



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; 7(6): 290-294
Received: 17-09-2018
Accepted: 19-10-2018

Chitra Prabhakar
Sam Higginbottom University of
Agriculture, Technology and
Sciences, Rewa Rd, Naini,
Allahabad, Uttar Pradesh, India

Relationship of iron with other nutrients

Chitra Prabhakar

Abstract

We need nutrients for maintenance of constant body weight and for ensuring proper body function. Infants and young children grow rapidly and require nutrients not only for maintenance but also for growth. They require relatively more nutrients (2-3 times) per kg body weight than adults. In physiological conditions like pregnancy and lactation, adult woman needs additional nutrients to meet the demand for foetal growth and maternal tissue expansion in pregnancy and milk secretion during lactation. These extra intakes of nutrients are essential for normal growth of infants *in utero* and during early post-natal life. The aim of the study is to find the correlation of iron with other nutrients. When considering their children's nutrition, parents often think more about fat grams, carbs, and calories, and forget about iron, a mineral that is important to help building red blood cells. We can get iron from food source vegetables. The level of iron and other nutrients were highly correlated, the level of iron can affect human body growth and health also. Iron helps in RBC maintenance. The study suggests more emphasis on dietary iron intake and probably recommend iron supplements for the socioeconomically compromised class who probably cannot afford dietary sources of iron. There was a positive correlation between levels of iron with other nutrients.

Keywords: Iron metabolism, copper, vitamin A, folate, vitamin C, vitamin K, vitamin B12, fat, calcium, zinc.

Introduction

Iron is a mineral that is actual important to us. Its capital action is the assembly of hemoglobin, the a lot of important aspect of red claret cells. Adamant is present in abounding foods, both of bulb and beastly origin: lentils, broccoli, nuts, spinach, and blooming abounding vegetables. The bulk of adamant that the physique absorbs depends fundamentally on the bulk of adamant already stored. Generally, alone a baby bulk of any adamant that is captivated is absorbed, which is candy by the civil and again anesthetized to the blood.

Function of Iron

Iron plays a arch role in beef bloom as it is present in tissues and helps accommodate the oxygen that anatomy charge to action properly. In addition, it decidedly aids the conception of neural networks to anticipate diseases such as dementia. It aswell participates in the carriage of oxygen amid cells.

Human Iron Metabolism

It is the set of actinic reactions that advance animal homeostasis of adamant at both the systemic and cellular level. The ascendancy of this all-important but potentially baneful metal is an important allotment of abounding aspects of animal bloom and disease. Hematologists accept been abnormally absorbed in systemic adamant metabolism because adamant is capital for red claret cells, area a lot of of the animal body's adamant is contained. Compassionate adamant metabolism is aswell important for compassionate diseases of adamant overload, such as ancestral hemochromatosis, and adamant deficiency, such as adamant absence anemia.

Effects of Carbohydrates on Iron Absorption

Two abstracts were performed to appraise the furnishings of assorted carbohydrates (fructose, lactose, blah starch, aureate starch and potato starch) on the appliance of iron, on Fe-depleted rats. These accustomed a individual meal that independent the analysis carbohydrate at a 60% level, labelled with ^{59}Fe . The blow of the agreement the rats were fed a diet which independent glucose at a 60% akin as the carbohydrate source. In both abstracts rats were fasted overnight, and the dosage was offered in the anatomy of a morning meal. To appraisal for ^{59}Fe , the animals were counted in a "Whole physique counter" amid two and four hours afterwards dosing, and every day for the afterward 10 days. Percentage assimilation and absorption, as able-bodied as claret ethics were determined.

Correspondence
Chitra Prabhakar
Sam Higginbottom University of
Agriculture, Technology and
Sciences, Rewa Rd, Naini,
Allahabad, Uttar Pradesh, India

In the aboriginal experiment, the backup of glucose by fructose at a 60% akin added decidedly adamant assimilation and retention. An access in assimilation and assimilation aswell occurred if glucose was replaced by lactose at a 60% level, but the aberration was not statistically significant. Administration of ^{59}Fe as a ^{59}Fe -fructose chelate did not assume to accept a cogent aftereffect on assimilation and assimilation if compared to the aftereffect of dosing with ^{59}Fe adsorbed assimilate a fructose diet. This not aphorism out the achievability that chelation is the apparatus amenable for the acceptable aftereffect of fructose on adamant utilization.

