

## Importance of Salt in our Diet – Part 1

### New Theory:

Daily intake of salt, required to efficiently operate the human body, is approximately 5.0 grams (1 teaspoon) per day. If, your Serum Electrolytes show marginally low or below normal sodium (Std. Ref. Range = 135 to 145 mmol/L) and chloride (Std. Ref. Range = 98 to 108 mmol/L) levels, it is time to wake up, and take immediate corrective action. Sodium and chloride levels tend to go below the normal range if one purposefully and / or fanatically abstained from taking dietary salt or engaged in low sodium diets under the false notion that “salt / sodium is totally harmful for the human body.”

If you have landed up deficient in serum sodium and / or chlorides you can make amends by taking ¼ teaspoon of natural salt to lime / lemon juice or just to warm water first thing in the morning on waking up. You can do this once more in the late afternoon / evening if required. Do this for a few weeks at a time and monitor your serum electrolyte levels and bring them to the midpoint of their respective Standard Reference Range. Serum electrolytes should be measured only after discontinuing all sodium supplements (extra intake of salt) for a minimum period of 7 days. This is done to ensure you have determined the true retained value of sodium and chlorides in the body.

* Serum Electrolytes	Standard Reference Range	Optimum Value
Sodium	136 to 145 mmol/L	142 mmol/L
Potassium	3.5 to 5.1 mmol/L	4.5 mmol/L
Chlorides	98 to 107 mmol/L	104 mmol/L

\* Serum electrolytes values can be falsely elevated in case of any kidney insufficiency, reflected by serum uric acid, creatinine well above the optimum values. In cases of a serious dietary protein deficiency leading to a N2 imbalance (low BUN), the renal profile will be inconclusive.

**Table 1 - Optimum Serum Electrolyte Levels**

Like sodium, chlorine is also very important for the proper functioning of the human body. There is no richer source of chlorine in our diet than the “chloride” found in sodium chloride. This source of chlorine is what allows our body to generate hydrochloric acid in order to digest food in our stomach. Here hydrochloric acid enables the absorption of iron to prevent anemia; helps to break down proteins for further digestion; and numerous other functions. The low pH of the stomach’s hydrochloric acid also destroys ingested bacteria and other microorganisms.

If you have abstained from eating salt for many years, you can be sure that you have poor levels of hydrochloric acid and are “wasting / excreting” the already scarce nutrition available in the food you eat. This causes ill health in addition to the rapid aging of the body. Prescription drugs that cause GI disturbances and / or suppress the flow of gastric acids also contribute to rapid aging the body by depriving the body from receiving nutrition from our daily diet. Conditions such as anemia and poor ferritin levels often result from such deprivation. Healthy stomach acid helps kill disease-causing microbes and parasites routinely found in food you eat.

To determine if the hydrochloric acid produced in your stomach is at an optimum level, a gastrin hormone blood test (Fasting and PP) should be performed. Gastrin (Standard Ref. Range Fasting =  $\leq 90$  pg/mL) is inversely proportional to hydrochloric acid levels in your stomach. Try to maintain your body to stay at the lower end of the gastrin standard reference range - at approximately  $\leq 25$  pg/mL (Fasting and Post Prandial).

* Gastrin	Standard Reference Range	Optimum Value
Fasting	Up to 90 pg/ml	≤ 15 pg/ml
Post Prandial 2 hours after meal	Up to 250 pg/ml	≤ 25 pg/ml

\* Gastrin is inversely proportional to HCl levels

**Table 2 - Optimum Gastrin Levels**

Again, iodized salt (elemental iodine ≈ 50 mcg/gram) is our primary source of iodine to operate the body. It allows the body to maintain a high rate of metabolism by allowing our thyroid gland to function properly. Improper functioning of the thyroid gland, due to iodine deficiency (less than 150 mcg/day of elemental iodine per person), leads to hypothyroidism, weight gain, increased body fat and poor cardiac health. Abstinence from dietary salt, for numerous years, can cause severe iodine deficiency resulting in goiters, which were rampant in many parts of the world about a hundred years back. We are once again seeing the reemergence of goiters today due to abstinence from salt in our diet.

