# Better Immunity

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### 1. The Journal Of Nutrition: *Drinking Water Constituents and Disease, 2008*

**Several epidemiological investigations over the last 50 y have demonstrated a relation between risk for cardiovascular disease and drinking water hardness or its content of magnesium and calcium. An additional parameter, first suggested in a study from Japan 50 y ago, is the acidity of the water**. It is known that acid load influences the reabsorption of calcium and magnesium in the renal tubuli. Intervention studies have shown that acid-base conditions influence the homeostasis of minerals. It has been concluded that there is some evidence for a relation between the drinking water content of magnesium and calcium and the risk for cardiovascular disease.

**New data suggest that acid/base conditions in the body are of importance for the homeostasis of the minerals calcium and magnesium. Because drinking water contains hydrogen carbonate and thus influences mineral homeostasis, health criteria for a good drinking water should include a sufficient content of hydrogen carbonate.**

https://academic.oup.com/jn/article/138/2/423S/4665076

### 2.International Journal of Collaborative Research on Internal Medicine and Public Health : *Role of Waterborne Magnesium in Preventing Chronic Diseases 2011*

**Magnesium in hard water is known for its cardio protective effect especially against sudden cardiac death by preventing malignant arrhythmias and coronary vasospasm. Waterborne magnesium is also known for its protective effect on diabetes, metabolic syndrome, hypertension, stroke, insulin resistance, preeclampsia, and other chronic diseases. It is so effective that even a small amount (6 mg / l) can prevent cardiovascular mortality by 10% (a disproportionate response).**

Hard water supplies other micronutrients like, calcium, zinc, iodine etc. and it also protects the body against other harmful chemicals of water like, cadmium, aluminum, beryllium, mercury, and nickel. Demineralized water produced through reverse osmosis process removes 93-97% of calcium and magnesium. Such water is stripped of its beneficial elements and produces magnesium deficiency if consumed for prolonged periods.

https://www.researchgate.net/publication/267222924_Role_of_Waterborne_Magnesium_in_Preventing_Chronic_Diseases

### 3. Journal of Water and Health: *Magnesium in Drinking Water - a Case for Prevention?*

**Studies in many countries have demonstrated a relationship between drinking water mineral content and the risk of death in cardiovascular disease (CVD).** Particularly strong relationships have been found for magnesium and it has been suggested that magnesium be added to drinking water.

The aim of this article is to evaluate the validity of this suggestion by reviewing information on possible causative agents.

**Major epidemiological studies on the drinking water content of calcium, magnesium, and hardness were analysed regarding exposure specificity, confounding factors, dose-response relationships and biological plausibility. Intervention experiments were analysed. The risk of death in CVD was related to the content of Ca, Mg and HCO(3-). The data demonstrate that Ca and Mg need to be considered together, and that HCO(3-) could play a role by intervening with the body acid load**

https://pubmed.ncbi.nlm.nih.gov/24642430/

## 4. MDPI Journal of Nutrients 2019: *Metabolic Syndrome Features: Is There a Modulation Role by Mineral Water Consumption? A Review*

**Metabolic syndrome (MetSyn) promotes, among others, the development of atherosclerotic cardiovascular disease and diabetes. Its prevalence increases with age, highlighting the relevance of promoting precocious MetSyn primary prevention and treatment with easy-to-implement lifestyle interventions.** MetSyn features modulation through mineral water consumption was reviewed on Pubmed, Scopus and Google Scholar databases, using the following keywords: **metabolic syndrome, hypertension, blood pressure (BP), cholesterol, triglycerides, apolipoprotein, chylomicron, very low-density lipoprotein, low-density lipoprotein, high-density lipoprotein (HDL), glucose, insulin, body weight, body mass index, waist circumference (WC), obesity and mineral(-rich) water.**

Twenty studies were selected: 12 evaluated BP, 13 assessed total-triglycerides and/or HDL-cholesterol, 10 analysed glucose and/or 3 measured WC. Mineral waters were tested in diverse protocols regarding type and composition of water, amount consumed, diet and type and duration of the study. Human and animal studies were performed in populations with different sizes and characteristics. Distinct sets of five studies showed beneficial effects upon BP, total-triglycerides, HDL-cholesterol and glucose.

**Minerals/elements and active ions/molecules present in mineral waters (and their pH) are crucial to counterbalance their inadequate intake and body status as well as metabolic dysfunction and increased diet-induced acid-load observed in MetSyn.**

**Mineral water consumption represents not only a good source of specific minerals/elements, active ions and molecules but also an adequate tool against diet-induced acid-load.** As such, from this review, we can highlight the need to control effectively and acknowledge acid-base balance and minerals/elements, active ions and molecules status in the body as well as the composition and acid-load capacity of the diet of the volunteers included in the studies that evaluate mineral water consumption impact upon MetSyn. This is most crucial because mineral water consumption could be happening in different baseline backgrounds and, so, revealing different results. **From one extreme to the other, mineral water consumption could be either (a) compensating deficiencies in the body and diet and/or correcting acid-base imbalance in the body and reducing diet acid-load capacity, or (b) supplementing an already adequate body status and dietary ingestion, with further alkalinisation of the acid-base balance in the body and/or further reduction of acid-load capacity of the diet. In between, it could be mitigating or increasing disproportions in mineral/element/active ion/molecule ratios in the body and diet**

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**Globally, ingestion of mineral waters might be beneficial upon BP regulation when a dysfunction in metabolism and/or mineral/elements homeostasis exits. The same has become evident for lipid profile and glucose homeostasis, but more independently of the health status than revealed for BP.**

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6566252/

### 5.International Journal of Preventive Medicine 2014: *Does Water Hardness Have Preventive Effect on Cardiovascular Disease?*

Background: The aim of this study is **to investigate the association of calcium and magnesium concentration of drinking water with cardiovascular disease (CVDs)** in urban and rural areas of a city in Iran.

