

# Water, Vitamins, & Minerals

# Intro to Water, Vitamins & Minerals

1. What is the main function of vitamins and minerals?

To regulate body functions

2. What foods are many of the vitamins and minerals we need found in?

Fruits and Vegetables



# Intro to Water, Vitamins & Minerals

3. Because different fruits and vegetables have different vitamins and minerals, how can we ensure that we get all the different vitamins and minerals that we need?

- Eat a variety of fruits and vegetables

4. Which vegetables have the most vitamins and minerals?

Red, Orange and Dark Green



# Intro to Water, Vitamins & Minerals

How many calories are in Water, Vitamins and Minerals?

**ZERO!** They may not provide any **energy**, but they are **ESSENTIAL** in keeping our bodies running!

## Quick Review of Nutrients:

Nutrient	Calories Per Gram
Carbohydrates	4
Fat	9
Protein	4
Vitamins	0
Minerals	0
Water	0



# Vocabulary

1. Deficiency: *Not enough of something (shortage)*
2. Toxicity: *Too much of something (can become toxic/poisonous)*
3. Water-Soluble: *Dissolves in water*
4. Fat-Soluble: *Dissolves in fat*
5. Macro: *Large / Big amount*
6. Micro or Trace: *Small / Tiny amount*
7. Electrolyte: *Minerals that help maintain fluid balance in the body*

The top half of the image features a light gray background with numerous thin, dark gray lines of varying lengths and angles, creating a visual effect of rain falling. A thin yellow horizontal line separates this from the section below.

**WATER**

The bottom half of the image consists of a solid, medium-blue horizontal band. A thin yellow horizontal line is positioned just below this band, and the bottom-most section of the image is a solid light gray.

# Functions of Water

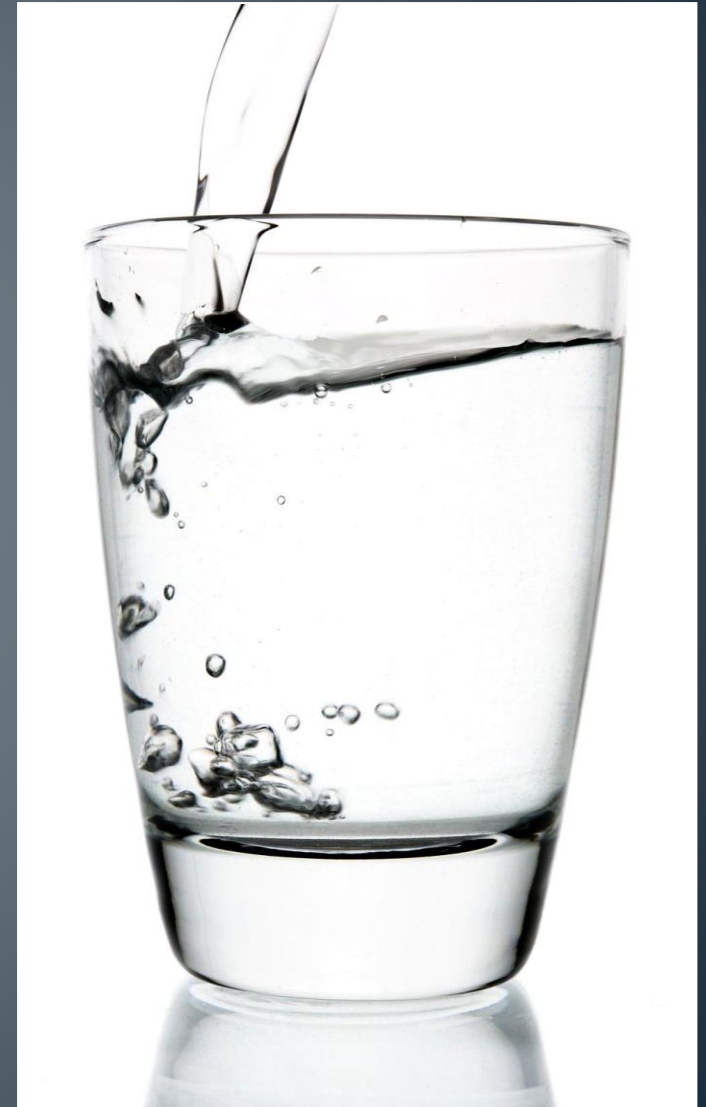
## 1. Functions of Water:

- a. Carries water soluble vitamins
- b. **Regulated** body temperature through **perspiration**
- c. Carries **waste** products through and out of the body
- d. Prevents **dehydration**

## 2. How much water should we drink every day?

At least **8** cups a day (or **64** fl. oz.)

\*Water is the MOST important nutrient our body needs! If you're thirsty, you're already dehydrated!



# Dehydration

1. Dehydration happens when the water in your body drops below the level needed for normal body functions.
2. Common causes of dehydration:
  - Vomiting or diarrhea
  - Excessive urinating
  - Excessive sweating
  - Fever
3. Signs of dehydration:
  - Increased thirst
  - Dry mouth
  - Swollen tongue
  - Weakness
  - Dizziness
  - Confusion
  - Sluggishness
  - Fainting
  - Inability to sweat
  - Heart palpitations
  - Decreased urine output
  - Dark urine





# Are YOU Hydrated?



FYI: Hyponatremia is over-hydration. Balance in all things

# Hydration Before, During and After Physical Fitness

- For short duration (less than 60 min) water is a good choice to drink before, during and after exercise.
- For moderate to high intensity activities (more than 60 min.), sports drinks will help replace carbohydrate loss and electrolyte balance.
- Drink according to thirst during the day and include fluids with meals.
- Drink 8-20 oz. of water an hour before exercise.
- Continue drinking water during exercise, up to 16-24 oz. of fluid per hour (4-6 oz. every 15 min.).





