

Iron—the Goldilocks mineral (part two of two)



How to detect iron deficiency? The simplest test is the CBC (complete blood count), which can determine whether you have adequate red blood cells, which are dependent on iron. The test also includes information on the size of the red blood cells (MCV, or mean corpuscular volume). In iron deficiency, the MCV is low (as distinguished from B12 deficiency anemia where the MCV is high).

But merely because the CBC indicates anemia, that doesn't conclusively pinpoint iron deficiency. There are many reasons for anemia, and it takes a medically trained professional to order and interpret additional tests, sometimes even requiring a bone biopsy. Too many people reach for iron supplements when told they have low blood counts, which may have other causes. If not needed they might be detrimental.

Conversely, a normal CBC doesn't guarantee you have adequate iron. Iron deficiency has to be pretty severe and long-standing to affect your hemoglobin and hematocrit. More discriminating tests, like iron levels, total iron binding capacity (TIBC) and ferritin can pinpoint more subtle iron deficits.

But even those tests can be misleading: inflammation can spuriously raise ferritin,

offering false reassurance of iron adequacy, especially in conditions like rheumatoid arthritis and ulcerative colitis; alternatively, iron levels may dip in severe infections even when iron stores are optimal.

PATIENT VIGNETTE: I recently saw a young man in his 30s who was a body builder. He had a full time job as a fund manager and had recently partnered in a gym startup. He wasn't getting much sleep, but was concerned that he didn't have as much pep as usual. He wondered if perhaps he needed some vitamins.

At first I suspected that he was suffering from simple burnout, but nonetheless I ordered a full panel of blood tests. To my surprise, his CBC indicated a low red blood cell count, and his MCV was low. Consistent with that, his iron and ferritin were also low, perhaps not too surprising had he been a staunch vegan young woman, but he didn't fit the typical profile: he was an inveterate meat eater and could have been a body double for Jason Momoa!

Seeing this through a purely nutrition lens, I could've simply prescribed iron pills and waited the 3 or 4 months that it would take to replete my patient's iron stores. But my conventional medicine alarm bells went off and I remembered the dictum: "Unexplained iron deficiency always requires a GI workup!". Sometimes it's as simple as bleeding hemorrhoids or chronic gastritis; worse possibilities include ulcerative colitis, Crohn's or even stomach or colon cancer. I arranged for him to see a gastroenterologist.

Imagine my surprise when the patient reported that a colonoscopy had revealed a rectal cancer. Fortunately, it was caught early enough that the patient will likely respond to treatment.

So what's the best way to treat iron deficiency when it's properly diagnosed? Iron pills are a logical recourse, but they can be problematic. Many over-the-counter and prescription forms, like ferrous sulfate, cause constipation; besides they can inflame the intestine and feed harmful intestinal bacteria (sequestering iron is the immune system's natural way of "starving" harmful bugs).

MY STORY: When I broke my hip in a bike accident in 2006 (an episode many of you veteran readers and listeners recall!) I was left profoundly anemic due to blood loss from the crash and the subsequent surgery. My surgeon even considered transfusing me, but preferred not to take the risk of a bad donor. When I was released from the hospital, my blood count was less than half normal for an adult male.

I felt weak as a kitten. When I stood up on crutches my head swam. My complexion was pale and washed out. My mood took a steep decline. I obtained a crash course in empathy.

I was given iron pills along with my painkillers. But try sitting on a toilet seat with an excruciatingly painful broken hip while trying to overcome the dual constipating effects of the iron pills and the Percocet! I resolved to ditch the iron pills and wean off the pain pills as quickly as possible and replete my iron the natural way—with food.

The word went out to family members to bring me takeout consisting of iron-rich foods: lamb kebabs, hamburger, steak, even liver. I dutifully ate a heme-rich diet for four months, the time it takes the body to manufacture a whole new set of red blood cells if there are enough raw materials for the hematological assembly line.

Two months in, I got a blood test, and I was half way to normal; a blood test called

a reticulocyte count informed me that my bone marrow was fully utilizing all that iron to crank out new young blood cells (in certain diseases, the body can't properly incorporate iron to overcome anemia). After four months, my blood counts had been fully restored to their previous levels.

On the other hand, the solution to a *high* ferritin is straightforward: **Giving blood**. Additionally, **specific genetic tests** can determine the risk for iron overload.

When it comes to iron supplements, there are several options. Ferrous sulfate, the most common one, is a potent source of iron, but it's also harshest on the GI tract, and is most likely to cause constipation.

Others are gentler, but contain less iron per dose. When taking iron supplements it's important to distinguish between their total weight (e.g. 325 milligrams for Feosol® ferrous sulfate) versus their content of *elemental* iron (65 milligrams).

The gentler ones are "chelated", including ferrous fumarate, ferrous gluconate, ferrous succinylate, and ferrous bisglycinate. They may deliver less elemental iron, but according to studies, it's more bioavailable. For example, ferrous bisglycinate with 25 milligrams of elemental iron was found to be **as effective as harsher ferrous sulfate** delivering 50 milligrams of elemental iron for prevention of anemia of pregnancy.

INTERESTING SIDELIGHT: Ferrous is from the Latin word for iron, *ferrum*; in French, a railway is a *chemin de fer*—literally, a "path of iron"!

Iron is best taken on an empty stomach; taking it with food may help reduce stomach discomfort but reduces absorption by as much as 40-65%. It should be taken away from calcium supplements which interfere with its uptake, but vitamin C enhances its absorption. But there's some concern that in the presence of iron, vitamin C switches from an antioxidant to a pro-oxidant, potentiating GI inflammation. High intake of black tea interferes with iron bioavailability.

Oh, and vegetarian iron tonics like Floradix®? Fuggedaboutit! Their iron content is too trivial to make a dent against all but the mildest iron deficiencies.

Turns out, Goldilocks was correct; when it comes to iron, you want yours to be neither too high, nor too low, but *just right*!