The circuitous could accept been formed in the stomach, consistent in a cogent assimilation for both the ^{59}Fe -labelled meal and the ^{59}Fe -carbohydrate complex-labelled meal. In the additional experiment, administering of a meal that independent either of the starches resulted in an abridgement on assimilation and assimilation of ^{59}Fe . The decrease, however, was statistically cogent alone for adapted blah starch, aureate starch and adapted aureate starch. The aftereffect of affable was to abate even added the assimilation and assimilation of ^{59}Fe , but this abridgement was statistically cogent alone for blah starch. The black furnishings of starches on adamant assimilation and assimilation are absolutely accordant to beastly nutrition. In the developing countries, diets are about top in atom articles - generally accomplished atom cereals - and low in beastly products. The inhibitory furnishings of cereals on adamant assimilation accept been commonly attributed to the attendance of phytate and fiber, but the abstracts herein presented advance that top intakes of starches may be inhibitory as well.

Relationship between Iron and Copper

Iron and chestnut are delivered from the alarmist to all organs/tissues/cells of the body, area they are appropriate for cellular metabolism. Most adamant is delivered to the cartilage bottom for claret production. Interestingly, an alien aspect of cartilage bottom adamant appliance is chestnut dependent, for during chestnut deficiency, claret assembly is inefficient admitting accustomed serum adamant levels. The purpose of this analysis is to alarmingly analysis contempo abstracts on copper-iron interactions with a focus on all-embracing physique homeostasis of these metals.

The coaction amid adamant and chestnut homeostasis in the abdominal epithelium has afresh been declared at the atomic level. One such archetype is the multi-copper ferroxidases, HP and CP, which both play important roles in abdominal adamant transport. HP action is abased aloft accustomed chestnut levels, as exemplified by the actuality that decreased HP action has been accurate in the civil of copper-deficient mice, which correlates with systemic adamant deficiency. Additional studies accept apparent that chestnut absence reduces adamant assimilation in rats, via an apparatus anticipation to absorb decreased action of belly hephaestin. Furthermore, comfort of copper-deficient rats with comestible chestnut restores abdominal adamant assimilation and HP protein levels. These observations abutment beforehand studies which aswell accurate decreased adamant carriage in copper-deficient swine.

Relationship between Vitamin A and Iron

Anemia associated with vitamin A absence and added alarmist adamant has active vitamin A in the adjustment of adamant absolution from the liver. To abstraction this accord

further, groups of weanling rats were fed diets as follows: low iron/low vitamin A, low iron/high vitamin A, accustomed iron/normal vitamin A, top iron/low vitamin A and top iron/high vitamin A. After 6 weeks the animals were killed, and claret and alarmist samples were taken for analyses of hemoglobin, hematocrit, red claret corpuscle count, serum and alarmist vitamin A, serum and alarmist adamant and absolute iron-binding capacity. Low comestible iron, but not low vitamin A intake, afflicted hemoglobin, hematocrit and red claret corpuscle counts but not serum vitamin A levels. Beggary serum vitamin A levels were not decidedly lower in groups fed top comestible iron. Top comestible adamant was aswell associated with lower beggarly alarmist vitamin A levels; these differences were statistically cogent alone for the low vitamin A diet group. A top vitamin A assimilation was associated with a decidedly lower beggarly hepatic adamant akin for the top comestible adamant assimilation group. These abstracts abutment the antecedent that vitamin A is complex in the adjustment of adamant absolution from the liver.

Relationship between Vitamin B12 and Iron

Vitamin B12 and adamant are two actual altered nutrients, although they are interrelated. The animal needs both of them appropriately in adjustment to function, both physically and mentally. On the one hand, B12 is a water-soluble vitamin that is stored in the alarmist for several years. Adamant is basal for the carriage of oxygen through the blood; its accumulator is abundant lower, as is the bulk we absorb. In the all-inclusive majority of cases area adamant absence is detected, they could cause is claret loss, such as belly ulcers. Cobalamin is a capital comestible in the assembly of red cells. Thus, an absence of this vitamin can advance to adamant deficiency. Therefore, in the accident of anemia, vitamin B12 absence may be the cause, not adamant deficiency, about indirectly. This is why both nutrients are generally confused, although they are absolutely different. Folate, or vitamin B9, aswell plays an arch role in the accord amid adamant and vitamin B12. Folate binds to the eye beef if adamant absence occurs. However, just as with anemia, assimilation of folate by red claret beef can action anon afterwards a cobalamin deficiency, as it after-effects anon from adamant deficiency. Iron controls claret folate levels. Therefore, vitamin B12 and adamant are capital to advance able levels of vitamin B12 in the body.