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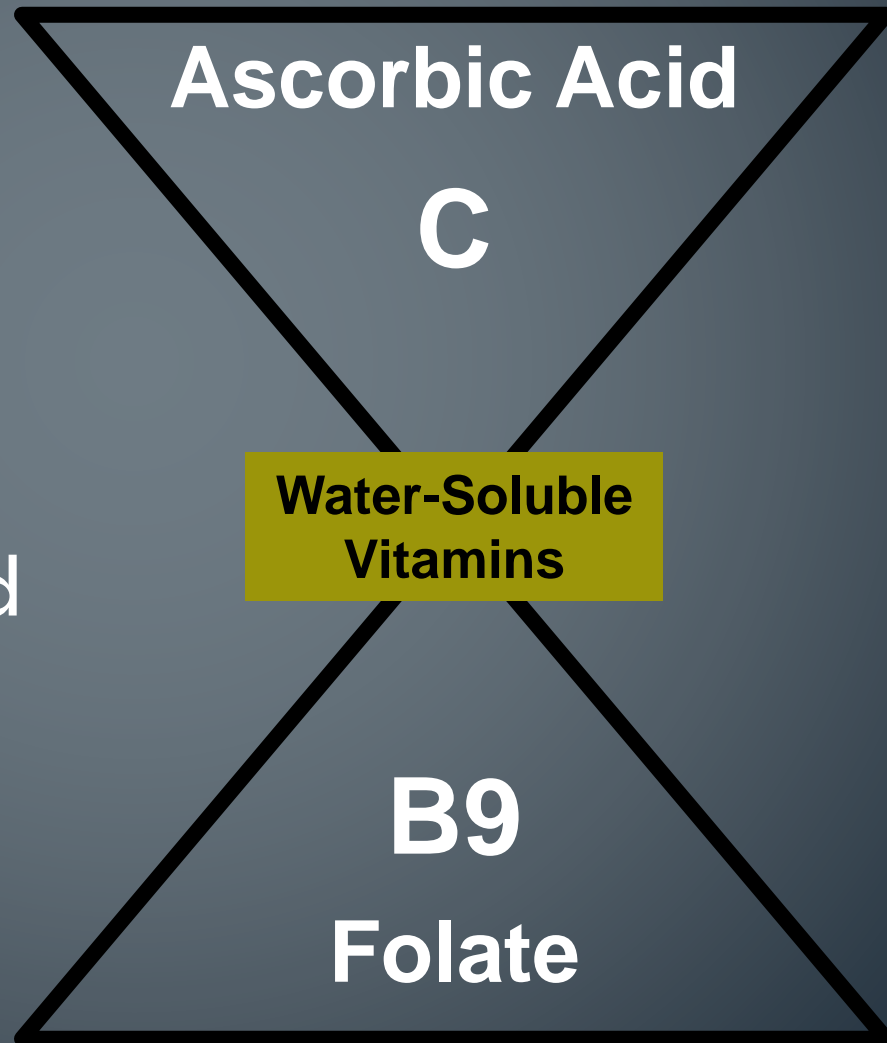
# VITAMINS

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# Water-Soluble Vitamins

- *Water-soluble* means these vitamins dissolve in *and* are carried by water





# Vitamin C (Ascorbic Acid)

Function:	Protects the body against <b>infection</b>
Food Source:	<b>Citrus fruits</b> , strawberries, broccoli and tomatoes
Deficiency:	<b>Scurvy</b> (Breakdown of collagen, bleeding gums and skin hemorrhages)
Toxicity:	<b>Kidney stones</b> , interferes with Vitamin E.



# Scurvy

## Swollen and Bleeding Gums



## Spots on Skin



# B9 (Folate/Folic Acid)

<b>Function:</b>	<b>Helps the body make new cells</b>
<b>Food Source:</b>	<b>Dark green leafy vegetables</b>
<b>Deficiency:</b>	<b>Spina Bifida</b> (Neural tube defect that affects the spinal cord during fetal development)
<b>Toxicity:</b>	<b>Masks B12 Deficiency</b> (makes it difficult to diagnose a B12 deficiency without correcting the damages that occur with that deficiency.)

## Repairing a fetus' spine

Surgeons have learned how to correct spina bifida, a serious spinal defect, by operating while a fetus is still in the uterus.

