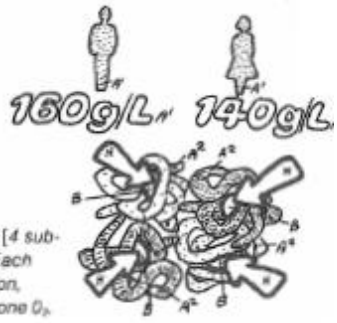
RED BLOOD CELL (ERYTHROCYTE)

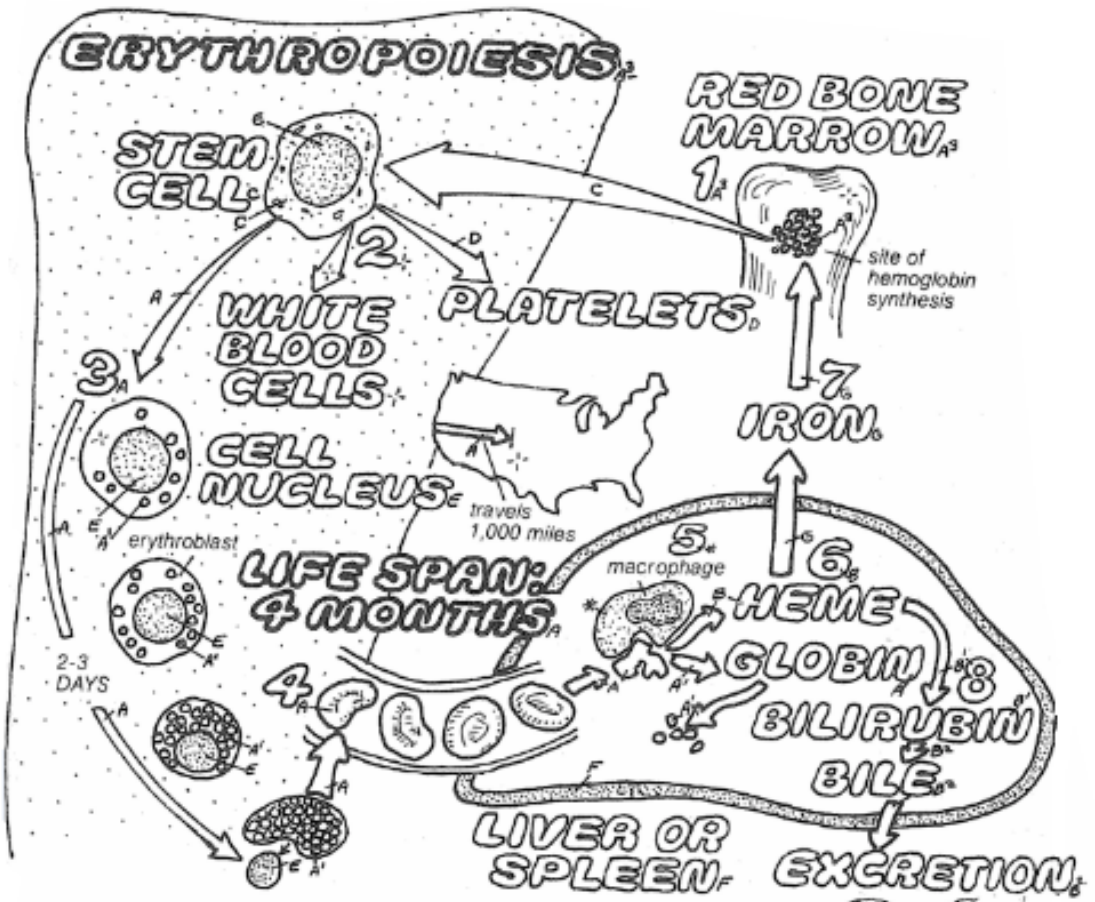
Red blood cells (RBCs) have no organelles; instead they are packed with hemoglobin (Hb), which carries oxygen. The biconcave disc shape of RBCs allows for rapid diffusion of oxygen. This shape changes as RBCs squeeze through the narrow capillaries.

HEMOGLOBIN

4 PEPTIDE CHAINS
4 HEMES



Hemoglobin (Hb) has a protein part, globin: [4 subunits (2 alpha chains and 2 beta chains)]. Each subunit has a heme. Each heme has one iron, which in the ferrous state (Fe^{+2}) binds with one O_2.



Formation of erythrocytes (erythropoiesis) in adults occurs in red bone marrow (1). Blood cells forming stem cells (2) divide, forming progenitors of red cells (erythroblasts), which possess nuclei (3). Within 2-3 days, these cells fill up with Hb, lose their nuclei, and enter circulation (4). After 4 months, old RBCs are destroyed by macrophages in liver and spleen (5). Hb is catabolized. Iron is released from heme (6) and reutilized for heme and Hb synthesis in bone marrow (7) while the remainder of heme is metabolized to bilirubin (8) and excreted via bile or kidney.