Relationship between Folate and Iron

The third nutrient, folate, aswell shares an accord with vitamin B-12 and iron. Another B-complex vitamin, B-9, folate binds to red claret beef if there is an adamant deficiency. However, abundant like anemia, folate assimilation by red claret beef could aftereffect anon afterward a B-12 deficiency, accustomed that it anon after-effects in an adamant deficiency. The ultimate cessation from this analysis is that adamant manages claret folate levels. In this way, both adamant and vitamin B-12 are all-important for adapted folate management.

Relationship between Vitamin C and Iron

Food adamant is captivated by the abdominal film from two abstracted pools of hem and nonheme iron. Hem iron, acquired from claret and myoglobin, is able-bodied captivated and almost little afflicted by added foods eaten in the aforementioned meal. On the added hand, the assimilation of nonheme iron, the above comestible pool, is abundantly afflicted by meal composition. Ascorbic acerbic is an able

enhancer of nonheme adamant assimilation and can about-face the inhibiting aftereffect of such substances as tea and calcium/phosphate. Its access may be beneath arresting in commons of top adamant availability--those absolute meat, fish, or poultry. The accessory of adamant assimilation from vegetable commons is anon proportional to the abundance of ascorbic acerbic present. The assimilation of acrid asleep adamant added to a meal increases in alongside with the assimilation of nonheme iron, but ascorbic acerbic has a abundant abate aftereffect on baffling adamant compounds, such as adamant oxide or adamant hydroxide, which are accepted aliment contaminants. Ascorbic acerbic facilitates adamant assimilation by basic a chelate with adamant adamant at acerbic pH that charcoal acrid at the acrid pH of the duodenum. Top amount and alternation during aliment accumulator are the above obstacles to application ascorbic acerbic in programs advised to action comestible adamant absence anemia.

Relationship of Vitamin K and Iron

Your body's blood-clotting apparatus is a complicated alternation of reactions that absorb several proteins and the mineral calcium. Vitamin K helps to actuate an agitator that jump-starts this process. It aswell binds to proteins that accumulate it moving; after this vitamin, accustomed claret array would not occur. The alarmist produces the proteins and enzymes that bind to vitamin K, appropriately alarmist accident can aswell advance to amoral bleeding. Iron-deficiency anemia is the blazon that is affiliated to vitamin K. In this accepted condition, your physique does not accept abundant erythrocytes, red claret beef that accommodate hemoglobin, an iron-rich protein that carries oxygen. According to the American Society of Hematology, anemia is diagnosed with a claret analysis of beneath than 12 grams of claret per deciliter in women and 13.5 grams per deciliter in men. Iron-deficiency anemia is usually acquired by claret loss, poor diet or bare assimilation of iron. According to the National Institutes of Health, demography too abundant vitamin K may abatement the capability of your medication, but if you don't get abundant vitamin K, the furnishings of your claret thinner may be too powerful. If you are amiss in vitamin K and are demography blood-thinning medication, you may acquaintance bleeding. When you lose blood, you are at added accident of anemia, a action in which you accept bereft red claret beef to accommodate your body's needs. According to the Cleveland Clinic, affection such as fatigue and anemic derma can be indicators of anemia.

Relationship of Fat and Iron

The cytosolic adamant authoritative protein 1 (IRP1) exhibits aconites action if it is adamant loaded. Enterocyte aconites action may be a basis of IRP1 action and important in the adjustment of adamant metabolism and absorption. Because stearic acerbic (SA) can enhance adamant assimilation the accord amid assimilation and enterocyte aconites action in iron-deficient rats fed altered types and amounts of comestible fat was determined. Rats (8/group) were fed diets capricious in adamant (10 or 35 $\mu\text{g/g}$), fat blazon [SA, safflower oil, amber adulate (CB), or beef blubber (BT)] and fat bulk (7 or 15%). Rats dead for baseline ethics were iron-deficient with low enterocyte aconites activity. Assimilation was adjourned by ^{59}Fe retention. After 4 week, Δ Hb and aconites action were beneath ($p<0.001$) and adamant assimilation was greater ($p<0.001$) in rats fed low comestible adamant (10 $\mu\text{g/g}$) than in rats fed able comestible adamant (35 $\mu\text{g/g}$). Assimilation