**Spina bifida** Spinal column, which begins as groove on embryo, fails to close at bottom

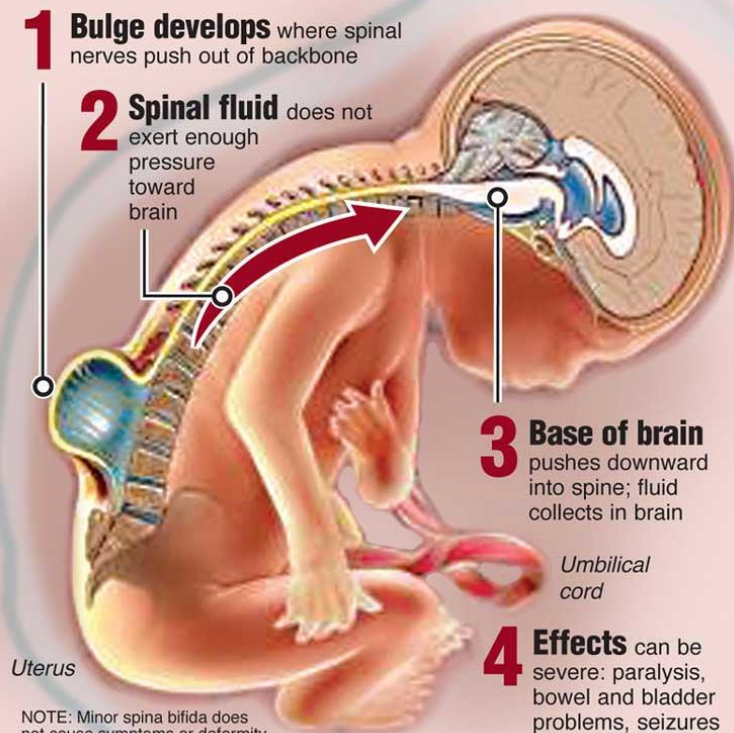
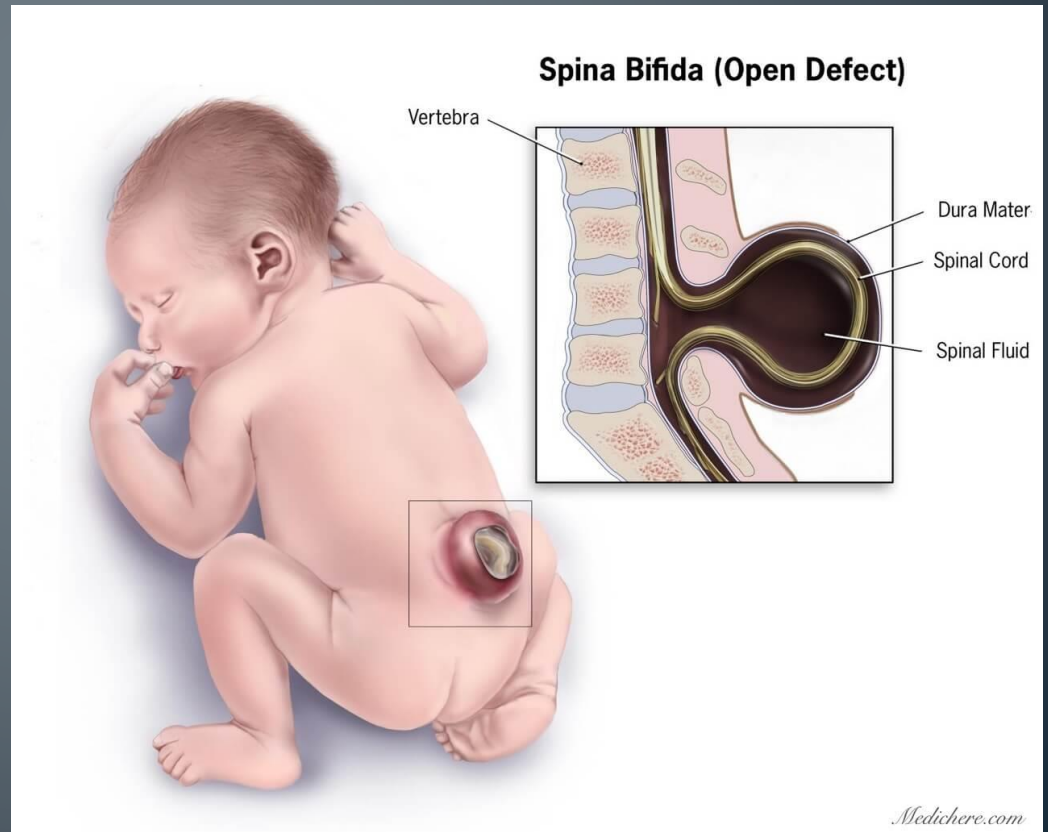


Image Credit: wsuignpost.com

# Spina Bifida

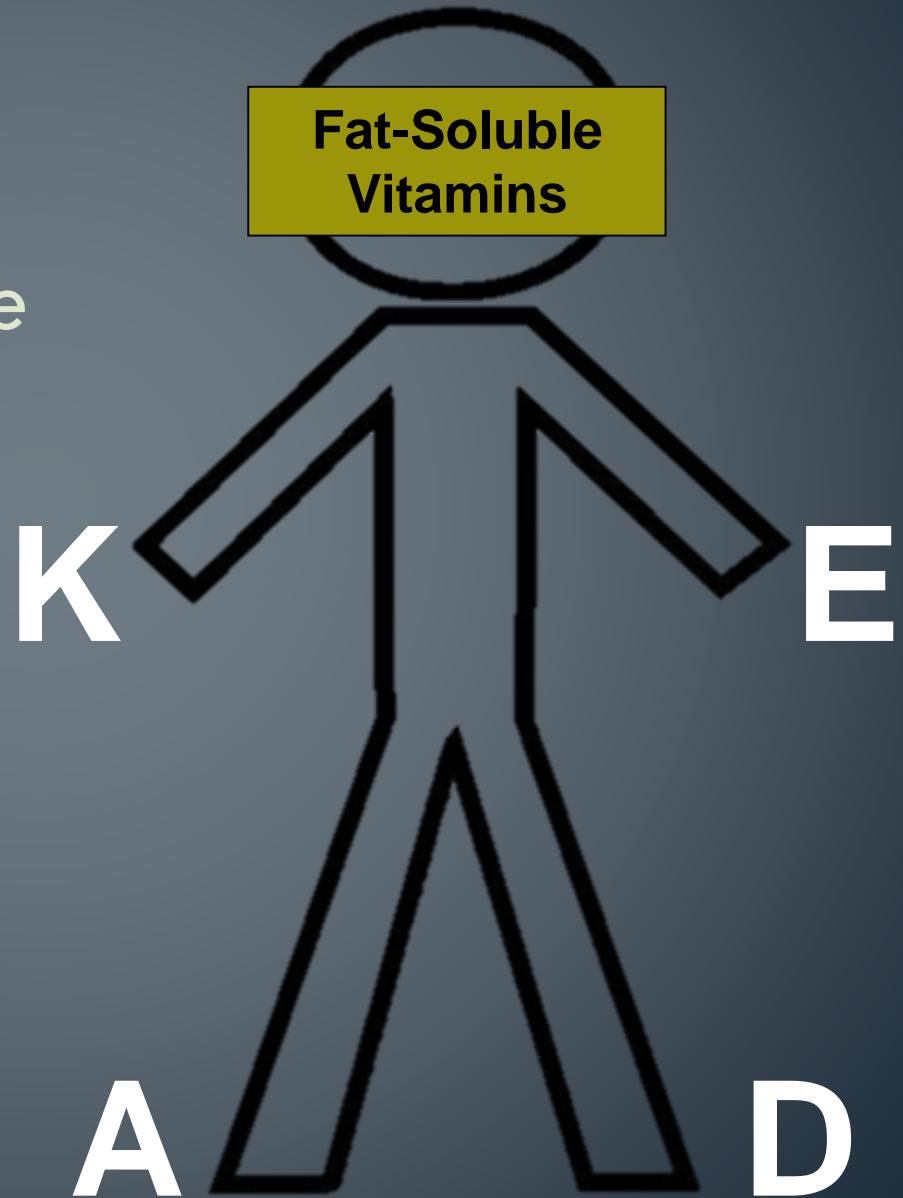
The spinal cord begins to develop within the first 28 days of pregnancy. Since folate makes new cells, it is vital that the mother's body already has a supply of folate in her system to prevent this tragic condition.





