



INE | INSTITUTE OF  
NUTRITIONAL  
ENDOCRINOLOGY

# Micronutrients: Introduction to Minerals

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**Medical Disclaimer:** The information in this presentation is not intended to replace a one-on-one relationship with a qualified health care professional and is not intended as medical advice. It is intended as a sharing of knowledge and information from the research and experience of Dr. Ritamarie Loscalzo, [drritamarie.com](http://drritamarie.com), and the experts who have contributed. We encourage you to make your own health care decisions based upon your research and in partnership with a qualified health care professional.



# Mineral Facts and Figures

- ✓ They are catalysts that keep the '*battery*' going and hold its '*charge*'
- ✓ They compose about 4% of the human body
- ✓ Can't produce minerals so they must be obtained through food
- ✓ They ultimately come from the earth
- ✓ Good soil is 45% minerals
- ✓ Soils currently depleted
- ✓ Sea vegetables are a reliable source



# Minerals

## Periodic Table of Elements

Including Names, Atomic Numbers, Weights, Symbols

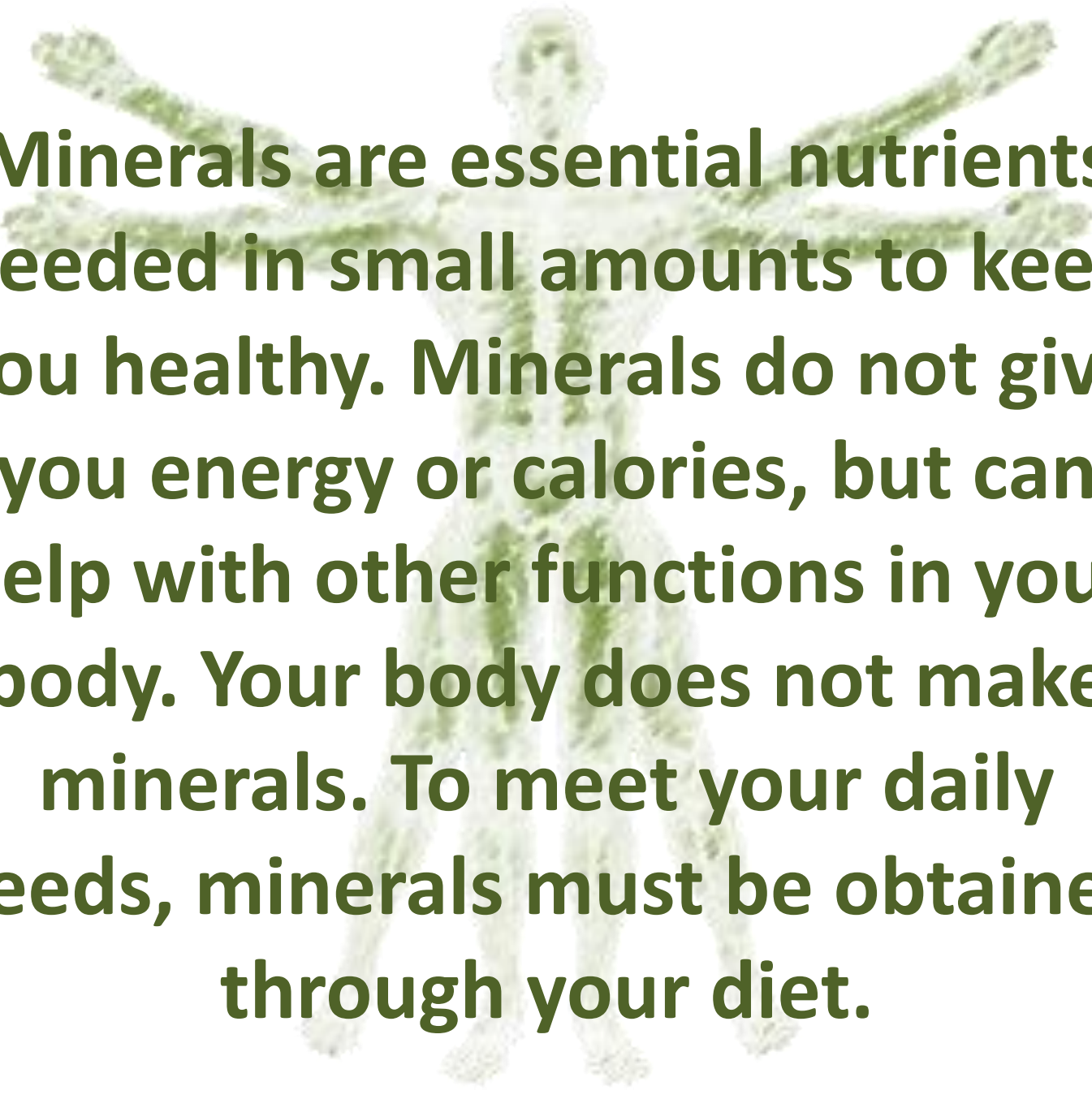
# Including Names, Atomic Numbers, Weights, Symbols

