Iron is a chemical element with symbol Fe (from Latin: ferrum) and atomic number 26. It is a metal in the first transition series.

Fe2+ refers to the ferrous ion, which is a positively charged ion of iron with a 2+ charge. I

It is by mass the most common element on Earth, forming much of Earth's outer and inner core. It is the fourth most common element in the Earth's crust. Its abundance in rocky planets like Earth is due to its abundant production by fusion in high-mass stars, where the production of nickel-56 (which decays to the most common isotope of iron) is the last nuclear fusion reaction that is exothermic. Consequently, radioactive nickel is the last element to be produced before the violent collapse of a supernova scatters precursor radionuclide of iron into space.

Iron Regulation

Iron regulation refers to the complex system in the body that maintains the balance of iron, an essential mineral, to ensure that it is available for vital physiological functions while preventing excess or deficiency. Proper iron regulation is crucial because iron is required for various processes in the body, including oxygen transport, energy production, and DNA synthesis.

Here are the key aspects of iron regulation:

Dietary Iron Absorption: Iron is primarily obtained from the diet through the consumption of iron-rich foods such as meat, fish, poultry, and fortified cereals. The body has mechanisms to regulate the absorption of dietary iron in the small intestine. This regulation is influenced by factors like the body's iron stores and the presence of dietary enhancers (e.g., vitamin C) and inhibitors (e.g., calcium, tea) of iron absorption.

Iron Transport: Once absorbed in the small intestine, dietary iron is transported in the bloodstream bound to a protein called transferrin. Transferrin carries iron to various tissues and cells in the body, including the bone marrow (where red blood cells are produced) and the liver (where excess iron is stored).

Storage and Release: The liver is the primary organ for storing excess iron in the form of ferritin. When the body needs iron, such as during periods of increased demand (e.g., growth, pregnancy) or when there is blood loss (e.g., menstruation, injury), it releases stored iron into the bloodstream.

Hepcidin Regulation: As mentioned earlier, hepcidin is a hormone produced by the liver in response to various signals, including iron levels and inflammation. Hepcidin helps regulate iron balance by controlling the release of iron from storage and the absorption of dietary iron in the small intestine. When hepcidin levels are high, iron absorption and release are reduced, and when hepcidin levels are low, iron absorption and release are increased.

1/3

Iron Recycling: Iron is also recycled within the body through a process known as erythropoiesis. Old red blood cells are broken down in the spleen, and the iron released from them is reused to make new red blood cells in the bone marrow.

Iron Disorders: Imbalances in iron regulation can lead to various iron-related disorders. For example, iron overload conditions like hereditary hemochromatosis can result from excessive iron absorption, while iron-deficiency anemia occurs when the body doesn't have enough iron for essential functions.

Overall, iron regulation is a tightly controlled process that involves the absorption, transport, storage, and release of iron to meet the body's physiological needs. Proper regulation ensures that the body has the right amount of iron available for essential functions while preventing the harmful effects of iron deficiency or excess.

Iron metabolism

Iron metabolism

Iron deficiency

see Iron deficiency.

Brain Iron

see Brain Iron

Among preterm neonates with Posthemorrhagic hydrocephalus following severe IVH, elevated CSF hemoglobin, ferritin, and iron were associated with more severe early ventricular enlargement (FOHR > 0.6 vs \leq 0.6 at first ventricular tap)¹⁾.

Cerebrospinal fluid iron

Cerebrospinal fluid iron

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Mahaney KB, Buddhala C, Paturu M, Morales DM, Smyser CD, Limbrick DD, Gummidipundi SE, Han SS, Strahle JM. Elevated cerebrospinal fluid iron and ferritin associated with early severe ventriculomegaly in preterm posthemorrhagic hydrocephalus. J Neurosurg Pediatr. 2022 May 27;30(2):169-176. doi: 10.3171/2022.4.PEDS21463. PMID: 35916101.

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3/3