Plasma and Plasma Clearance Encyclopedia Article

Plasma and Plasma Clearance

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Plasma and Plasma Clearance

Blood consists of blood cells, **platelets**, and other particles suspended in a clear, pale-red liquid called plasma. Plasma, which makes up 50%-60% of blood by volume, is a complex solution of water (90%), proteins (%-9%%), inorganic salts (0.9%), urea, **uric acid**, creatinine, ammonia salts, **amino acids**, sugar, **fat**, **hormones**, and many other substances.

As blood passes through the **capillaries**, some plasma leaks out through the capillary walls. This fluid bathes the cells of the surrounding tissues and is called **tissue** fluid. If tissue fluid accumulates, the tissues swell, causing **edema**; normally, however, it is drawn off by the venules (small **veins** exiting the capillary bed) and by the vessels of the lymphatic system. Once in the lymphatic system, the fluid is called lymph. Lymph is eventually returned to the bloodstream, helping balance plasma loss from the capillaries.

Many proteins are dissolved in plasma, including fibrinogen, albumin, and the globulins. These proteins are formed mostly in the **liver** and perform a wide variety of functions. They aid in the transport of iron, copper, **lipids**, hormones, **bilirubin**, fatty acids, drugs, and other substances; function as antibodies, clotting factors, and **enzymes**; correct the **acid-base balance** of the plasma; form a protein reserve that the body can access during starvation; and by their mere presence create inward-acting osmotic pressure that restrains plasma from leaking out of the capillaries too quickly.

The rate at which drugs are removed or cleared from plasma is important in medicine because it affects how long drugs remain active in the body. The volume of plasma that is completely cleared of a substance in a given time is called the plasma clearance of that substance. For example, if 130 milliliters (ml) per minute of plasma are being completely cleared of a given drug by an individual's **kidneys** every minute, then the plasma clearance of that drug, for that individual at that time, is 130 ml/min. When a substance is being cleared from the plasma by more than one process--metabolism and urinary excretion, for example--the calculation of plasma clearance is more complex.