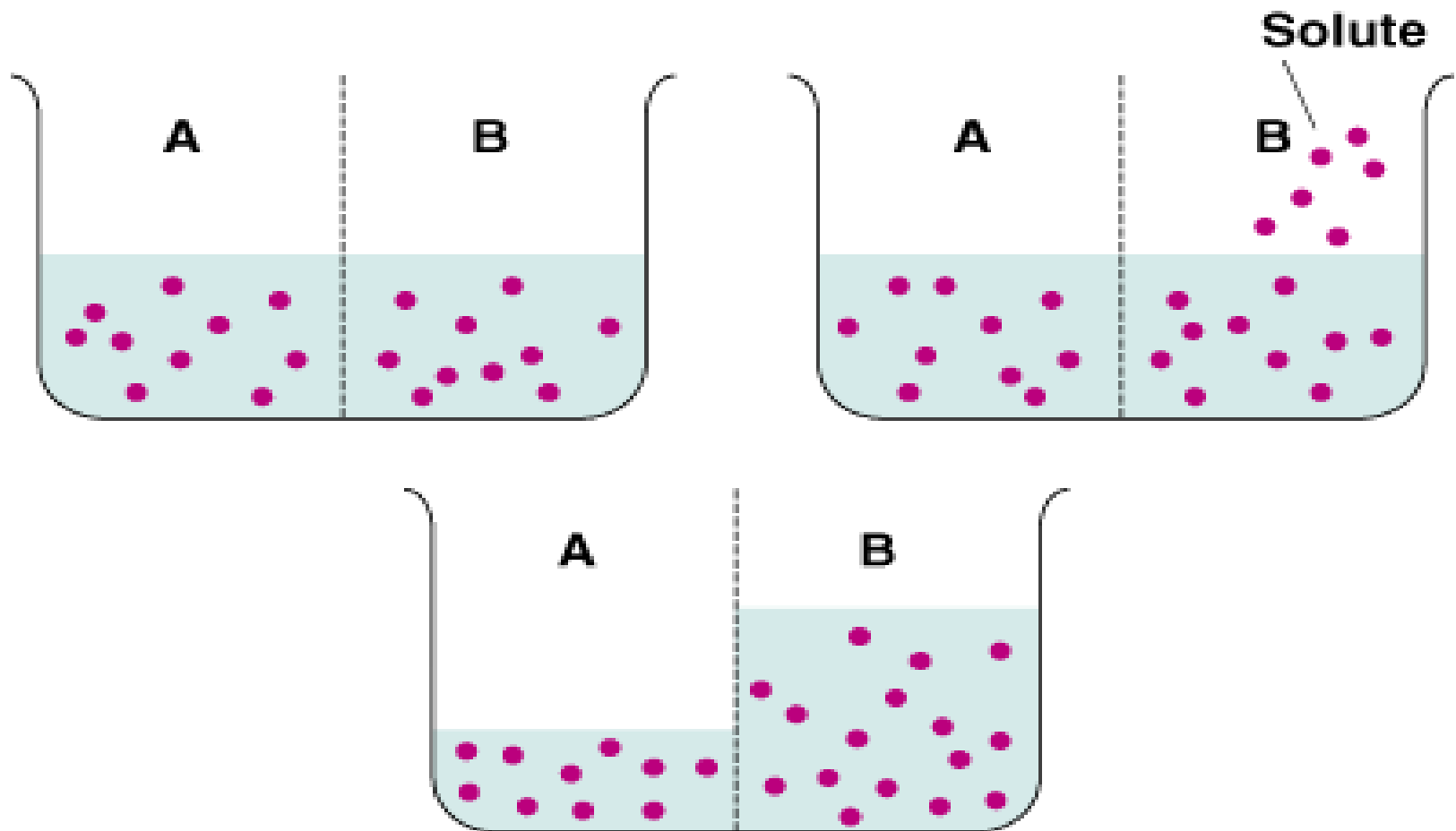
C. Sodiu

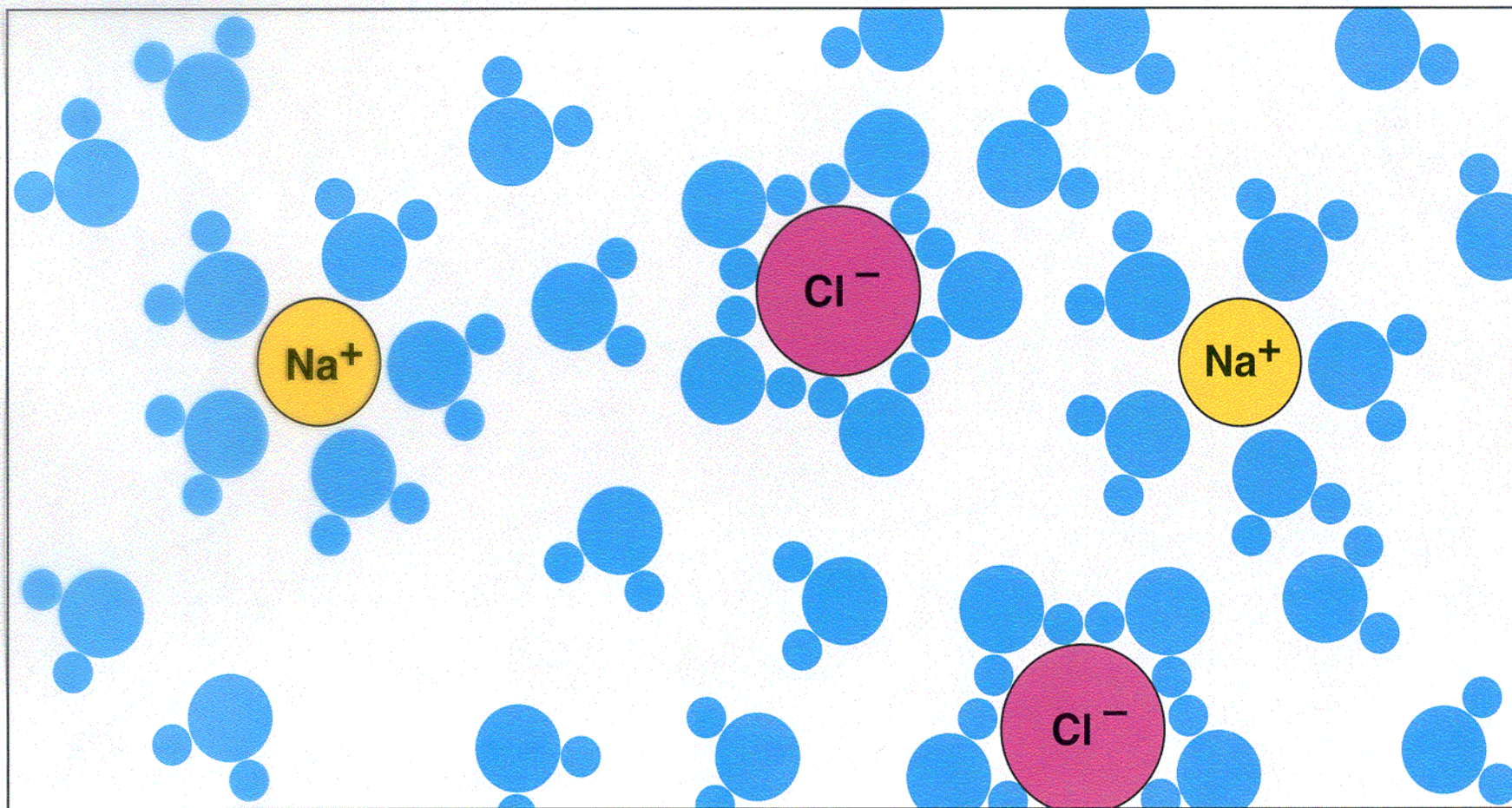
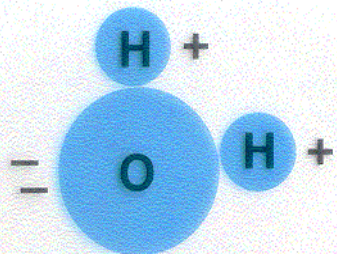
- **electrolit**
- **Electrolit: compus care disociaza in apa, cu formare de ioni**
 - **Contribuie la mentinerea echilibrului hidroelectrolitic**
 - **Principalul ion pozitiv extracelular**



Funcții

- **Participa la mentinerea echilibrului acido-bazic**
- **Transmiterea impulsului nervos**
- **Funcția cardiacă**
- **Contractia musculară**