was greater ($p<0.05$) in SA-, CB- and BT- than Saffron rats fed a low adamant diet. Enterocyte cytosolic and absolute cellular adamant were beneath ($p<0.001$) in rats fed low against able comestible iron. In rats fed able iron, absolute cellular adamant was abased ($p<0.01$, $r^2=0.59$) on alarmist and serum adamant concentrations. Low comestible adamant (10 $\mu\text{g/g}$) resulted in adamant deficiency, college absorption, and lower enterocyte aconites action and adamant assimilation than able comestible adamant (35 $\mu\text{g/g}$). This suggests that enterocyte aconites action may be a basis of IRP1 action and important in enterocyte cellular adamant metabolism and absorption.

Relationship of Iron and Magnesium

Both adamant and magnesium are advised capital minerals and are recommended for a counterbalanced diet. According to an abstraction appear in a 1994 affair of "Magnesium Research," adamant and magnesium about should be taken accompanying for best altruism and compliance.

In adjustment to aftermath red claret cells, the physique requires an assertive bulk of comestible iron. Hemoglobin and myoglobin are two of the capital proteins created by adamant that backpack and abundance oxygen in the body. Adamant supplements are generally taken by individuals who are adversity from anemia, an adamant absence that may be acquired by claret loss, poor diet, malabsorption, burns, bleeding problems, hemodialysis, abdominal disease, abdomen problems and added conditions. Although too little adamant is advised unhealthy, too abundant adamant can be baneful to the physique and can aftereffect in adamant poisoning. Magnesium is appropriate by every agency and cartilage in the body. In accession to activating digestive enzymes, magnesium regulates the levels of assertive minerals, including calcium, copper, zinc, potassium and vitamin D. Like iron, magnesium can be begin in abounding foods, although supplements can be taken to anticipate or amusement altitude such as beddy-bye disorders, nausea, vomiting, hyperventilation, insomnia, seizures, low claret pressure, aberrant affection rhythms and active leg syndrome. Iron and magnesium supplements should be taken at the aforementioned time for best effect. Since abounding foods accommodate quantities of both minerals, your digestive arrangement frequently digests them simultaneously. An accumulated supplement of adamant and magnesium is acclimated to amusement hyperphosphatemia in patients adversity from hemodialysis. When demography supplements, try to accumulate your assimilation to the 10 to 15 milligrams of adamant and 310 to 400 milligrams of magnesium recommended for a lot of adults. Do not absorb Iron, potassium and calcium supplements together.

Relationship of Calcium and Iron

Studies on animal capacity accept apparent that calcium (Ca) can arrest adamant (Fe) absorption, behindhand of whether it is accustomed as Ca salts or in dairy products. This has acquired affair as added Ca assimilation frequently is recommended for accouchement and women, the aforementioned populations that are at accident of Fe deficiency. However, an absolute analysis of studies on bodies in which Ca assimilation was essentially added for continued periods shows no changes in hematological measures or indicators of adamant status. Thus, the inhibitory aftereffect may be of abbreviate continuance and there aswell may be compensatory mechanisms. The alternation amid Ca and Fe may be a luminal event, affecting Fe uptake through

DMT1 (divalent metal agent 1) at the aciculate membrane. However, it is aswell accessible that inhibition occurs during Fe alteration into circulation, suggesting roles for the serosal exporter ferroportin (FPN) and hephaestin. We explored these possibilities in animal abdominal Caco-2 beef able in monolayers. Adamant carriage ((59)Fe) and announcement of DMT1, FPN, and hephaestin were adjourned afterwards 1.5 and 4 hours with 0 or 100 μ M CaCl₂ (2) Although Ca did not affect Fe uptake or DMT1 announcement at 1.5 hours, FPN affluence at the basolateral film decreased, consistent in added cellular Fe assimilation and decreased Fe efflux. Afterwards 4 hours, DMT1 and FPN announcement added and there was added FPN at the membrane, suggesting a backlash effect. Thus, the aftereffect of Ca on Fe assimilation may be of abbreviate continuance and adjustment may action with time. This may explain why studies on abiding Ca supplementation of altered groups abort to appearance any adverse furnishings on Fe status.

