

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Role Of Calcium, Magnesium And Phosphorous In Human Body.

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ABSTRACT

This paper describes the role of mineral elements, such as calcium, phosphorus, magnesium, in human body. The deficiency and excess of mineral elements, their physiological functions and effect to human body is described. Recommended daily consumption of minerals will lead to health improvement and disease prevention.

Keywords: calcium, phosphorus, magnesium, deficiency, human body, health

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INTRODUCTION

Mineral elements play an important role in promoting health and active ageing. Human being mostly gets minerals from food and water. Therefore, in case of nutritional disorder minerals deficiency in human body can lead to the metabolism troubles and different diseases. First of all it concerns iron, potassium, magnesium, calcium, sodium and other trace elements. The human body is constantly requires mineral elements and therefore daily intakes of most important minerals is necessary for healthy life [1]. Different products contain different amounts of mineral substances. For example, milk products contain more than two dozen minerals, among them the most significant for humans are calcium, iron, manganese, fluorine, zinc, iodine. Meat products contain such trace elements as copper, zinc, silver, titanium, and marine products are rich in iodine, fluorine, and nickel [1, 4]. Individual foods have the ability to selectively concentrate in their composition a significant amount of certain minerals.

CALCIUM

One of the most abundant minerals in the body is calcium. This nutrient is essential for many functions and necessary for life. The role of calcium in human body ranges from the building of bones with and keeping them healthy, blood clot function, muscle contraction, transmission and regulation of beating of heart, oocyte activation, stronger teeth, fluid balance within cells and nerve impulse transmission. Calcium has been considered as the most abundant mineral in the body with about 99% of it found within the bone and teeth while the remaining 1% is found in the serum [2]. The serum level of this nutrient calcium is being monitored and regulated effectively to ensure it remain at the normal range. This regulation involves certain complex process. Some studies found that 2% of Ca is in the body while 98% is found in bone and teeth [3]. The cells and body fluid is found to contain the range of 10-15mg per 100gm. The daily body requirements of calcium is about 450mg while that requirements for the adult ranges because of the body shape, size and activities [3].

Calcium tends to plays different major roles in human body. Researchers have found that some of those roles calcium plays in the body include;

- Combination with phosphorus for the formation of the bones and teeth so as to make them hard and resistant to both breaks and decays [3]. Maintaining calcium body level is essential in preventing and managing major forms of calcium deficiencies such as the osteoporosis. Managing this is to control protein and salty diet which tend to reduce amount of calcium present in the body. This can be noticed by signs that include; muscle cramping, dry skin and brittle nails, increase PMS symptoms, and bone fracture or breakages [4]. The calcium loss especially in terms of bone density starts between ages of 30-40 while excessive level is between 45 above [3].
 - It helps in muscle contraction and the deficiency in it level can lead to muscle spasms and cramps
 - It also helps in the blood clot process
 - An essential process in the nervous transmission of information to and from the brain towards other part of the body.
 - Too much blood calcium level has been found to cause high blood pressure hence the level must be duly regulated in patients with high blood pressure.
 - It has been found to also reduce the cancer risk especially the colon cancer. This mostly found to happen in two major ways which include the binding of fat and bile acids in large intestine hence prevention from causing any form of harm. The second way is by prevention of the excessive growth of those cells in the intestines that can lead to cancer [5].
 - It can also lead to reduce weight reduction especially those calcium intake from dairy products.

ROLE OF PHOSPHORUS IN HUMAN BODY

It is the second most abundant essential minerals in human body. It tends to play several essential roles in the body. Most of those functional processes relate more to the energy metabolism and bone mineralization. The other functional aspect of the elements relates to the structural framework of the DNA and RNA. 80-90% of the phosphorus is present in bone and teeth in form of the hydroxyapatite while the other are present in the ECF, the soft tissues and erythrocytes [6]. Inorganic phosphate is required for the cellular function and skeletal mineralization within the human body. It tend to perform a major role in the energy

production, protein synthesis, acting as the buffer, neutralizing the acids, maintenance of the hormones and enzymes in the body [7]. One major good aspect of phosphorus is simply because of the fact that it is found in a wide variety of foods hence this makes the deficiency a little bit rare except in those diseases that tend to affect the absorption such as the diabetes or crohn's disease [6, 8].

ROLE OF MAGNESIUM IN HUMAN BODY

Magnesium is the third important minerals being considered in this short review. It also plays several major roles in human body especially in the physiological functional processes. This cation is required for many energy requiring metabolic processes, protein synthesis, membrane integrity, nervous tissue conduction, neuromuscular excitability, muscle contraction, hormone secretion and other minor metabolic functions [9]. It is considered as a trace metals because of the low concentration requirements for the body. It get involves in multiples of enzymatic reactions in the body. It also participates in metabolisms of the glucids, proteins, lipids and nucleic acids. One other important role of magnesium is that of the complex with the adenosine diphosphate (ADP) which appears to be the active substrate for the creatine kinase and some other enzymes. It also results in some allosteric activation by its direct binding to the enzyme protein linked to the enzyme. It also performs some cell membrane level function by causing some forms of alteration to the receptor sites and ion movement. It helps to reduce the electric excitability of the neurons by acting as the calcium antagonist [10]. Apart from that, at that neuromuscular system, it can also inhibit the release of acetylcholine which results in the neuromuscular junction blocks. Since it helps to reduce coagulation processes as the calcium antagonist, it also helps acts as a vasodilator in the body [11].

The states of magnesium in human body are; bound to protein, complex to anions because it's a cation, and Free states. The standard body concentration of magnesium is about 24g in cells and 280mg in extracellular fluids [9]. The largest (60%) part is mostly stored within the body skeletal system. It is this bone magnesium reservoir that helps to maintain the normal serum level of the magnesium especially when there is a need for one [12]. Magnesium deficit have been found to increase risk of aging. It is also linked to contributing factor of cardiovascular diseases and osteoporosis [13].

CONCLUSION

Mineral elements are classified as an essential component in food composition with different physiological functions. Recommended daily consumption of minerals will lead to health improvement and disease prevention.

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