Bilirubin Encyclopedia Article

Bilirubin

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Bilirubin

Bilirubin is the waste product that results from the breakdown of **hemoglobin** molecules in red **blood** cells. It is excreted from the body via the bile ducts of the **liver**, typically as the main component of **bile**.

Bilirubin is an end product of the **metabolism** of the heme component of red blood cells. In our bodies, bilirubin serves an important purpose. It is one of the most powerful anti-oxidants produced by the body (**vitamins** E and C are other examples of anti-oxidants). An anti-oxidant functions, as the name implies, to prevent the chemical process of oxidation, which can be destructive to the functioning of cells, tissues and **organs**. In normal quantities, bilirubin aids the body. But, when it accumulates, bilirubin poses problems.

Accumulation of bilirubin can occur in several ways. A liver malfunction can result in the impaired or blocked excretion of bilirubin. Secondly, the compound can be over-produced. Lastly, the normal binding of bilirubin to another molecule in body fluids, albumin, may be impaired, allowing more of the unbound form of bilirubin to be present. It is this unbound form that is problematic.

The build-up of bilirubin in the fatty tissues of the skin turns the tissues yellow. This condition is known as jaundice. Excessive accumulation of bilirubin in newborns may be serious if untreated, causing permanent **brain** damage. In this condition, kernicterus, a decrease in pH causes bilirubin to come out of solution and accumulate in solid form in the brain. The brain malfunction can lead to a characteristic form of crippling called athetoid cerebral palsy. To prevent these catastrophes, bilirubin levels are monitored in newborns. Excessive levels can be treated in two ways. A newborn can be exposed to a "bilirubin light", which emits light of a certain wavelength in order to slightly alter the three-dimensional shape of the bilirubin molecule so that it is able to dissolve back into solution again. The dissolved bilirubin is then able to be excreted form the body more readily. Another treatment procedure called exchange transfusion washes out excess bilirubin by a series of **transfusions**. In each transfusion a small amount of the baby's blood is removed and replaced with an equal volume of adult donor blood (not the mother's, to avoid antigenic reaction) that is the same type as the mother's blood.