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FACT SHEET

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MACROMINERALS: PHOSPHORUS, POTASSIUM, SODIUM AND MAGNESIUM

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Minerals are essential for good health and growth. Certain amounts of minerals are needed to keep our bodies functioning properly.

Mineral elements have two important body functions — building and regulating. Their building functions affect the skeleton and all soft tissues, including the blood. Their varied regulating functions include heartbeat, blood clotting, maintenance of blood pressure and water balance, nerve responses and transport of oxygen from lungs to tissues.

Relatively large amounts of some minerals are needed in the diet because they are present in large amounts in the body. These minerals — calcium, phosphorus, sodium, chloride, potassium, magnesium and sulphur — are known as macrominerals. Daily requirement of each of these minerals is more than 100 milligrams. Others, called trace minerals, are needed in very small amounts. These include iron, manganese, copper, iodine, zinc, cobalt, fluoride and selenium.

Some mineral elements including lead, mercury and cadmium, are regarded as harmful.

Four of the macrominerals needed for health are discussed in this fact sheet. Publications about other important mineral elements also are listed.

Phosphorus

Phosphorus, combined with calcium, helps strengthen bones and teeth. This mineral also is part of every body tissue. Phosphorus becomes part of enzymes and other compounds needed for the absorption and use of body nutrients. It has more functions than any other mineral element.

Daily requirements for phosphorus are shown in table 1. American diets generally are adequate in this nutrient. Phosphorus intake should almost equal that of calcium for maximum use of both nutrients.

Antacids can impair phosphorus absorption. Long-term use of certain antacids may lead to severe bone demineralization.

Protein-rich foods from animals such as meat, fish, poultry and eggs are excellent sources of phosphorus. Milk, cheese, nuts and legumes also are good sources. Vegetables and fruits generally are low in phosphorus. Most of the phosphorus in whole-grain cereals is part of phytic acid, which combines with calcium to form an insoluble substance. So they are not good sources of phosphorus. Its content in selected foods is shown in table 2.

Potassium

Potassium is a necessary part of the fluid inside body cells. It helps control muscular contraction and transmission of nerve impulses. Prolonged vomiting, use of diuretics and kidney disease cause potassium deficiencies more often than do dietary inadequacies.

There is no information available on daily dietary needs of potassium. The American diet which appears to be adequate contains about two to six grams per day.

Potassium is abundant in food; the richest sources are fruits and vegetables. Table 2 shows the potassium content of certain foods.

Sodium

Sodium is found mainly in the blood and fluids outside body cells. It maintains normal water balance inside and outside the cells, and helps maintain body neutrality by counteracting acid-forming substances in the blood. Normal transmission of nerve impulses also depends on the proper concentration of sodium.

Table 1. Recommended daily dietary allowances

	Age (years)	Phosphorus (milligrams)	Magnesium (milligrams)
Infants	0.0-0.5	240	60
	0.5-1.0	400	70
	1-3	800	150
	4-6	800	200
	7-10	800	250
Males	11-14	1,200	350
	15-18	1,200	400
	19-22	800	350
	23-50	800	350
	51+	800	350
Females	11-14	1,200	300
	15-18	1,200	300
	19-22	800	300
	23-50	800	300
	51+	800	300
Pregnant		1,200	450
Lactating		1,200	450

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Table 2. Food sources of some minerals

Food	Amount	Phosphorus (milligrams)	Potassium (milligrams)	Sodium (milligrams)
Cheddar cheese	10 oz.	136	23	198
Whole milk	1 cup	227	351	122
Cottage cheese	½ cup	171	86	158
Round steak	3 oz.	213	272	60
Pork chop	3 oz.	218	233	51
Chicken	3 oz.	133	206	32
Ham	3 oz.	146	199	637
Halibut	3 oz.	210	447	114
Peanuts (unsalted)	10 nuts	74	127	1
Blackeyed peas	1 cup	238	573	20
Egg	1 large	103	65	61
Whole wheat bread	1 slice	57	68	132
White enriched bread	1 slice	27	29	142
Cornflakes	1 cup	9	30	251
Oatmeal	1 cup	137	146	523
Apple	1 medium	14	152	1
Orange juice	½ cup	21	248	1
Snap beans	½ cup	23	94	2.5
Potato	1 medium	101	782	6
Banana	1 medium	31	440	1
Carrot	1 medium	26	246	34

Dietary requirements for sodium have not been determined. However, the American diet probably provides more than the body needs. Sodium-rich foods include meats, fish, poultry, eggs and milk. Processed foods such as ham, bacon, bread and crackers have high sodium contents because salt (sodium chloride) or sodium compounds are added. Sodium content of some foods is shown in table 2.

Physicians often prescribe sodium (e.g., salt) reductions for persons with high blood pressure, kidney disease, cirrhosis of the liver and congestive heart disease. A decrease in sodium can reduce water retention, which usually is associated with these health problems. Degree of restriction varies with severity of the condition. Mild restriction often can be accomplished by limiting use of salt at the table. Severe restriction means selecting foods naturally low in sodium, eliminating those in which sodium is added in processing and using sodium-free salt substitutes and low-sodium milk. Dietary sodium restriction for pregnant women is no longer recommended under normal conditions.

Increased salt intake may be necessary when intense perspiration, diarrhea or vomiting cause large losses of sodium in body fluids.

Magnesium

Although magnesium is concentrated in the bones, it is present in all body tissues. Magnesium is an important part of enzymes which convert energy in the body. Heart and skeletal muscle and nervous tissue depend on a proper balance of calcium and magnesium.

Table 1 shows daily magnesium requirements. Magnesium deficiency is common only in cases of postsurgical patients and alcoholics.

Table 3. Dietary sources of magnesium

Rich	Good	Fair	Poor
Cocoa	Clams	Oysters	Lobster
Nuts	Cornmeal	Crab	Pork
Soybeans	Spinach	Fresh peas	Lamb
Whole grains		Liver	Milk
			Eggs
			Veal
			Fowl
			Most fruits
			Most vegetables

Magnesium occurs widely in foods, but fruits, vegetables and cereal grains provide the highest amounts. Table 3 lists dietary sources of magnesium.

References

Agricultural Handbook No. 456, "Nutritive Value of American Foods," United States Department of Agriculture, 1975.

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Damon, G. E. "A Primer on Dietary Minerals," *Food and Drug Administration Consumer*, September 1974.

Food and Nutrition Board — National Research Council, "Recommended Dietary Allowances," Eighth Revised Edition, 1974.

Guthrie, H. A. *Introductory Nutrition*, Second Edition, C. V. Mosley Co., St. Louis, Mo., 1971.

Other Extension Publications About Minerals

L-1362 *Iron*, L-1381 *Calcium* and L-1500 *Trace Minerals*

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