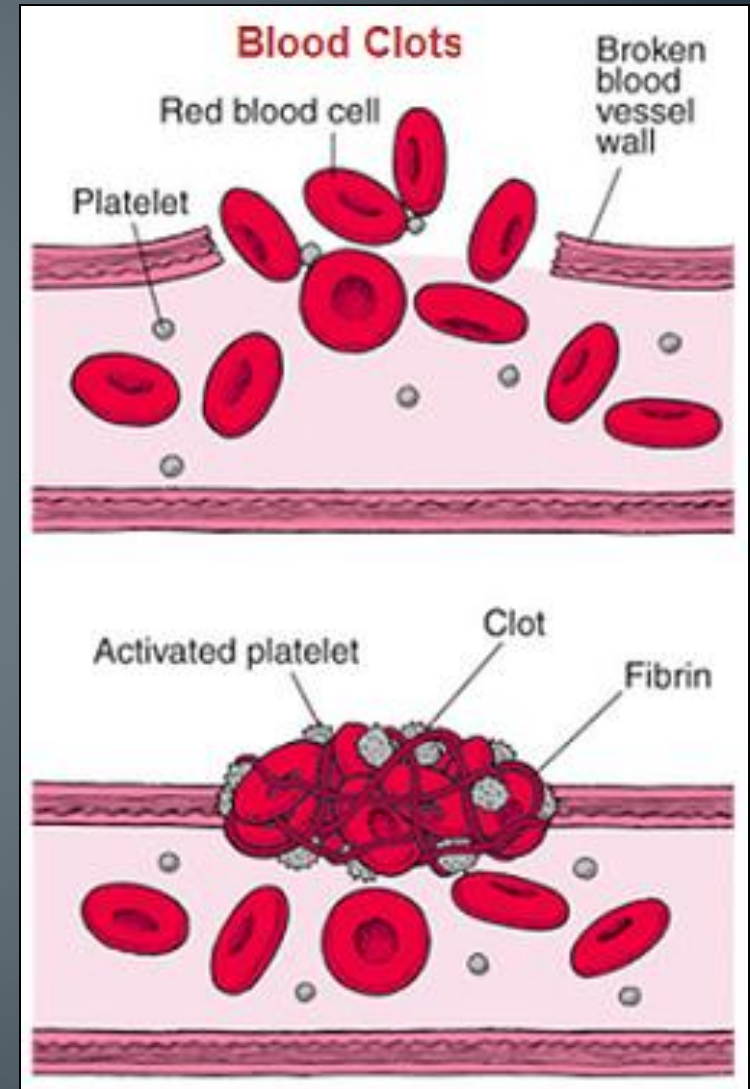
# Fat-Soluble Vitamins

- Remember, *fat-soluble* means these vitamins dissolve in *and* are carried by fat
- Remember KADE?...



# Vitamin K

<b>Function:</b>	<b>Helps blood clot normally</b>
<b>Food Source:</b>	<b>Dark green leafy vegetables</b> (spinach, kale, collard greens, parsley, etc.)
<b>Deficiency:</b>	<b>Bleeding and Bruising</b>
<b>Toxicity:</b>	<b>Jaundice</b> —breakage of red blood cells