The periodic table is organized into groups and periods. The legend identifies the following categories:

- Non-Metal** (Orange)
- Alkali Metals** (Yellow)
- Alkaline Earth** (Black)
- Transition Metal** (Grey)
- Lanthanides** (Red)
- Actinides** (Pink)
- Basic Metal** (Purple)
- Semi Metal** (Brown)
- Halogen** (Blue)
- Noble Gas** (Green)

1	2											13	14	15	16	17	18	
1 H 1.008 Hydrogen																		
2 Li 6.941 Lithium	3 Be 9.012 Beryllium											7 B 10.811 Boron	6 C 12.011 Carbon	7 N 14.007 Nitrogen	8 O 15.999 Oxygen	9 F 18.998 Fluorine	10 Ne 20.180 Neon	
3 Na 22.990 Sodium	4 Mg 24.305 Magnesium											13 Al 26.982 Aluminum	14 Si 28.086 Silicon	15 P 30.974 Phosphorus	16 S 32.065 Sulfur	17 Cl 35.453 Chlorine	18 Ar 39.948 Argon	
4 K 39.098 Potassium	5 Ca 40.078 Calcium	21 Sc 44.956 Scandium	22 Ti 47.883 Titanium	23 V 50.942 Vanadium	24 Cr 52.004 Chromium	25 Mn 54.938 Manganese	26 Fe 55.845 Iron	27 Co 58.933 Cobalt	28 Ni 58.693 Nickel	29 Cu 63.546 Copper	30 Zn 65.38 Zinc	31 Ga 69.723 Gallium	32 Ge 72.64 Germanium	33 As 74.922 Arsenic	34 Se 78.96 Selenium	35 Br 79.904 Bromine	36 Kr 83.80 Krypton	
5 Rb 85.468 Rubidium	6 Sr 87.62 Strontium	39 Y 88.906 Yttrium	40 Zr 91.224 Zirconium	41 Nb 92.906 Niobium	42 Mo 95.94 Molybdenum	43 Tc 98 Technetium	44 Ru 101.07 Ruthenium	45 Rh 102.91 Rhodium	46 Pd 106.42 Palladium	47 Ag 107.87 Silver	48 Cd 112.41 Cadmium	49 In 114.82 Indium	50 Sn 118.71 Tin	51 Sb 121.76 Antimony	52 Te 127.6 Tellurium	53 I 126.91 Iodine	54 Xe 131.29 Xenon	
6 Cs 132.91 Cesium	7 Ba 137.33 Barium	55-57 La, Ce, Pr Lanthanides	72 Hf 178.49 Hafnium	73 Ta 180.95 Tantalum	74 W 183.85 Tungsten	75 Re 186.21 Rhenium	76 Os 190.23 Osmium	77 Ir 192.22 Iridium	78 Pt 195.08 Platinum	79 Au 196.97 Gold	80 Hg 200.59 Mercury	81 Tl 204.38 Thallium	82 Pb 207.2 Lead	83 Bi 208.98 Bismuth	84 Po 209 Polonium	85 At 210 Astatine	86 Rn 222 Radon	
7 Fr 223 Francium	8 Ra 226 Radium	89-103 Ac, Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr Actinides	104 Rf 261 Rutherfordium	105 Db 262 Dubnium	106 Sg 266 Seaborgium	107 Bh 264 Bohrium	108 Hs 277 Hassium	109 Mt 268 Meitnerium	110 Ds 271 Darmstadtium	111 Rg 272 Roentgenium	112 Cn 285 Copernicium	113 Uut 284 Ununtrium	114 Uuq 289 Ununquadium	115 Uup 288 Ununpentium	116 Uuh 292 Ununhexium	117 Uus 286 Ununseptium	118 Uuo 294 Ununoctium	
		6 La 138.91 Lanthanum	58 Ce 140.12 Cerium	59 Pr 140.91 Praseodymium	60 Nd 144.24 Neodymium	61 Pm 145 Promethium	62 Sm 150.36 Samarium	63 Eu 151.96 Europium	64 Gd 157.25 Gadolinium	65 Tb 158.93 Terbium	66 Dy 162.50 Dysprosium	67 Ho 164.93 Holmium	68 Er 167.26 Erbium	69 Tm 168.93 Thulium	70 Yb 173.05 Ytterbium	71 Lu 174.97 Lutetium		
		7 Ac 227 Actinium	90 Th 232.04 Thorium	91 Pa 231.04 Protactinium	92 U 238.03 Uranium	93 Np 237 Neptunium	94 Pu 244 Plutonium	95 Am 243 Americium	96 Cm 247 Curium	97 Bk 247 Berkelium	98 Cf 251 Californium	99 Es 252 Einsteinium	100 Fm 257 Fermium	101 Md 258 Mendelevium	102 No 259 Nobelium	103 Lr 262 Lawrencium		