Methods: This case-control study was conducted in 2012 in Khansar County in Isfahan province, Iran. We used the official data of the Provincial health center regarding the chemical analysis data of urban and rural areas including the hardness, calcium and magnesium content of drinking water. Data of patients hospitalized for CVD in the only specialty hospital of the city was gathered for the years of 2010 and 2011.

**Conclusions: Our study suggests favorable protective effects of water hardness, mainly water magnesium content, on CVDs. Water hardness, as well as calcium and magnesium content of drinking water may have a protective role against CVDs.**

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3950737/

### 6. Alternative Therapies in Health and Medicine: *Health Effects of Alkaline Diet and Water, Reduction of Digestive-tract Bacterial Load, and Earthing, 2016*

A large number of studies showing the benefits of alkaline water (mineral water) have revealed that **people consuming water with a high level of total dissolved solids (TDS) (ie, with a high mineral content) have shown a lower incidence of coronary heart disease (CHD), cardiovascular disease (CVD), and cancer and lower total mortality rates. Consumption of alkaline water also may prevent osteoporosis and protect pancreatic beta cells with its antioxidant effects.**

https://pubmed.ncbi.nlm.nih.gov/27089527/

### 8. Reference Module in Earth Systems and Environmental Sciences: *Magnesium and Calcium in Drinking Water and Heart Diseases, 2015*

During past decades, several epidemiological studies have reported the lower heart disease risk in areas with hard water with high levels of magnesium or calcium. Magnesium and calcium, the principal components of water hardness, are both essential nutrients for human health. **The available information supports the hypothesis that intake of hard water, especially rich in magnesium, decreases the risk of CVD.**

https://www.researchgate.net/publication/285657090_Magnesium_and_Calcium_in_Drinking_Water_and_Heart_Diseases

## 9. European Journal Of Chemical Nutrition: *Possible roles of magnesium on the immune system, 2003*

During the last few years, magnesium (Mg) has been subject of research due to its functionality in the organism. It is one of the most important micronutrients, and therefore its role in biological systems has been extensively investigated. **Particularly, Mg has a strong relation with the immune system, in both nonspecific and specific immune response, also known as innate and acquired immune response.** The aim of this paper is to review the state of the art about the interactions between Mg and the immune system

We discuss the link between dietary Mg and inflammation, apoptosis and alterations in number and function of innate immune cell populations, described in animal models. Furthermore, the immune system can be compromised in human populations under certain circumstances, including athletes and elderly people. The importance of a balanced Mg homeostasis and its interaction with the immune system in these groups has also been reviewed

https://pubmed.ncbi.nlm.nih.gov/14506478/

## 10. Nutrition Reviews, Volume 63: *The Importance of Good Hydration for the Prevention of Chronic Diseases*

There is increasing evidence that mild dehydration plays a role in the development of various morbidities. In this review, the effects of hydration status on chronic diseases are categorized according to the strength of the evidence. **Positive effects of maintenance of good hydration are shown for urolithiasis (category Ib evidence); constipation, exercise asthma, hypertonic dehydration in the infant, and hyperglycemia in diabetic ketoacidosis (all category IIb evidence); urinary tract infections, hypertension, fatal coronary heart disease, venous thromboembolism, and cerebral infarct (all category III evidence); and bronchopulmonary disorders (category IV evidence).**

https://academic.oup.com/nutritionreviews/article/63/suppl_1/S2/1927728

## 11. Annals of Nutrition and Metabolism 2016: Fluid Intake and Vasopressin: *Connecting the Dots*

**In the last decade, cross-sectional and multiple cohort studies have associated total fluid intake or water intake with the risk for chronic kidney disease (CKD) and even the risk of developing hyperglycemia.**

**Urine biomarkers have also been linked to the risk of CKD and lithiasis, and these biomarkers respond quickly to variations in fluid intake.**

High circulating copeptin levels, a surrogate marker of arginine vasopressin, have been associated with metabolic syndrome, renal dysfunction and increased risk for diabetes mellitus, cardiovascular disease and death.

**The aim of this paper was to explore how the various findings on water intake, hydration and health are interconnected, to highlight current gaps in our understanding and to propose a model that links water intake, homeostatic mechanisms to maintain water balance and health outcomes.**

**Since plasma copeptin and vasopressin have been demonstrated to be sensitive to changes in water intake, inversely associated with 24-hour urine volume,** and associated with urine biomarkers and fluid intake, **vasopressin is proposed as the central player** in this theoretical physiological model.

https://www.researchgate.net/publication/303983892_Fluid_Intake_and_Vasopressin_Connecting_the_Dots