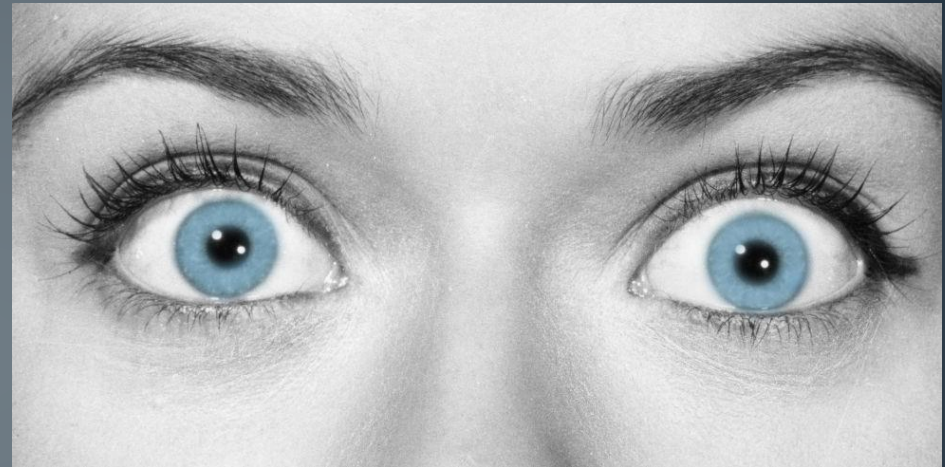






# Vitamin A

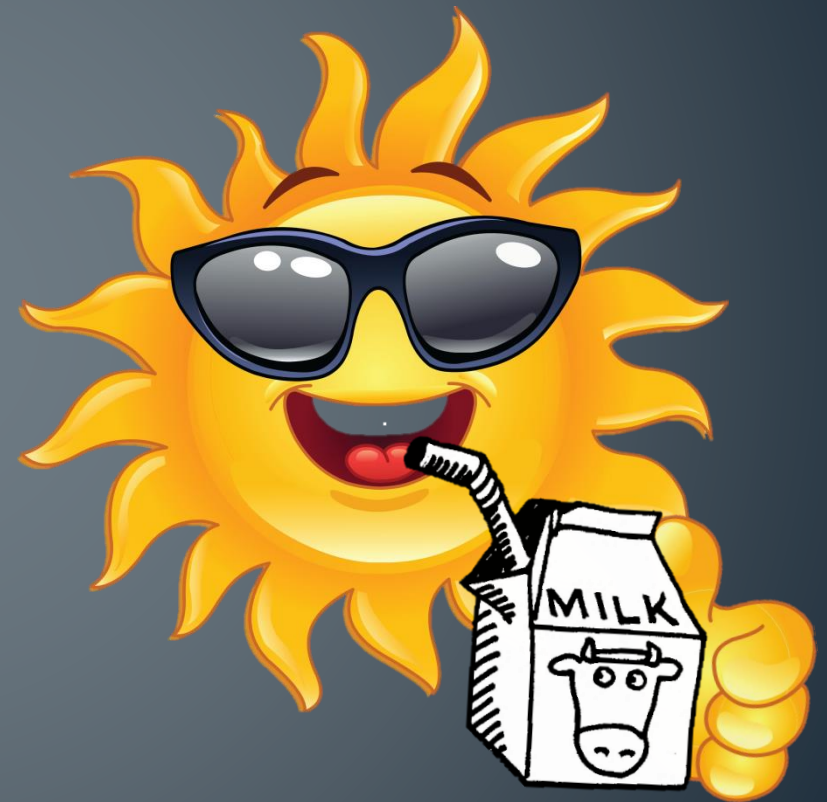
<b>Function:</b>	<b>Promotes good vision, hair and skin</b>
<b>Food Source:</b>	<b>Red, orange and dark green vegetables</b>
<b>Deficiency:</b>	<b>Night Blindness</b>
<b>Toxicity:</b>	<b>Loss of appetite, blurred vision, joint pain</b>





# Vitamin D (“The Sunshine Vitamin”)

<b>Function:</b>	<b>Builds and maintains bones and teeth</b>
<b>Food Source:</b>	<b>Milk/Dairy Products &amp; Sunlight</b>
<b>Deficiency:</b>	<b>Rickets (Bowed Legs)</b>
<b>Toxicity:</b>	<b>Nausea and vomiting, kidney damage</b>



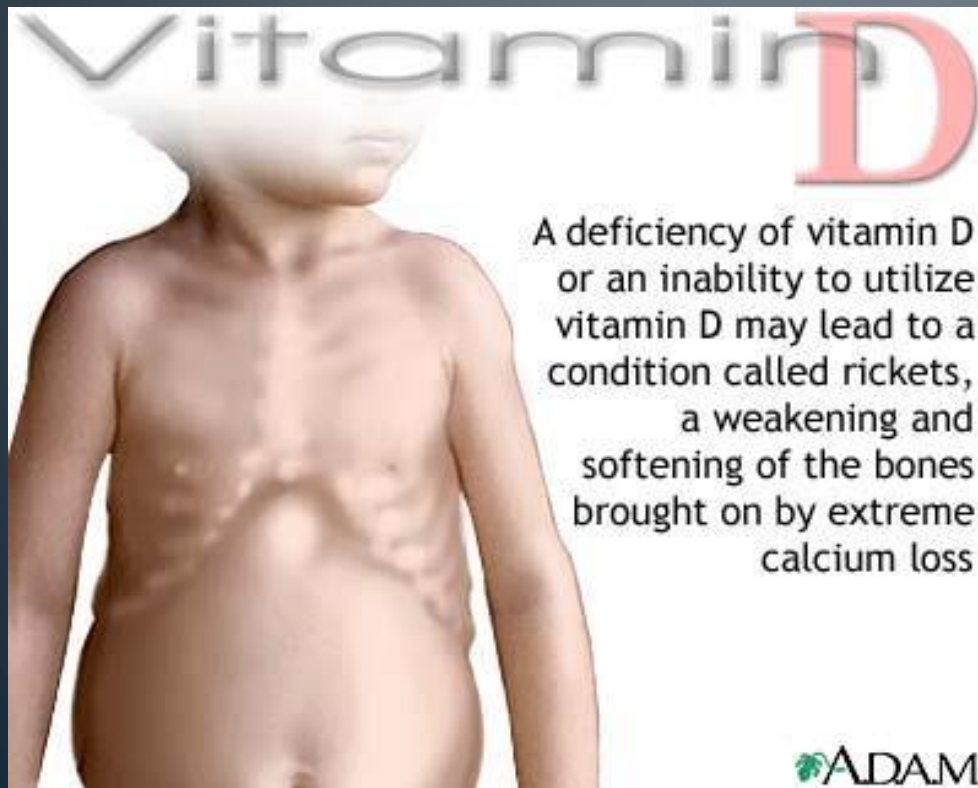
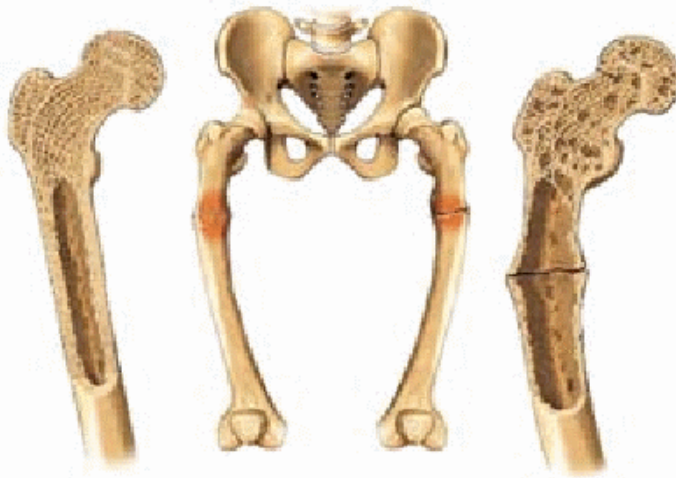
# Rickets



