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## **Ionic and Colloidal Minerals: The Difference is in the Absorption!**

**By Chris D. Meletis, N.D.**

**Trying to sort through, much less understand, the myriad absorption claims made by some mineral supplements can be confusing. Here's a primer on mineral forms and absorption.**

Minerals can generally be found in two different forms. The first form is that of a colloid, where minerals are suspended in a stable form. In this stable form, the minerals are evenly distributed throughout the medium in which they are suspended. Minerals in this colloid state are held in large, organized patterns, whereby they remain in suspension without settling out. Colloidal minerals are not readily absorbed by the body due to the absence of an electrical charge and their relatively large size, unlike other mineral forms. In fact, one definition of a colloid is a substance that, when suspended in a liquid phase, will not easily diffuse through a living membrane.<sup>1</sup> Colloid arrangements are unable to pass through the membrane that lines the digestive tract. It is argued that colloidal mineral forms are more easily dispersed in the body; however, this hypothesized ability does not improve their absorption. In fact, it is necessary for the body to break these minerals down into smaller constituents in order for them to be absorbed.

Manufacturers claim that supplements made from these colloids are more balanced than other mineral supplements and are in a natural form that is easier for the body to use. According to the Food and Drug Administration (FDA) and the American Dietetic Association (ADA), there is no scientific evidence to support these claims. Commercial colloidal mineral products are derived from clay or humic shale deposits, and there is a tremendous amount of promotional claims for colloidal mineral products. There is no reliable medical evidence to support using these products.<sup>2</sup>

Ionic minerals, on the other hand, are easily transported across the highly selective cell membranes of the human digestive tract. Because ionic minerals are charged, the body has to employ less energy in order to absorb these minerals. Colloidal minerals must be dismantled into smaller parts and obtain an electrical charge in order to cross the intestinal membrane. This electrical gradient allows for the easy flow of ionic minerals from an area of higher concentration (intestines) to an area of lesser

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concentration (the cells of the body). The body assists in this process by further charging ions during the course of the digestive process. The body absorbs ionic minerals with greater efficacy than colloidal minerals, as colloids must undergo the complete processes of digestion into smaller charged particles. And even after undergoing these processes, the body doesn't utilize all of the colloid mineral form—just as not all of the foods eaten are completely utilized.<sup>3</sup>

### **Ionic States**

Ionic minerals are comprised of atoms or collections of atoms that retain their intrinsic electric charge—either positive or negative. This electrical charge that exists surrounds the atom because it is either missing an electron or has additional electrons within its surrounding area. The addition or subtraction of electrons gives the atom, or ion, its electrical signature, or charge. This charge causes the ions to interact, attracting or repelling each other in a search for another ion to contribute to or remove additional electrons, in a never-ending process to create a neutral electrical charge, which is important in maintaining the total concentration of ions in the body.

Various minerals, in their atomic form, link with other minerals to form ionic complexes. Nature has designed an intricate fit between atoms of different species. For instance, each atom has a particular number of electrons within its grasp that it constantly maintains. As this atom interacts with other atoms of the same type, or even different types, it enters into electron-sharing agreements with these different atoms, forming different mineral complexes. This association is highly important to the workings of all biological organisms, as the linking of many different types of atoms forms solid matter.

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### **Sodium Chloride**

However, on a smaller scale, minerals form relatively simple interactions with each other. These mineral complexes are necessary for various metabolic needs, and are vitally important to proper physiologic function, as well as optimal health. For instance, an atom of sodium and an atom of chloride are often found linked together, forming sodium chloride, commonly known as table salt.

In recent years, many negative health effects have been attributed to salt, namely high blood pressure.<sup>4</sup> However, in the absence of sodium chloride, no organism would be able to exist. Additionally, the dissociation between sodium and chloride contributes to physiologic functions such as kidney function, the formation of digestive enzymes, nerve transmission, and muscle function, to name a few.

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Chloride is another form of chlorine, a naturally occurring atom, which is a major mineral nutrient that occurs in body fluids. Chloride is a prominent negatively charged ion (anion) and a predominant ion (electrolyte) in the human body, where it represents 70 percent of the anions. The negative charge of chloride helps to balance the positive charge of sodium and potassium.

### **Potassium Chloride**

There are multitudes of vital ionic mineral combinations that are necessary for optimal physiologic function. Potassium chloride is a mineral complex that is quickly becoming widely recognized for its important role in health. When potassium chloride is ingested, it dissociates into its principle atoms of potassium and chloride. Potassium itself is vital in bone health, cardiac muscle function, cellular membrane transport, and is one of the principle electrolytes of the body—meaning that of the hundreds of physiological useful ions, potassium is found in large amounts in the body and is used for many diverse functions.

Potassium performs many of the same functions inside cells that sodium does outside of cells such as maintenance of acid-base balance and osmotic balance (the balance between negative and positive ions). Potassium is the major intracellular cation, providing approximately 75 percent of the total cations within the cell. Increased intake of potassium coupled with reduced sodium leads to greater control of blood pressure, a common problem in the United States.<sup>5</sup>

### **Importance of Ionic Minerals**

Minerals are found both in their single, unlinked form (such as a solitary potassium ion) and their ionic form in which they have joined with another atom to make a charged mineral particle. The large majority of minerals are found bound in some form or another, which is important for their utilization in human physiology.

When the body absorbs ionized, or electrically charged minerals, they can be readily absorbed through our selectively permeable intestinal membranes.<sup>6</sup> In fact, the membranes lining our intestinal tract maintain their own specific electrical charge in the form of ionic receptors. The body maintains this charge on the lining of membranes in order to facilitate the absorption of food nutrients. Different receptor areas maintain different charge qualities, allowing for the attraction of the multitude of diverse nutrients that pass through the intestinal tract. Because of this charge, ionic minerals are easily taken into the cells lining the intestinal tract, whereby they may be readily employed in the many physiologic activities of the body.

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