**Minerals are essential nutrients needed in small amounts to keep you healthy. Minerals do not give you energy or calories, but can help with other functions in your body. Your body does not make minerals. To meet your daily needs, minerals must be obtained through your diet.**





# Macrominerals

Needed in large amounts – measured in mg

- Calcium
- Phosphorus
- Magnesium
- Sodium
- Potassium
- Chloride
- Sulfur



# Microminerals

Needed in small amounts – measured in mcg or small # of mg

- Iron
- Zinc
- Manganese
- Chromium
- Molybdenum
- Copper
- Iodine
- Cobalt
- Fluoride
- Selenium



# Functions of Minerals

- ✓ Act as co-factors for enzyme reactions.
- ✓ Maintain the pH balance within the body
- ✓ Facilitate the transfer of nutrients across cell membranes
- ✓ Maintain proper nerve conduction
- ✓ Help to contract and relax muscles
- ✓ Help to regulate tissue growth
- ✓ Structural and functional support





# What You Need to Know About Minerals

- ✓ How to look for deficiency signs
- ✓ What happens when excess is consumed
- ✓ How to help your clients choose the best food sources
- ✓ When to supplement
- ✓ How to choose supplements
- ✓ Factors that help or hinder absorption
- ✓ When to use lab testing



Mineral	Actions	RDA/Deficiency/Notes
Calcium	Bones, teeth, muscle contraction	1000mg/osteoporosis, osteomalacea, tetany
Chloride	Enzyme activation, pH, stomach acid	1.8-2.3g/Loss of appetite, weakness, lethargy, acidosis
Magnesium	Nerve impulse, protein synthesis, muscle relaxation, 325 enzymes	350 - 400mg/neuromuscular hyperexcitability, muscle weakness