Aport & Surse

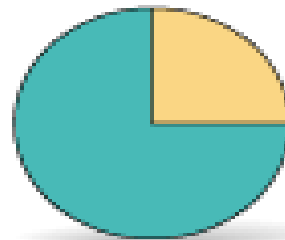
- **NO DRI**
- **Necesarul minim = 500 mg**
- **Valoarea zilnica = 2400 mg**
- **Sarea de bucatarie (NaCl)**
 - 1 lingurita = 2300 mg sodiu
- **Alimente procesate (conservate, murate, etc.)**
 - 75% din aportul alimentar

Major Sources of Sodium in the U.S. Diet

Sodium Source	Contribution to Sodium Intake (%)
Processed foods	77
Fresh foods	12
Salt added at the table	6
Salt added during cooking	5

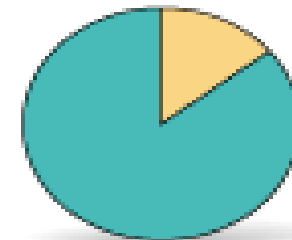
**LESS
PROCESSED**
= Potassium

Milks

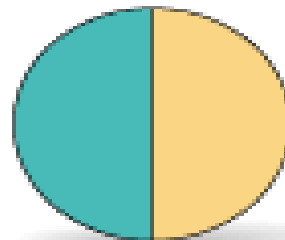


Milk (whole)