***There is not much merit to the age old theory that salt results in weight gain and high blood pressure. There are many other safer methods to naturally lower high blood pressure without exposing oneself to the damaging effects of dietary salt abstinence. As a matter of fact the lack of iodine from iodized salt can result in hypothyroidism and weight gain.***

For instance, lowering sodium levels in the body to lower hypertension, can also be achieved by increasing potassium intake. After all, it is the ratio of sodium to potassium that is important for the smooth operation of the human body. Increasing potassium intake is easier and has less harmful effects on the human body. The kidneys strive to maintain the sodium / potassium equilibrium in the body at all times. Again, magnesium is very effective in naturally lowering high blood pressure and has very low chances of causing any toxic effects. Excess magnesium is quickly excreted by the body. Again, magnesium is also utilized for building of bones which is a very slow process. Therefore, it normally takes six to twelve months to replenish depleted magnesium levels in the body when therapeutic doses of magnesium are administered.

For more information on use of intracellular magnesium therapy for the treatment of primary hypertension (high blood pressure) please go to: <http://www.space-age.com/HighBloodPressure.pdf>

***Avoiding salt is therefore, one of the worst and the most damaging methods of high blood pressure control and is definitely not recommended for people pursuing a long healthy life with anti-aging as a goal.***

## ***Digestion Begins in our Mouth***

### **Old Theory:**

In humans, digestion begins in the oral cavity where food is chewed. Saliva is secreted in large amounts (1-1.5 litres/day) by three pairs of exocrine salivary glands (parotid, submandibular, and sublingual) in the oral cavity, and is mixed with the chewed food by the tongue. There are two types of saliva. One is a thin, watery secretion, and its purpose is to wet the food. The other is a thick, mucous secretion, and it acts as a lubricant and causes food particles to stick together and form a bolus. The saliva serves to clean the oral cavity and moisten the food, and contains digestive enzymes such as salivary amylase, which aids in the chemical breakdown of polysaccharides such as starch into disaccharides such as maltose. It also contains mucin, a glycoprotein which helps soften the food into a bolus.

The gastrointestinal tract starts in the oral cavity (i.e. mouth) where your teeth grind and chew food, breaking it into smaller manageable pieces. This chewing process, known as mastication, is dependent upon powerful muscles (i.e. masseter and temporalis), as well as smaller muscles that permit fine control; they move the mandible (i.e. lower jawbone) against the upper jaw and enable the crushing of relatively hard food. Mastication causes exocrine glands under the tongue and in the back of the mouth to secrete a water-like liquid called saliva which performs two essential functions. It moistens and compacts the chewed food so your tongue can roll it into a ball (i.e. bolus), pushing it to the back of your mouth for swallowing and easy passage through the pharynx and esophagus. In addition, saliva contains digestive enzymes (eg. salivary amylase or ptyalin) which initiate the breakdown of carbohydrates. Mastication and saliva secretion work in harmony: chewing increases the surface area of foods which helps to accelerate the breakdown of starch molecules into simple sugars by the digestive enzymes. Almost no protein or fat digestion occurs in the mouth, except for the release of lingual lipase an enzyme secreted by Ebner's glands on the dorsal surface of the tongue.

In addition to ptyalin, saliva has an enzyme called lysozyme that digests bacterial cell walls, thus killing certain microorganisms. Saliva also has a cleansing action as its constant flow helps to dissolve and remove food particles from the teeth.

The actions of the teeth and tongue prepare food for swallowing. After swallowing, the food enters the esophagus, the next stage of the digestive tract.

## **Micronization of Food**

In order to derive the full nutritional value of food and experience its therapeutic effects, it is necessary to understand the process of micronization.

Normally, grains are made into flour for ease of making dough for breads (e.g. rotis). Here the particle size is quite large, restricting to some extent the bioavailability of nutrition from the food we eat. It also prevents us from experiencing the therapeutic effects food has on the human body.

During micronization, food particles are reduced to micron size and we approach closer to the cell wall to extract the nutrition in a more complete manner. The assimilation and retention of nutrition and other phytochemicals present in food is much higher in the case of micronized food.