Phosphorus	Component of bone, phospholipids, ATP, pH regulation	700mg/Neuromuscular, skeletal and heart symptoms
Potassium	Water, electrolyte and pH balance	4.7g/Weakness, apathy, arrhythmias, fragile bones
Sodium	Water, pH and electrolyte, nerve transmission, muscle contraction	<1900mg/Anorexia, nausea, muscle atrophy, weight loss
Sulfur	Part of sulfur containing vitamins and lipoic acid	800-1000mg/inefficient detoxification, methylation
Chromium	Blood Sugar	25-35mcg/Insulin resistance, diabetes
Copper	Neurotransmitter synthesis, pigment	900mcg/anemia, neutropenia, bone irregularities
Iodine	Thyroid hormone, breast health	150mcg/Thyroid dysfunction, increased blood lipids
Iron	Oxygen carrying - hemoglobin	8-18mg/Fatigue, palpitations
Manganese	Collagen, brain, glucose metabolism	2.3mg/Impaired growth, slow repair
Molybdenum	Purine, pyrimidines, pterines, aldehyde	45mcg/Buildup of sulfur by products
Selenium	Free radical protection, convert T4->T3	55mcg/Myopathy, cell fragility, pancreas degeneration
Silica	Bones, teeth, hair and nails	9-14mg/Osteoporosis, weak skin and nails, brittle hair
Zinc	Energy, protein, sex hormones, digestion	11g/Poor wound healing, anorexia, hormone imbalance

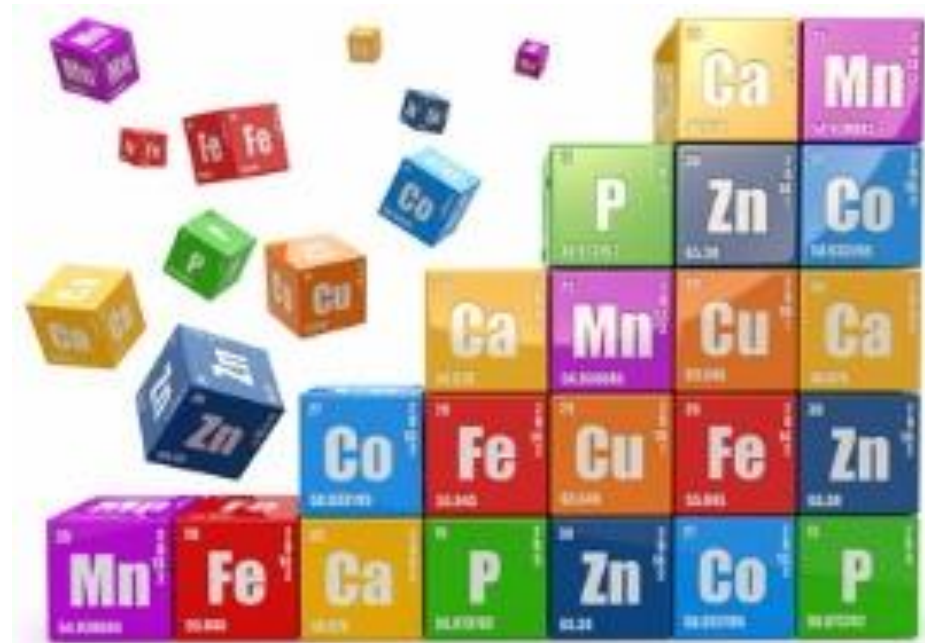
# Mineral Chart Resources

## ✓ Dr. Decuypere's Nutrient Charts™

<http://www.drritamarie.com/go/DrDecuypereMineralCharts>

## ✓ Advanced Nutrition and Human Metabolism

<http://www.drritamarie.com/go/AdvancedNutritionHumanMetabolism>



# Deficiency Signs

- ✓ Hormone imbalance
- ✓ Fatigue
- ✓ Osteoporosis
- ✓ Anemia
- ✓ Digestive upset
- ✓ Immune problems
- ✓ Allergies
- ✓ Depression
- ✓ Anxiety
- ✓ Skin problems
- ✓ Neuropathy
- ✓ Inflammation