Normal anatomy

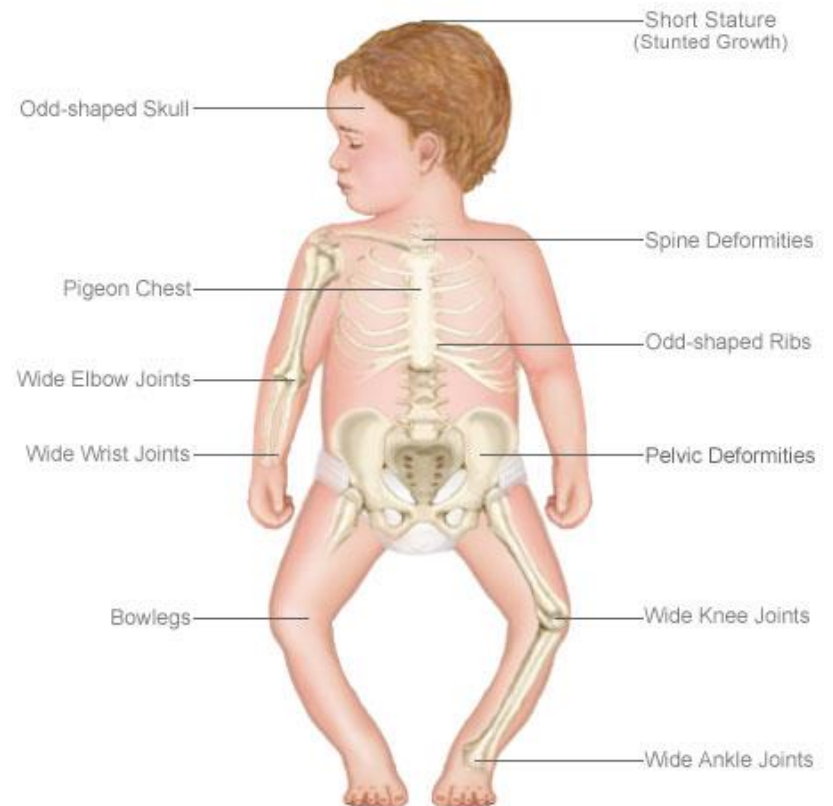


Rickets



A deficiency of vitamin D or an inability to utilize vitamin D may lead to a condition called rickets, a weakening and softening of the bones brought on by extreme calcium loss

The Effects of Rickets



# Vitamin E

**Function:**

Vitamin E acts like a traffic warden for cell membranes, **allowing Vitamins and other nutrients in while sending waste material out.**

**Food Source:**

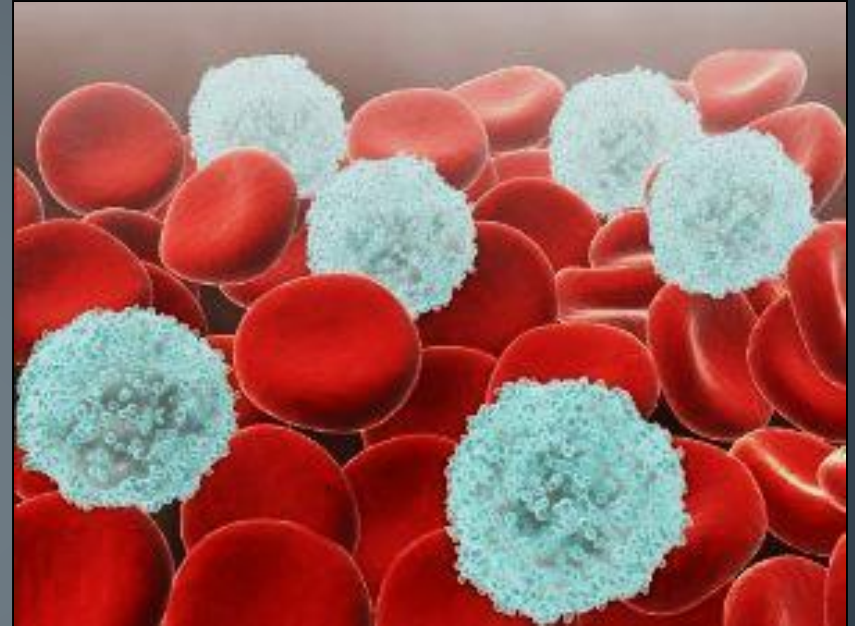
**Vegetable Oils, Fruits and Vegetables**

**Deficiency:**

**Poor nerve connection and neurological problems**

**Toxicity:**

**Headaches, brain hemorrhages, muscle weakness**





## Hemorrhagic Stroke

Weakened/diseased  
blood vessels rupture.