This is very important today, as the nutritional value of produce from farmlands has steadily declined to an alarming low level of approximately 25%. This is due to the extensive use of synthetic fertilizers and over cultivation of land during the last 50 years.

Today, farmlands are over cultivated and the soil is almost entirely depleted of nutrition. This has led to a host of chronic ailments such as hypertension, type 2 diabetes, cardiac diseases, and hypothyroidism.

Under these circumstances, it was imperative to innovate the concept of micronization of food; so that the bioavailability of nutrition could be enhanced and optimized to ensure that the human body did not easily develop these kinds of chronic ailments which have become rampant today. These ailments have been wrongly classified as chronic diseases when they are really symptoms of severe nutritional deficiency. These "chronic diseases" or shall I say symptoms, are fully reversible in nature by implementing therapeutic doses of nutrition synergistically administered at the intracellular levels.

***"Let thy food be thy medicine and let thy medicine be thy food".***

***Hippocrates, Circa 400 BC***

***"The doctor of the future will give no medicine, but will interest his patient in the care of the human frame, in diet and the cause and prevention of disease".***

***Thomas Edison***

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## Importance of Salt in Digestion – Part 2

### New Insight:

The important thing to understand is that the process of mastication causes the production of small particles. This is known as micronization and is ultimately responsible for the enhanced release of nutrition from the food we eat.

The mouth essentially serves like a kitchen “wet grinder” and enables the micronization of the food we eat.

It is well established that, when we want to draw out the nutrients from the food we eat, we have to go as close as possible to the cell wall. Chewing one’s food thirty-two times before swallowing is therefore emphasized.

Salt or sugar in the diet enables the enhanced release of saliva which allows our “wet grinder” to efficiently micronize the food. While salivary amylase (ptyalin) can break down carbohydrates, the micronized food readily releases proteins and fats for digestion once the food travels past the esophagus. If it was not micronized in our mouth, the nutrition received by our body would be deficient and would contribute to the rapid aging of our body.

It is therefore appropriate to say that 50% of our digestion occurs in the mouth and it is necessary to eat food slowly, without distraction, and not to hastily swallow improperly chewed food. Chewing food thirty-two times with adequate stimulus to enhance the flow of saliva therefore makes sense. Ayurveda talks about the six tastes required in our daily diet and essential to operate the body: sweet, sour, salty, bitter, astringent and pungent.

It is more important to understand the essential role that salt plays in digestion, beginning with our mouth. Salt enhances the flow of saliva and enables our “wet grinder” to function more efficiently to micronize our food for further digestion in the digestive tract.

Salt and sugar are therefore important and essential for the operation of the human body.

Ask most culinary pundits, and they will tell you that salt helps to “draw out the flavor in our food,” Flavor increases the flow of saliva to enhance the digestion of food in our mouth and increases the flow of gastric juices (acids) to enhance the digestion of food in our stomach and the consequent absorption of nutrition vital to good health.

***It is time to bid goodbye to the widely prevalent theory that salt (sodium) harms our health and must be avoided at all costs by hypertensive and obese patients.***

## Importance of Hydrochloric Acid in the Stomach

Hydrochloric acid helps digest food by breaking up fats and proteins. The low pH of the stomach's hydrochloric acid also destroys ingested bacteria and other microorganisms. Adequate levels of HCl are necessary for adequate absorption of protein, calcium, vitamin B12 and iron.

Healthy stomach acid is needed for a healthy digestive tract. If you have low stomach acid, even foods with high level of nutrition cannot be properly digested. If you are unable to absorb nutrients properly, this can lead to chronic health problems. Healthy stomach acid helps kill disease-causing microbes and parasites routinely found in food you eat. If you have low stomach acid, these infecting invaders may not be destroyed in your stomach. They can then lead to many types of infections.