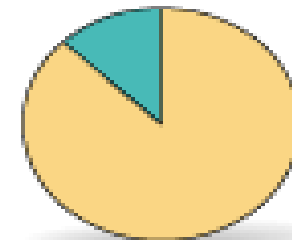
Meats



Beef roast

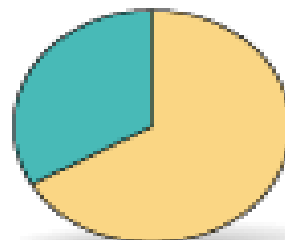


Chocolate
pudding

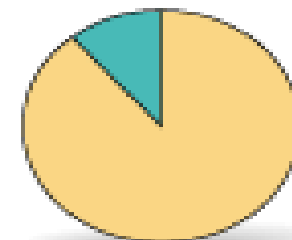


Cor

ned beef



Instant chocolate
pudding



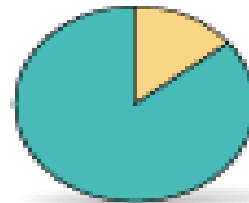
Chipped beef

= Sodium

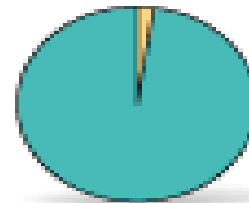
MORE PROCESSED

**LESS
PROCESSED**
= Potassium

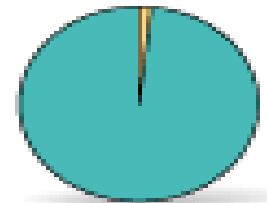
Vegetables



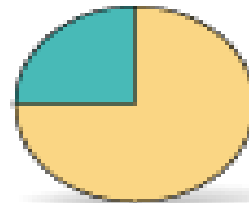
**Fresh corn,
cooked**



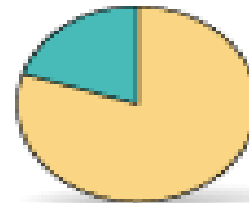
**Cucumber
(fresh)**



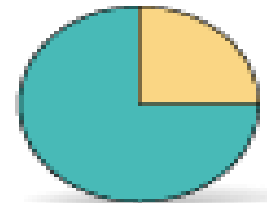
**Potato
(baked)**



**Canned,
creamed corn**



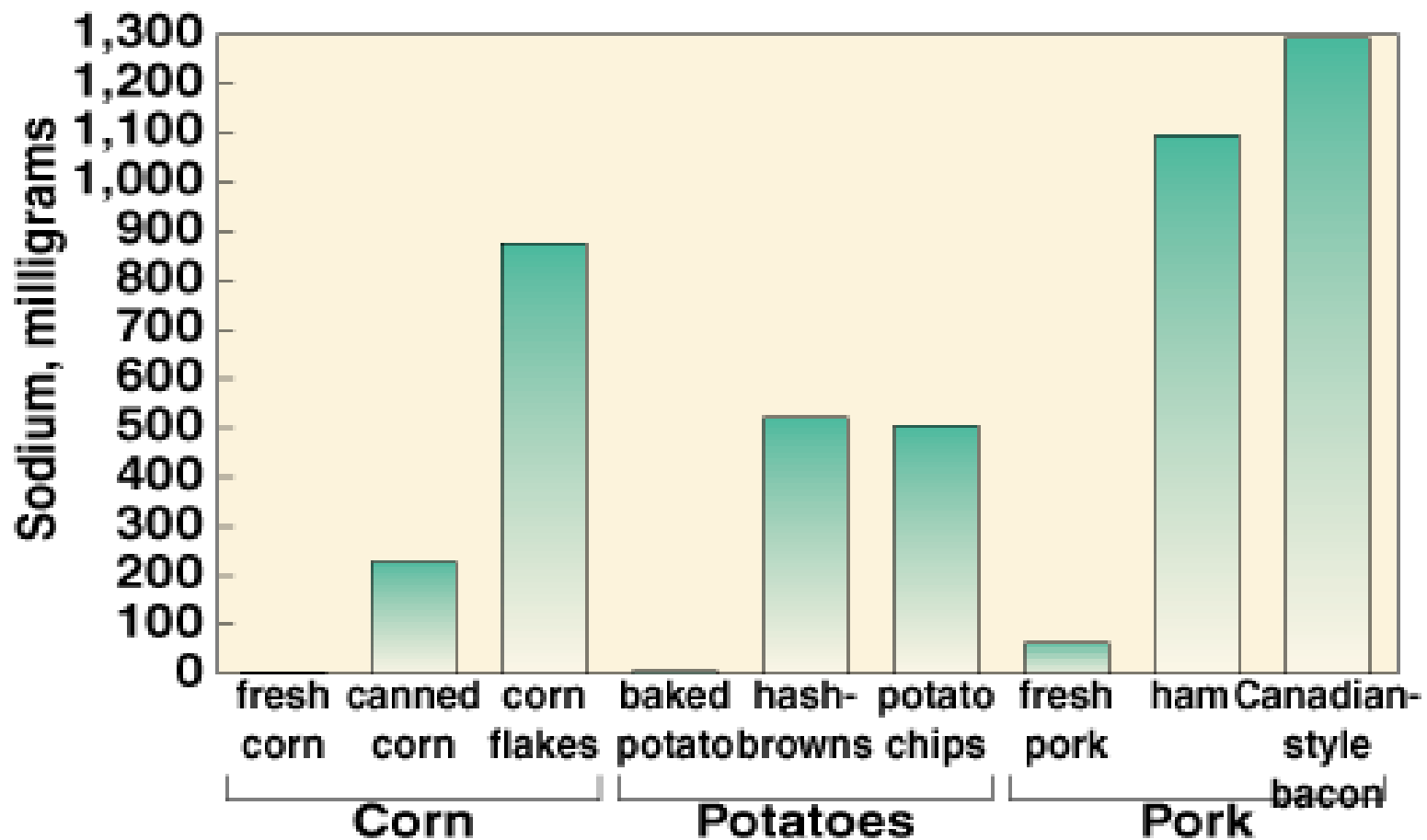
Dill pickle



**Potato
chips**

MORE PROCESSED

= Sodium



Simptome ale deficitului si toxicitatii

- **Deficit:**
 - Crampe musculare
 - apatie
 - Pierderea apetitului
- **Toxicitate:**
 - HTA

Category	Systolic (mm Hg) ^a	Diastolic (mm Hg)
Normal	<130	<85
High normal	130–139	85–89
Hypertension ^b		
Stage 1 (mild)	140–159	90–99
Stage 2 (moderate)	160–179	100–109
Stage 3 (severe)	180–209	110–119
Stage 4 (very severe)	≥210	≥120

Hipertensiunea – factori de risc

- Obezitate
- Antecedente familiale
- Rasa (African American)
- varsta
- Exces de alcool
- Sedentarism

Dieta si presiunea arteriala

Recommendations for Preventing Hypertension*

- Consume a diet rich in vegetables and fruits.
- Use low-fat dairy products.
- Reduce saturated and total fat intake.
- Reduce sodium intake.
- Limit alcohol intake.
- Exercise regularly.
- Lose weight if overweight.