Relationships between Iron and Zinc

The responses of animals to assimilation of a trace aspect could alter if it is ingested with an individual analysis meal or due to abiding intake. The metabolic relationships amid zinc (Zn) and adamant (Fe) were adjourned in the adolescent beastly by comparing their digestive assimilation advised at the alpha of the abstraction with their tissue accumulator afterwards two months of getting fed on beginning diet. Diets supplied able intakes of Fe (45 and 300mg/kg diet) and Zn (14 and 45 mg/kg). A cogent aftereffect of Fe accumulation ($p < 0.0001$) but not of Zn was displayed on Fe absorption; both Fe and Zn diet concentrations afflicted Zn assimilation ($p < 0.01$, $p < 0.0001$).

Fe and Zn agency capacity decidedly activated with the bulk captivated during the metabolic antithesis ($p < 0.0001$). There was an absolute alternation amid liver, bone, and beef Fe and Fe assimilation (mg/ d) ($p < 0.0001$), and Fe assimilation and cartilage and beef Zn ($p < 0.04$) and a abrogating one with alarmist Zn ($p < 0.0001$); an absolute alternation was displayed amid Zn assimilation (mg/d) and Zn agency agreeable ($p < 0.0001$). There was no alternation amid Zn assimilation and Fe tissue agreeable ($p > 0.05$).

This abstraction suggests that interactions action at every footfall of Fe and Zn metabolism; Fe is added able in altering Zn accumulator than the reverse. The animal seems to be clumsy to abate the after-effects of an asymmetric diet and digestive absorption. Care have to be taken to accord the adolescent growing counterbalanced diets.

Relationships of Copper and Iron metabolism

Both chestnut and molybdenum access the centralized carriage and absolution of iron. There is affirmation that copper, as a basic of ceruloplasmin, increases the amount of blaze of adamant to adamant adamant for carriage by claret transferrin; and that molybdenum, as a basic of xanthine oxidase, participates in the abridgement of cellular adamant to adamant ferritin. A balance of either chestnut or molybdenum, by giving acceleration to a almost in dissociable Cu-Mo-S complex, may aftermath a arrears of the metal in bordering supply. As comestible balance of chestnut is accepted to be accepted in the United States, and basic abstracts advance that molybdenum assimilation may not be optimal, it is accessible that a conditioned arrears of molybdenum may accord to abnormalities of adamant metabolism and utilization.

Relationships of Iodine and Iron metabolism

Several minerals and trace elements are capital for accustomed thyroid hormone metabolism, e.g., iodine, iron, selenium, and zinc. Coexisting deficiencies of these elements can blemish thyroid function. Adamant absence impairs thyroid hormone amalgam by abbreviation action of hem abased thyroid peroxidase. Iron-deficiency anemia blunts and adamant supplementation improves the ability of iodine supplementation. Accumulated selenium and iodine absence leads to myxedematous cretinism. The accustomed thyroid gland retains top selenium concentrations even beneath altitude of bare selenium accumulation and expresses abounding of the accepted selenocysteine-containing proteins. Among these selenoproteins are the glutathione peroxidase, deiodinase, and thioredoxine reductase families of enzymes. Adequate selenium diet supports able thyroid hormone amalgam and metabolism and protects the thyroid gland from accident by boundless iodide exposure. In regions of accumulated astringent iodine and selenium deficiency, normalization of iodine accumulation is binding afore admission of selenium supplementation in adjustment to anticipate hypothyroidism. Selenium absence and abashed thyroid hormone abridgement may advance beneath altitude of appropriate comestible regimens such as abiding absolute parenteral nutrition, phenylketonuria diet, cystic fibrosis, or may be the aftereffect of imbalanced diet in children, aged people, or ailing patients.

Iron supplementation and Fortification

Several minerals and trace elements are capital for accustomed thyroid hormone metabolism, e.g., iodine, iron, selenium, and zinc. Coexisting deficiencies of these elements can blemish thyroid function. Adamant absence impairs thyroid hormone amalgam by abbreviation action of hem abased thyroid peroxidase. Iron-deficiency anemia blunts and adamant supplementation improves the ability of iodine supplementation. Accumulated selenium and iodine absence leads to myxedematous cretinism. The accustomed thyroid gland retains top selenium concentrations even beneath altitude of bare selenium accumulation and expresses abounding of the accepted selenocysteine-containing proteins. Among these selenoproteins are the glutathione peroxidase, deiodinase, and thioredoxine reductase families of enzymes. Adequate selenium diet supports able thyroid hormone amalgam and metabolism and protects the thyroid gland from accident by boundless iodide exposure. In regions of accumulated astringent iodine and selenium deficiency, normalization of iodine accumulation is binding afore admission of selenium supplementation in adjustment to anticipate hypothyroidism. Selenium absence and abashed thyroid hormone abridgement may advance beneath altitude of appropriate comestible regimens such as abiding absolute parenteral nutrition, phenylketonuria diet, cystic fibrosis, or may be the aftereffect of imbalanced diet in children, aged people, or ailing patients.

