

## Abstract

Hematopoiesis is a process by which blood cells are generated. All vertebrates have two phases of hematopoiesis – primitive and definitive. The main purpose of primitive hematopoiesis is the production of red blood cells, which provide oxygenation to the developing embryo. Other blood cell lineages are established by definitive hematopoiesis. The main function of erythrocytes is oxygen transport to all tissues. When erythrocyte production is decreased or they are damaged due to the membrane, enzyme or hemoglobin impairment, the condition called anemia arises. Sickle cell disease and  $\beta$ -thalassemia are called hemoglobinopathies as they are caused by the damaged hemoglobin. Fanconi anemia is caused by mutations in one of 21 genes of Fanconi anemia pathway, which plays an essential role in DNA repair. Diamond Blackfan anemia is caused by mutations gene for ribosomal proteins. Human cells, *Mus musculus*, *Gallus gallus*, *Xenopus laevis* and *Danio rerio* seem to be good models for study of this diseases and they are also useful for achieving therapeutical goals.