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Iron Panel Explained

Blog Categories:
HH Information Science

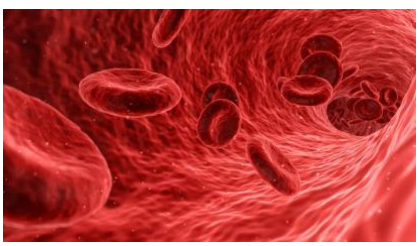
Do you know the difference between SF, TIBC, UIBC, TSAT? Most people, unsurprisingly, don't fully understand.

Background

Hereditary Hemochromatosis (HH) is the most common genetic disease so far identified, with around 1 in 200 people severely affected.

In largely Celtic Communities (e.g. Ireland) this figure is reportedly as high as 1 in 83 people.

Most people with Hemochromatosis have mutations in the HFE gene, discovered in 1996, although there are four categories of Hemochromatosis. (See our download on this.)



Transferrin

Transferrin is the protein in the liquid part of your blood that carries iron from place to place in your body. Each molecule can carry 2 molecules of iron.

Analogy - think of transferrin as a fleet of trucks that carry iron around the highways of your bloodstream. (We 'borrowed' this analogy from a post that we saw some time ago, as we think it gets the message across really well.)

Total Iron Binding Capacity (TIBC) is a measure of how much transferrin is in your blood, or, is how many trucks are in your fleet.

Unsaturated Iron Binding Capacity (UIBC) is a measure of how much transferrin is available (unbound), this is how many of your trucks are empty, and available to pick up iron.

Transferrin Saturation (TSAT) is the percentage of transferrin that is carrying iron, i.e. what % of your trucks are full. Normally TSAT should be under 45%. In someone with HH who is loading iron, this can go substantially over 45%. In a C282Y homozygote (someone who has two identical gene mutations), TSAT over 45% confirms iron loading is taking place and treatment (Phlebotomy / Therapeutic Venesection) should begin.

Ferritin

Ferritin is a protein produced in some parts of the body that is used to store iron. Without ferritin, iron would be stored as free iron ions in the form of ferrous oxide, which is harmful to body tissues. The body produces ferritin to protects the body by storing up to 80 molecules of iron in each molecule of ferritin. Higher ferritin levels can be indicative of high amounts of stored iron - as well as some other conditions.

For example, bacteria often require a source of iron in order to multiply and grow, so when the body detects an infection it may decrease the free iron available to cells, including the invading bacteria, by moving iron into ferritin, raising its level.

As a result, high ferritin by itself does not indicate iron loading from HH; high TSAT % does, and high TSAT % plus high ferritin (>150) in someone with C282Y homozygote, indicates that iron reduction via phlebotomy should likely be started.

The calculation for TSAT % is:

$$\frac{(TIBC-UIBC)}{TIBC}$$

For example, if TIBC=266, and UIBC=17, then TSAT%:

$$\frac{(266-17)}{266}$$

$$= \frac{249}{266}$$

$$= 94\%$$

In order to reduce saturation, the iron overload - the excessive amount of stored iron - has to be reduced first. In most people, lowering the ferritin to about 50 or so will accomplish this, especially in those who had high/very high ferritin levels. Phlebotomies should continue until both ferritin and TSAT% are under 50 (opinions can vary on this number). You can then be considered to be in 'maintenance'.