### Common Symptoms of Low Hydrochloric Acid

- Bloating or belching, especially after eating
- Burning in the stomach, especially after eating
- Fullness or heaviness in the stomach after eating
- Nausea after eating or taking supplements (especially vitamins and minerals)
- Intestinal gas
- Indigestion
- Bad breath
- Diarrhea or constipation
- Food allergies
- Itching around the rectum
- Weak or cracked fingernails
- Dilated blood vessels in the cheeks or nose (roseacea in nonalcoholics)
- Skin break-outs or acne
- Iron deficiency
- Chronic intestinal parasites
- Undigested food in the stool
- Chronic candida (yeast) infection

### Diseases Associated With Low Hydrochloric Acid

- Asthma
- Diabetes
- Osteoporosis
- Arthritis
- Hepatitis
- Eczema
- Acne, rosacea
- Psoriasis
- Gallbladder disease
- Herpes
- Hives
- Hyperthyroid
- Hypothyroid
- Thyrotoxicosis
- Autoimmune disorders
- Lupus erythematosus
- Myasthenia gravis
- Pernicious anemia
- Celiac disease
- Sjogren 's Syndrome

### **Low Stomach Acid**

For many people, as they get older, the parietal cells in the stomach lining produce less and less hydrochloric acid. This is especially true of those who eat: 1) heavily cooked foods (which have no live enzymes), 2) difficult-to-digest foods such as red meat or fried foods, 3) chemicalized foods, such as those containing artificial preservatives and additives, 4) soft drinks, which contain high amounts of phosphorus, white sugar, and immune-stressing chemicals and 5) barbequed foods, which cause high digestive stress. (The blackened areas of the food contain carcinogenic [cancer-causing] agents.)

### **People Over Age 60**

Over 50% of the people over age 50 have low stomach acid. By age 70, 75% have low stomach acid. Healthy stomach acid is crucial to digest food properly in order to maintain good health. Hydrochloric acid is one of your body's first line defenses against disease-causing microbes. Weak stomach acid allows infecting organisms (that would normally be killed by the acid) to get past the stomach and set up infections in other areas. They can cause food poisoning and dysbiosis of the intestinal tract (abnormal overgrowth of unhealthy intestinal microbes).

For people aged 50, over 20% have bacterial overgrowth in the intestines. Over age 70, the percentage increases to 40%. This abnormal bacterial overgrowth is also common in younger people. It is linked to low stomach acid as well as eating a nutrient-poor diet, using antibiotics or pain killers, drinking excess alcohol and other factors. Thus, healthy stomach acid is a critical part of maintaining healthy intestines.

### **Getting The Minerals and Vitamins In**

Adequate hydrochloric acid is necessary to absorb vitamin B12. B12 deficiency can cause muscle weakness, fatigue and many nervous system problems. Healthy stomach acid is also required to absorb many minerals, including iron, calcium, magnesium, zinc, copper and most B-complex vitamins. Those with poor stomach acid typically have low vitamin C levels.

### **Exhausted Stomach Acid**

Adequate amounts of stomach acid are necessary to break down protein. That's why overeating meat, especially cooked red meat, is hard on the stomach -- it uses up the stomach's acid and enzymes very quickly. Eating red meat day after day can exhaust the stomach's ability to build up sufficient amounts of hydrochloric acid. Your best bet is to limit or eliminate red meat in your diet. Instead, enjoy an excellent, high quality vegetarian protein sources – mushrooms, beans, lentils and pulses.

Red meats are difficult to digest and contains arachidonic acid which encourages inflammatory by-products which can lead to joint pain, fatigue and osteoporosis.

### **Acid Stomach**

Low stomach acid can cause indigestion. Believe or not, too little stomach acid is the most common cause of an acid stomach, not excess acid. Some people take antacids to relieve the uncomfortable acid feeling in their stomachs (common after eating high protein or high fat meals). But the vast majority of those with an "acid stomach" suffer from not enough acid. They simply can't digest what they've eaten. For some, an antacid may temporarily relieve a queasy stomach, but in the long run, regular use of antacids makes the problem worse.

### **Naturally Increasing Stomach Acid**

Be sure you have adequate daily salt intake (from natural sea salt). The chloride fraction in salt is essential for your body to make hydrochloric acid. That's why a low-salt diet commonly leads to poor digestion over time.

### **Notes – Observations from Clinical Studies:**

The daily requirement of salt is about 5.0 gram for an adult weighing about 150 lbs. (70.0Kg). Again, this requirement will change depending upon the room temperature, body sweat, humidity, summer, winter, how much water you drink daily, etc. So one person may be OK with 3.0 grams per day and someone may require 5.0 grams per day because they exercise a lot and also sweat a lot.