Blood leaks into brain tissue

H. Mayer

© Heart and Stroke Foundation of Canada

Aneurysm in cerebral artery breaks  
open, causing bleeding around the brain

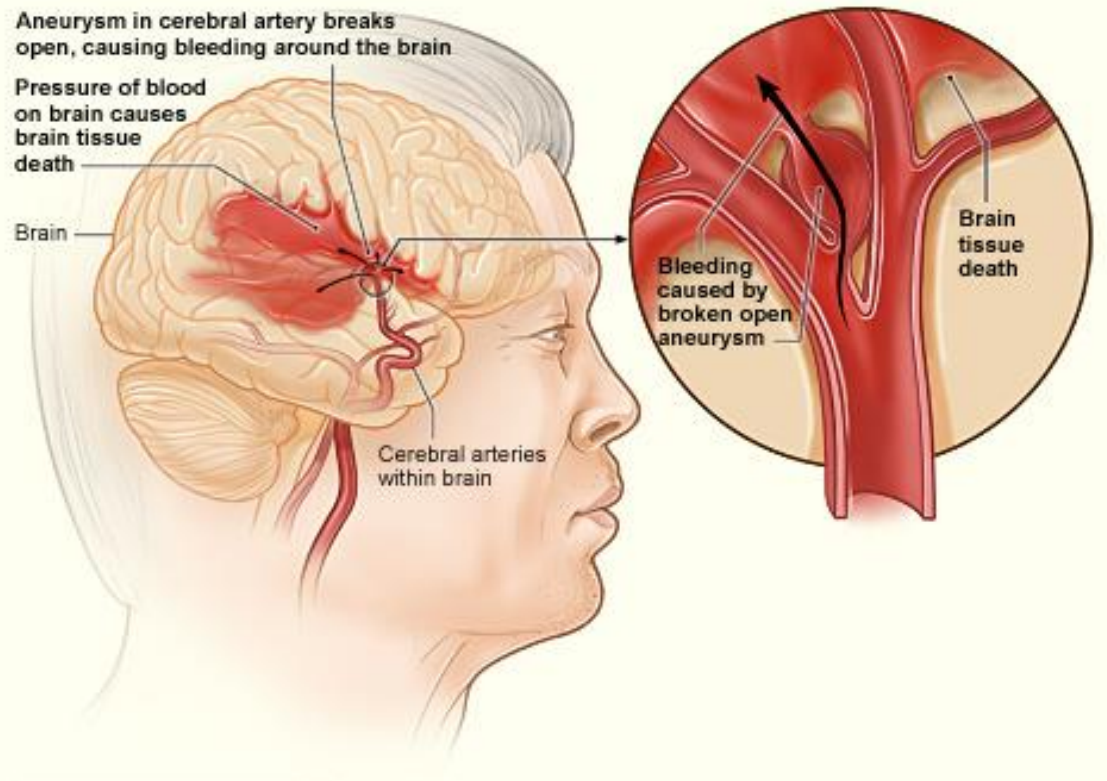
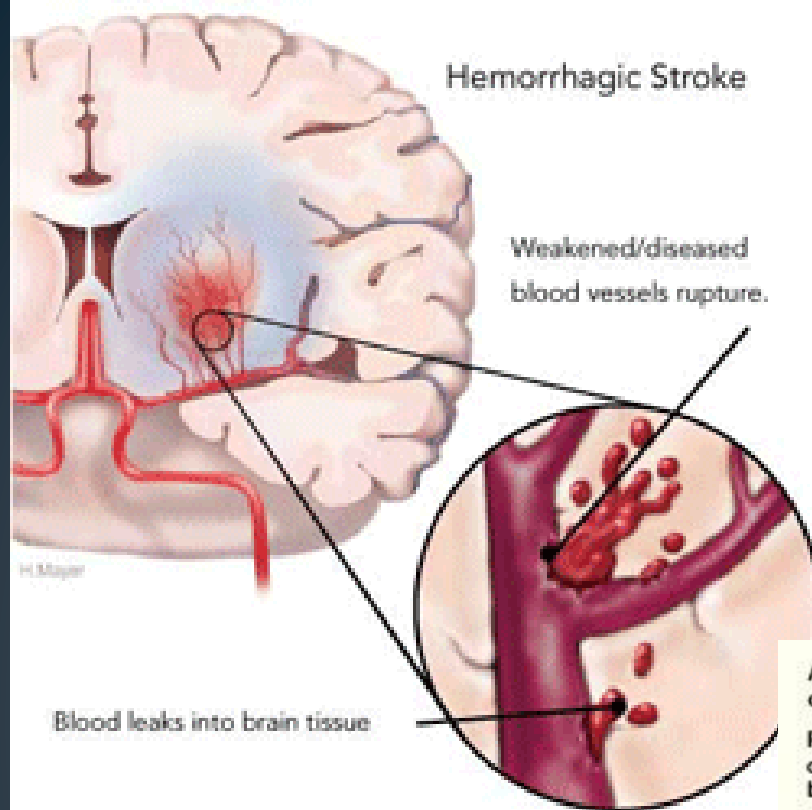
Pressure of blood  
on brain causes  
brain tissue  
death

Brain

Cerebral arteries  
within brain

Bleeding  
caused by  
broken open  
aneurysm

Brain  
tissue  
death



# How Do Vitamins Work Exactly?

<https://www.youtube.com/watch?v=ISZLTJH5IYg>

The background features a light gray gradient with numerous thin, vertical, slightly wavy lines in a muted blue-gray color. A solid, medium-blue horizontal band spans the width of the image, containing a white rectangular box with a black border.