# To Supplement or Not to Supplement?

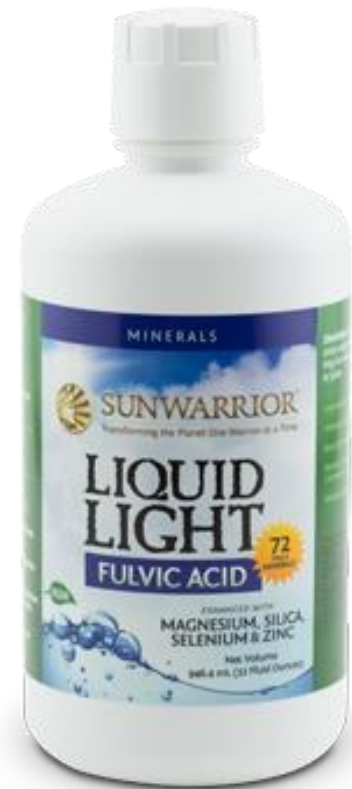
- As insurance for an already healthy diet
- When symptoms of deficiency in conjunction with a healthy diet
- Under adverse conditions that increase need for specific minerals, i.e. a cold, injury, infection
- NOT as a substitute for eating well
- NOT to “make up for” deliberate binges





# Hierarchy of Ways to Supplement

- Whole food concentrates
- Liquid minerals from concentrated whole food sources
- Ionic liquid minerals
- Powders that can be dissolved in water or green juice
- Capsules without excipients
  - Amino acid chelates
  - Organic salts
- Tablets without binders and preservatives



# Ingredients to Avoid in Supplements

- ✓ Hydrogenated oil
- ✓ Talc
- ✓ Sugar
- ✓ Artificial sweeteners
- ✓ FD&C colors
- ✓ Stearates
- ✓ Sodium Benzoate
- ✓ Titanium Dioxide



# Magnesium Stearate

- ✓ A lubricant so that the vitamins don't stick to one another or the equipment being used
- ✓ Safety is controversial
- ✓ One study links this compound to creating a suppressed immune system
- ✓ Other studies show that this 'chalk' will create a biofilm in the body that blocks absorbing any of the needed nutrients



# Testing Mineral Status

- ✓ Symptoms that can be observed and recorded on questionnaires (scorecards resource)
- ✓ Exam findings
- ✓ Lab testing
  - Direct measurement
  - Functional assessment



# Functional Tests for Mineral Status

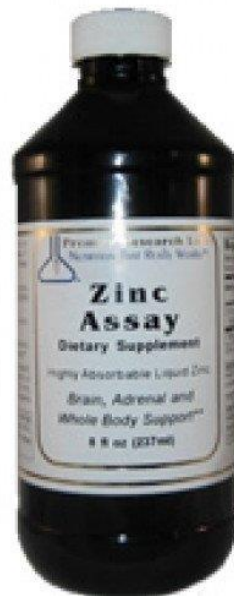
- ✓ Mean Corpuscular Volume (MCV)- (Fe)
- ✓ TIBC (Fe)
- ✓ Uric Acid (Mb, Cu)
- ✓ Hemoglobin (Fe)
- ✓ Ferritin (Fe)
- ✓ GGT (Mg)
- ✓ Alkaline Phosphatase (Zn)
- ✓ Organic Acids: All
  - Genova/Metamatrix
  - Great Plains
- ✓ NutrEval®
- ✓ Spectracell





# Other Tests for Mineral Status

- ✓ Urine toxic and essential elements
- ✓ Stool testing for toxic minerals
- ✓ Hair analysis
- ✓ Lingual testing



# Blood Tests for Mineral Status

- ✓ Iron
- ✓ Calcium
- ✓ Potassium
- ✓ Sodium
- ✓ Chloride
- ✓ Phosphorus
- ✓ Magnesium (RBC)
- ✓ Copper



# Additional Resources About Minerals

✓ *Advanced Nutrition and Human Metabolism*

– Gropper, Smith and Groff

<http://www.drritamarie.com/go/AdvancedNutritionHumanMetabolism>

✓ World's Healthiest Foods

<http://www.drritamarie.com/go/WHFoodsEssentNut>

✓ Linus Pauling Institute

<http://www.drritamarie.com/go/LPIMinerals>