The body knows how to excrete excess salt when taken within limits. So you do not really need to weigh the actual salt daily and take it like a tablet or a capsule. Just adding salt to enhance the taste of the food is enough control. You really do not need to fanatically avoid salt in peanuts or pistachios or cashews or potato chips or French fries or butter. Adding salt to drinking water on a hot summer day when you are sweating is also OK.

Also I would avoid eating canned food full of sodium preservatives. This is normally sodium citrate and does not provide chlorides (chlorine) to produce hydrochloric acid. I would eat only fresh food.

What has happened in the last two decades, and we are seeing this in the patients that come to us, is that patients have stopped eating salt or salty food for a number of years (because they were told it is bad for health). Subsequently, their blood reports show extremely low sodium and chlorides and consequently high gastrin levels (at the upper end of the Standard Reference Range) indicating poor hydrochloric acid supply (stomach acid to help digest food and absorb nutrition from food and supplements). Many times the sodium and chloride levels are dangerously well below the lower end of the Standard Reference Range and need immediate correction.

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### **For further Reading:**

#### **1. Reversing Hypertension – Primary & Secondary & Improving Cardiac Efficiency**

Download complete paper with numerous case studies (done without restricting salt intake) and a refresher course in undergraduate and post graduate Orthomolecular Nutrition with special emphasis on magnesium and vitamin D which play a very important role in cardiac health:

<http://www.space-age.com/HighBloodPressure.pdf>

**2. Salted**, Mark Bitterman, 2010, ISBN 978-1-58008-262-4

(A manifesto on the world's most essential mineral, with recipes)

**3. Salt Block Cooking**, Mark Bitterman, 2013, ISBN 978-1-4494-3055-9

(70 Recipes for Grilling, Chilling, Searing, and Serving on Himalayan Salt Blocks)

**4. More information on Himalayan Salt is at:**

<http://www.saltnews.com/>

Himalayan Salt – The Purest Salt on Earth

Himalayan salt was created 250 million years ago during a period of pristine environmental integrity. Sourced from deep within the remote Himalayas, it is free of impurities – unlike table salt or salt from our today's polluted oceans.

## Himalayan Salt - Analysis

Below is a spectral analysis of Himalayan pink salt. The list shows all the trace minerals, electrolytes, and elements contained in Himalayan salt.