# MINERALS

# Macro/Micro Minerals

**Macro-  
Minerals**

**Calcium**

- *Macro* means you need a large amount of these minerals

- *Micro/Trace* means you need a small amount of these minerals

**Micro/Trace-  
Minerals**

**Iron**



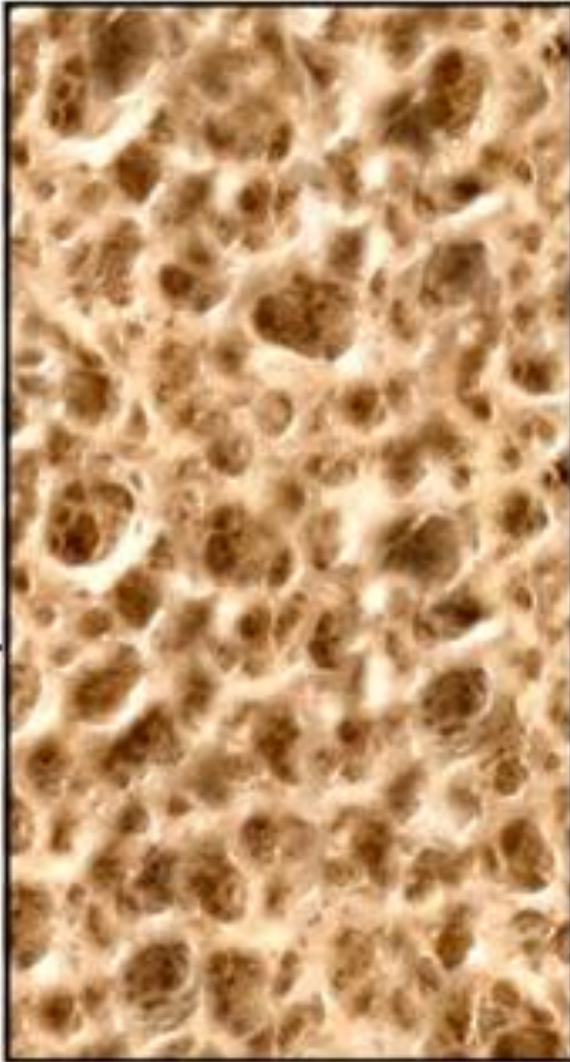
# Calcium

<b>Function:</b>	<b>Strengthens bones and teeth</b>
<b>Food Source:</b>	<b>Milk/Dairy Products, Whole Grains, Dark Green Leafy Vegetables</b>
<b>Deficiency:</b>	<b>Osteoporosis</b> (Bones become weak and brittle due to mineral loss)
<b>Toxicity:</b>	<b>-Kidney stones</b>

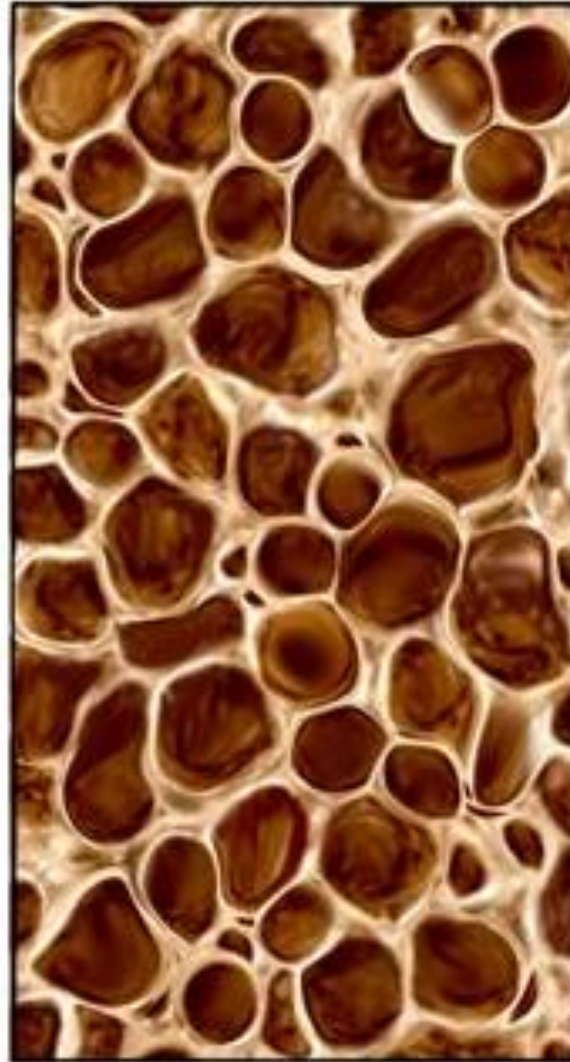


# Osteoporosis

Normal bone matrix



Osteoporosis



# Iron

<b>Function:</b>	<b>Helps make red blood cells, helps our muscles store and use oxygen</b>
<b>Food Source:</b>	<b>Animal products, meat, dark green leafy vegetables</b>
<b>Deficiency:</b>	<b>Anemia</b> (Low red blood cell formation)
<b>Toxicity:</b>	<b>Heart disease, elevated LDLs</b>



# Electrolytes

- *Electrolytes* helps maintain fluid balance in the body

**Electrolytes**

**Sodium  
&  
Potassium**



# Sodium & Potassium

Function:	Maintains <b>fluid balance</b> in the body
Food Source:	Salt, <b>fruits</b> and <b>vegetables</b>
Deficiency:	<b>Muscle cramps, irregular heart beat, seizures</b>
Toxicity:	<b>High blood pressure</b>