DASH = “Dietary Approaches to Stop Hypertension”

- **Aport ridicat de fructe si vegetale**
- **Produse sarace in grasimi, cholesterol, grasimi saturate**
- **Sodiu < 2400 mg/zi**

D. Potasiu

- **electrolite (principalul ion pozitiv intracelular)**
- **Functii:**
 - Poate scadea presiunea arteriala
 - Sinteza proteica
 - Balanta electrolitica
 - Transmisia nervoasa
 - Contractia musculara
 - Critic pentru mentinerea functiei cardiace

Simptome de deficit

- Slăbiciune musculară
- Paralizie
- Confuzie
- Poate cauza moartea
- Apare în deshidratare
- Rar, poate apărea odată cu creșterea aportului de sodiu

Simptome ale toxicitate

- Cauzeaza slabiciune musculara
- Cauzeaza voma

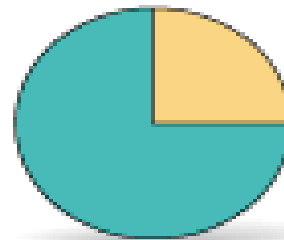
Aport & Surse

- **Necesarul minim estimat = 2000 mg**
- **Alimente integrale – incluzand carne, fructe, lapte, vegetale, cereal, legume**
- **Cantitatea de potasiu creste in alimente odata cu procesarea acestora**

**LESS
PROCESSED**

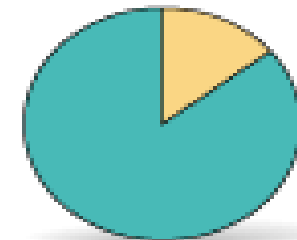
= Potassium

Milks

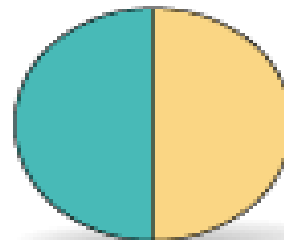


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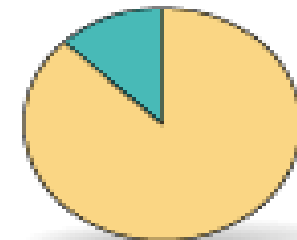
Meats



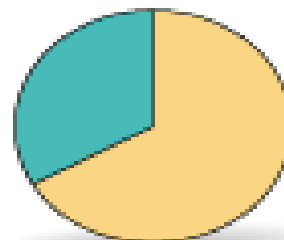
Beef roast



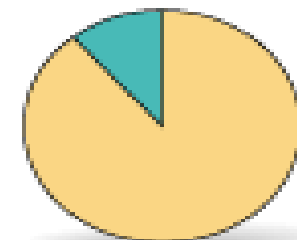
**Chocolate
pudding**



Corned beef



**Instant chocolate
pudding**



Chipped beef

**= Sodium
MORE PROCESSED**



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E. Clor

- **Electrolit**
- **Functii:**
 - **Apare in HCl din stomac**
 - **Necesar pentru digestia corecta**
 - **Echilibrul electrolitic**

Simptome in deficit

- Defecte de crestere la copii
- Crampe musculare
- apatie
- Pierderea apetitului

Simptome ale toxicitatii

- In mod normal lipsit de toxicitate
- Perturbarea echilibrului acido-bazic

F. Sulf

- **Functii:**
 - **Prezent in toate proteinele (structura)**
 - **Apare in biotina si tiamina**
 - **Apare in insulina**

Deficit si toxicitate - simptome

- **Deficit:**

- Nu se cunost deoarece ar fi precedate de simptomele deficitului proteic

- **Toxicitate:**

- Rara, dar cand apare afecteaza procesul de crestere

Surse alimentare

- **Toate alimentele care contin
proteine**

G. Magneziu

- **Functii: (DZN = 350 mg)**
 - **Prezent in oase si dinti**
 - **Sinteza proteica**
 - **Activitatea enzimatica (co-factor)**
 - **Contractia/relaxarea musculara**
 - **Transmisia nervoasa**

Deficit - simptome

- slabiciune
- Confuzie
- Scaderea secretiei hormonului pancreatic
- Deficit de crestere
- Crampe musculare

Toxicitate - simptome

- hTA
- Tulburari de coordonare
- Coma / moarte

Surse alimentare

- **Nuci**
- **Legume**
- **Cereale integrale**
- **Vegetale cu Frunze verzi**
- **Fructe de mare**
- **Ciocolata & cacao**