Hydrogen H 1 0.30 g/kg DIN

Lithium Li 3 0.40 g/kg AAS

Beryllium Be 4 <0.01 ppm AAS

Boron B 5 <0.001 ppm FSK

Carbon C 6 <0.001 ppm FSK

Nitrogen N 7 0.024 ppm ICG

Oxygen O 8 1.20 g/kg DIN

Flouride F- 9 <0.1 g/kg Potentiometer

Sodium Na+ 11 382.61 g/kg FSM

Magnesium Mg 12 0.16 g/kg AAS

Aluminum Al 13 0.661 ppm AAS

Silicon Si 14 <0.1 g/kg AAS

Phosphorus P 15 <0.10 ppm ICG

Sulfur S 16 12.4 g/kg TXRF

Chloride Cl- 17 590.93 g/kg Gravimetric

Potassium K+ 19 3.5 g/kg FSM

Calcium Ca 20 4.05 g/kg Titration

Scandium Sc 21 <0.0001 ppm FSK

Titanium Ti 22 <0.001 ppm FSK

Vanadium V 23 0.06 ppm AAS

Chromium Cr 24 0.05 ppm AAS

Manganese Mn 25 0.27 ppm AAS

Iron Fe 26 38.9 ppm AAS  
Cobalt Co 27 0.60 ppm AAS  
Nickel Ni 28 0.13 ppm AAS  
Copper Cu 29 0.56 ppm AAS  
Zinc Zn 30 2.38 ppm AAS  
Gallium Ga 31 <0.001 ppm FSK  
Germanium Ge 32 <0.001 ppm FSK  
Arsenic As 33 <0.01 ppm AAS  
Selenium Se 34 0.05 ppm AAS  
Bromine Br 35 2.1 ppm TXRF  
Rubidium Rb 37 0.04 ppm AAS  
Strontium Sr 38 0.014 g/kg AAS  
Ytterbium Y 39 <0.001 ppm FSK  
Zirconium Zr 40 <0.001 ppm FSK  
Niobium Nb 41 <0.001 ppm FSK  
Molybdenum Mo 42 0.01 ppm AAS  
Technetium Tc 43 unstable artificial isotope - not included  
Ruthenium Ru 44 <0.001 ppm FSK  
Rhodium Rh 45 <0.001 ppm FSK  
Palladium Pd 46 <0.001 ppm FSK  
Silver Ag 47 0.031 ppm AAS  
Cadmium Cd 48 <0.01 ppm AAS  
Indium In 49 <0.001 ppm FSK  
Tin Sn 50 <0.01 ppm AAS  
Antimony Sb 51 <0.01 ppm AAS

Tellurium Te 52 <0.001 ppm FSK  
Iodine I 53 <0.1 g/kg potentiometric  
Cesium Cs 55 <0.001 ppm FSK  
Barium Ba 56 1.96 ppm AAS/TXR  
Lanthan La 57 <0.001 ppm FSK  
Cerium Ce 58 <0.001 ppm FSK  
Praseodymium Pr 59 <0.001 ppm FSK  
Neodymium Nd 60 <0.001 ppm FSK  
Promethium Pm 61 unstable artificial isotope - not included  
Samarium Sm 62 <0.001 ppm FSK  
Europium Eu 63 <3.0 ppm TXRF  
Gadolinium Gd 64 <0.001 ppm FSK  
Terbium Tb 65 <0.001 ppm FSK  
Dysprosium Dy 66 <4.0 ppm TXRF  
Holmium Ho 67 <0.001 ppm FSK  
Erbium Er 68 <0.001 ppm FSK  
Thulium Tm 69 <0.001 ppm FSK  
Ytterbium Yb 70 <0.001 ppm FSK  
Lutetium Lu 71 <0.001 ppm FSK  
Hafnium Hf 72 <0.001 ppm FSK  
Tantalum Ta 73 1.1 ppm TXRF  
Wolfram W 74 <0.001 ppm FSK  
Rhenium Re 75 <2.5 ppm TXRF  
Osmium Os 76 <0.001 ppm FSK  
Iridium Ir 77 <2.0 ppm TXRF

Platinum Pt 78 0.47 ppm TXRF

Gold Au 79 <1.0 ppm TXRF

Mercury Hg 80 <0.03 ppm AAS

Thallium Tl 81 0.06 ppm AAS

Lead Pb 82 0.10 ppm AAS

Bismuth Bi 83 <0.10 ppm AAS

Polonium Po 84 <0.001 ppm FSK

Astat At 85 <0.001 ppm FSK

Francium Fr 87 <1.0 ppm TXRF

Radium Ra 88 <0.001 ppm FSK

Actinium Ac 89 <0.001 ppm FSK

Thorium Th 90 <0.001 ppm FSK

Protactinium Pa 91 <0.001 ppm FSK

Uranium U 92 <0.001 ppm FSK

Neptunium Np 93 <0.001 ppm FSK

Plutonium Pu 94 <0.001 ppm FSK

#### **Additional Combined Elements**

Water H<sub>2</sub>O 1.5 g/kg DIN

Ammonium NH<sub>4</sub><sup>+</sup> 0.010 ppm Photometrie

Nitrate NO<sub>3</sub><sup>-</sup> 0.09 ppm Photometrie

Phosphate PO<sub>4</sub><sup>3-</sup> <0.10 ppm ICG

Hydrogencarbonate HCO<sub>3</sub><sup>-</sup> <1.0 g/kg Titration

The sodium chloride content is 97.41% and meets the worldwide necessary standards for table salt.

**Legend:**

g/kg – Grams per kilogram

DIN – German Standards Institute

ICG – Ionchromatography

AAS – Atom absorbtion spectrometry

TXRF – Total reflection - X-Ray - Floresence-Spectrometry

ppm – Parts per million

FSM – Flamespectrometry

FSK – Frequency Spectroscope