INE INSTITUTE OF NUTRITIONAL ENDOCRINOLOGY

Micronutrients: Chloride

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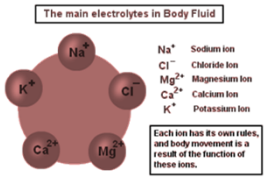
Chloride General Info

- ✓ An electrolyte
- ✓ Involved in electrolyte balance
- ✓ Most abundant anion in body (93%)
- ✓ 88% extracellular
- ✓ Formed when the element chlorine gains an electron or when a compound such as hydrogen chloride is dissolved in water or other polar solvents
- ✓ Usually associated with sodium
- ✓ Negative charge neutralized sodium's positive charge

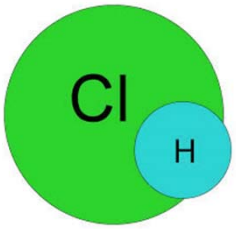
Chloride as an Electrolyte

- ✓Chloride is an anion
- ✓An electrolyte is a salt or ion that is electrically-charged and moves to either a **negative (cathode)** or **positive (anode) electrode**:
- ✓Ions that move to the cathode (**cations**) are positively charged
- ✓Ions that move to the anode (**anions**) are negatively charged



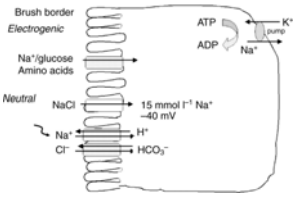
Chloride Functions

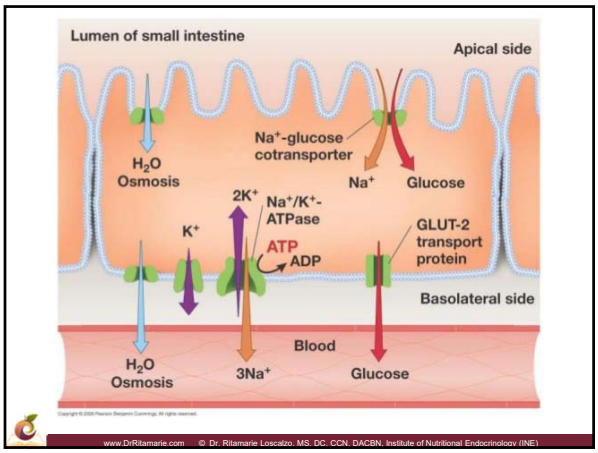
- ✓ Major electrolyte
- ✓ pH balance
- ✓ Part of hydrochloric acid (stomach acid)
- ✓ Assists in phagocytosis
- ✓ Exchange anion for bicarbonate
- ✓ HCO_3^- in red blood cells – in oxygen exchange
- ✓ Helps maintain proper blood volume
- ✓ Helps maintain proper blood pressure



Chloride Absorption

- ✓ Almost 100% absorbed in small intestine
- ✓ 3 major absorption pathways in intestine
  - ➢ **Na^+ / Glucose cotransport system:** Follows Na+ passively through a paracellular, or tight junction, pathway
  - ➢ **Electroneutral Na^+ - Cl^- cotransport system:** Small amount of Cl absorbed this way
  - ➢ **Electrogenic sodium transport system:** Follows sodium in this route





Chloride Excretion

✓Small amount of excretion through three routes:

1. GI tract
2. Skin
3. Kidneys (major)

Causes of Chloride Deficiency

- ✓Extensive sweating
- ✓Prolonged endurance exercises
- ✓Vomiting
- ✓Diuretics
- ✓Excess ADH (Antidiuretic hormone)
- ✓Water overload
- ✓Wasting conditions
- ✓Extensive bodily burns with sequestration of extracellular fluids

Symptoms of Chloride Deficiency

- ✓Alkalosis possibly as a result of excessive loss of sodium
- ✓Muscle weakness
- ✓Loss of appetite
- ✓Irritability
- ✓Dehydration
- ✓Profound lethargy

Adequate Intake of Chloride

Life Stage | Gender	Chloride Dosage | Day
Infants 0-6 mths	0.18* g
Infants 7-12 mths	0.57* g
Children 1-3 yrs	1.5* g
Children 4-8 yrs	1.9* g
Girls 9-13 Yrs	2.3* g
Boys 9-13 Yrs	2.3* g
Females 14-18 Yrs	2.3* g
Males 14-18 Yrs	2.3* g
Females 19-50 Yrs	2.3* g
Males 19-50 Yrs	2.3* g
Females 50-70 Yrs	2.0* g
Males 50-70 Yrs	2.0* g
Adults older than 70 Yrs	1.8* g
Pregnant Women 14-18 Yrs	2.3* g
Pregnant Women 19-50 Yrs	2.3* g
Lactating Mothers 14-18 Yrs	2.3* g
Lactating Mothers 19-50 Yrs	2.3* g

Food Sources of Chloride

- ✓ Table salt
- ✓ Sea salt
- ✓ Seaweed
- ✓ Rye
- ✓ Tomatoes
- ✓ Lettuce
- ✓ Celery
- ✓ Olives

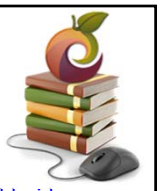
Medications That Deplete Chloride

- ✓Diuretics

Assessing Status of Chloride

- ✓Serum level (100-106)
- ✓Ratio-to-serum level of potassium and sodium
- ✓Sweat
- ✓24-hour urine
- ✓Diet journal
- ✓Questionnaires and good history taking for signs and symptoms

Resources



- ✓ *Advanced Nutrition and Human Metabolism – Gropper, Smith and Groff*
- ✓ http://www.drritamarie.com/go/WebMDChloride
- ✓ http://www.drritamarie.com/go/TraceMineralsChloride