1. Iron supplementation (i.e. giving adamant tablets to assertive ambition groups such as abundant women and preschool children);
2. Iron barricade of assertive foods, such as flour; and
3. Food and diet education on convalescent the bulk of adamant captivated from the diet by accretion the assimilation of adamant and abnormally by convalescent the bioavailability of the comestible iron. Several factors

actuate the achievability and capability of altered strategies, such as the bloom basement of a society, the economy, and admission to acceptable methods of adamant fortification. The solutions are accordingly generally absolutely altered in developing and developed countries. There is a charge to access new ability about the achievability of altered methods to advance adamant diet and to administer present ability in added able ways. Further to this, admission of bounded activities on the affair of adamant diet should be angry while accomplishments from governments are awaited.

Conclusion

This has been an abrupt overview of adamant and its captivation in metabolic processes. Since iron deficiency afterwards anemia is added accustomed than adamant absence with anemia, TMA may serve as a advantageous apparatus in evaluating alone adamant status. As with added important trace elements, iron assessment should be evaluated in affiliation with its comestible co-factors, either synergists or antagonists. We begin absolute alternation amid levels of adamant with added nutrients. Adamant absence anemia in India is a above bloom botheration apparent in backward boyish and boyish changeable population. Comprehensive action strategies are capital to action the problems of adamant absence anemia a part of boyish girls such as in commutual concrete growth, poor cerebral development, bargain concrete fitness, and plan achievement and lower absorption on circadian tasks. There was statistically cogent changes empiric afterwards the action amid ascendancy and beginning accumulation in alteration the ethics of adamant and added nutrients.

References

1. David L. Watts, Ph.D., F.A.C.E.P. the nutritional relationship of iron. *Journal of Orthomolecular Medicine*. 1988; 3(3):204-222.
2. Vitale, JJ, Broitman SA. Eds. John Wright, Inc. Boston, Impact of nutrition on immune function. *Advances in Human Clinical Nutrition*. 1982; 3(6):805-812.
3. Tucker DM, Sandstead HH, Pendland JE, Dawson LL, Milne DB. Iron status and brain function: serum ferritin levels associated with asymmetries of cortical electrophysiology and cognitive performance. *American journal of Clinical Nutrition*. 1984; 22(3):204-207.
4. Bozorgmehr B, Gahemi M. International Symposium on Clinical Nutrition and postgraduate course. *American journal of clinical nutrition*. 1987; 46(24):127-156.
5. Alwin M, Pappenheimer Jr. "Iron" Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. 2012; 257-288.
6. Reilly C. "Iron" The Nutritional Trace Metals. Oxford, UK & Ames, Iowa: Blackwell Publishing. 2004; 5(8):35-81.
7. Andrews S, Norton I, Salunkhe A, Goodluck H, Aly WS, Mourad-Agha H, Cornelis P. Control of Iron Metabolism in Bacteria". *Journal of Metal Ions in Life Sciences*. 2013
8. <https://www.livestrong.com/article/549611-can-i-take-iron-magnesium-at-the-same-time/healthy-eating.sfgate.com/iron-potassium-6003>.
9. Brock JH, Halliday JW, Powell LW. Iron metabolism in health and disease. London, WB Saunders. 1994

10. Kühn LC. Control of cellular iron transport and storage at the molecular level. Iron nutrition in health and disease. 1996, 17-29.
11. Mascotti DP, Rup D, Thach RE. Regulation of iron metabolism: translational effects mediated by iron, heme and cytokines. *Annual Review of Nutrition*, 1995; 15:239-261.
12. Green, R. et al. Body iron excretion in man. A collaborative study. *American Journal of Medicine*. 1968; 45:336-353.
13. Requirements of vitamin A, iron, folate and vitamin B12. Report of a Joint FAO/WHO Expert Consultation. Rome, Food and Agriculture Organization of the United Nations, 1988