



HEMATOPOIETIC & LYMPHATIC SYSTEM

-HAYAT BATCH-

SUBJECT : Biochemistry

LEC NO. : 2

DONE BY : Esra'a Khaled

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Pentose phosphate pathway

(Hexose Monophosphate Shunt or HMP-shunt)

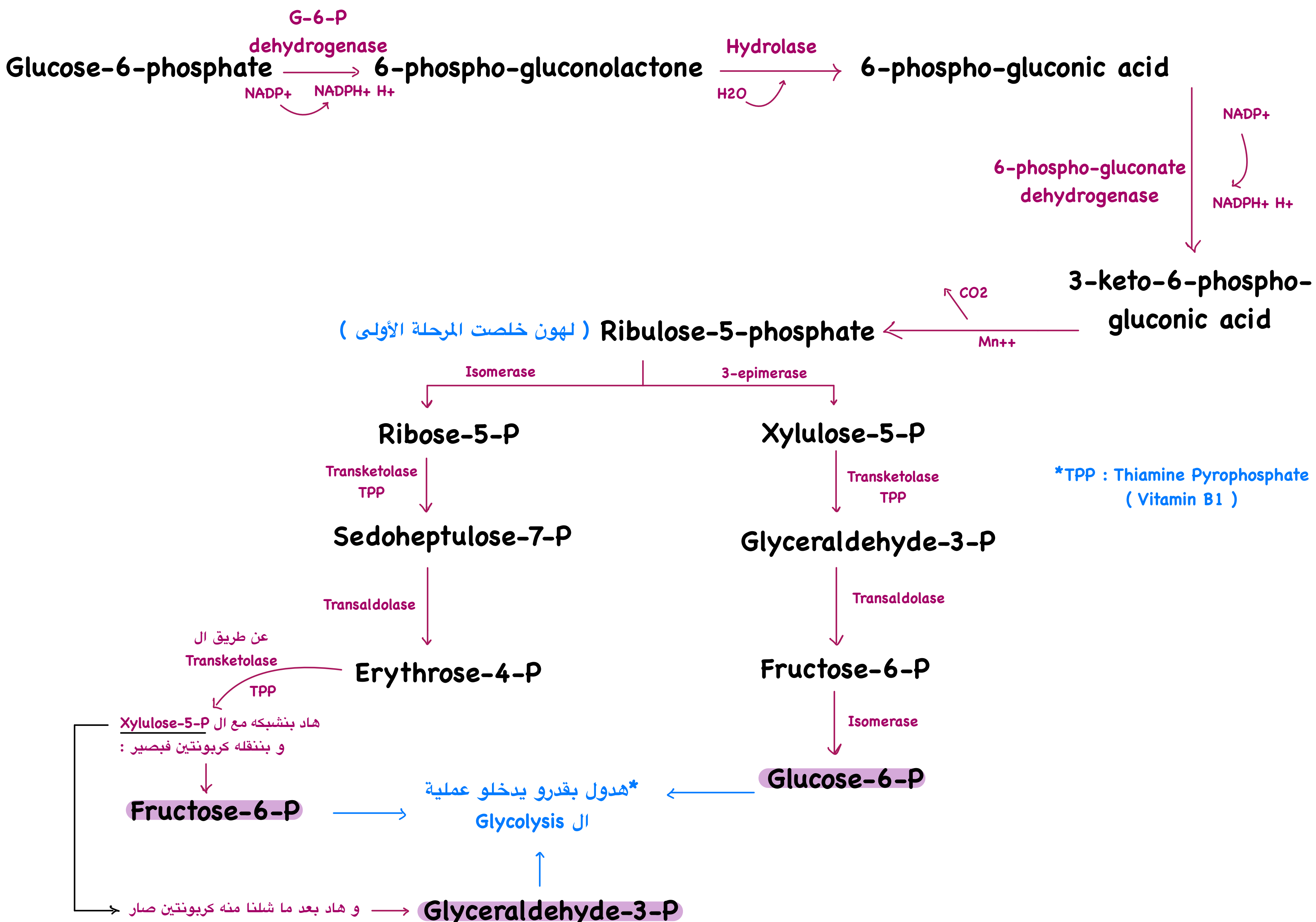
*The pentose phosphate pathway is divided into :

Irreversible redox stage ,
which yields both NADPH and
pentose phosphates

Reversible interconversion
stage , in which excess pentose
phosphates are converted into
glycolytic intermediates

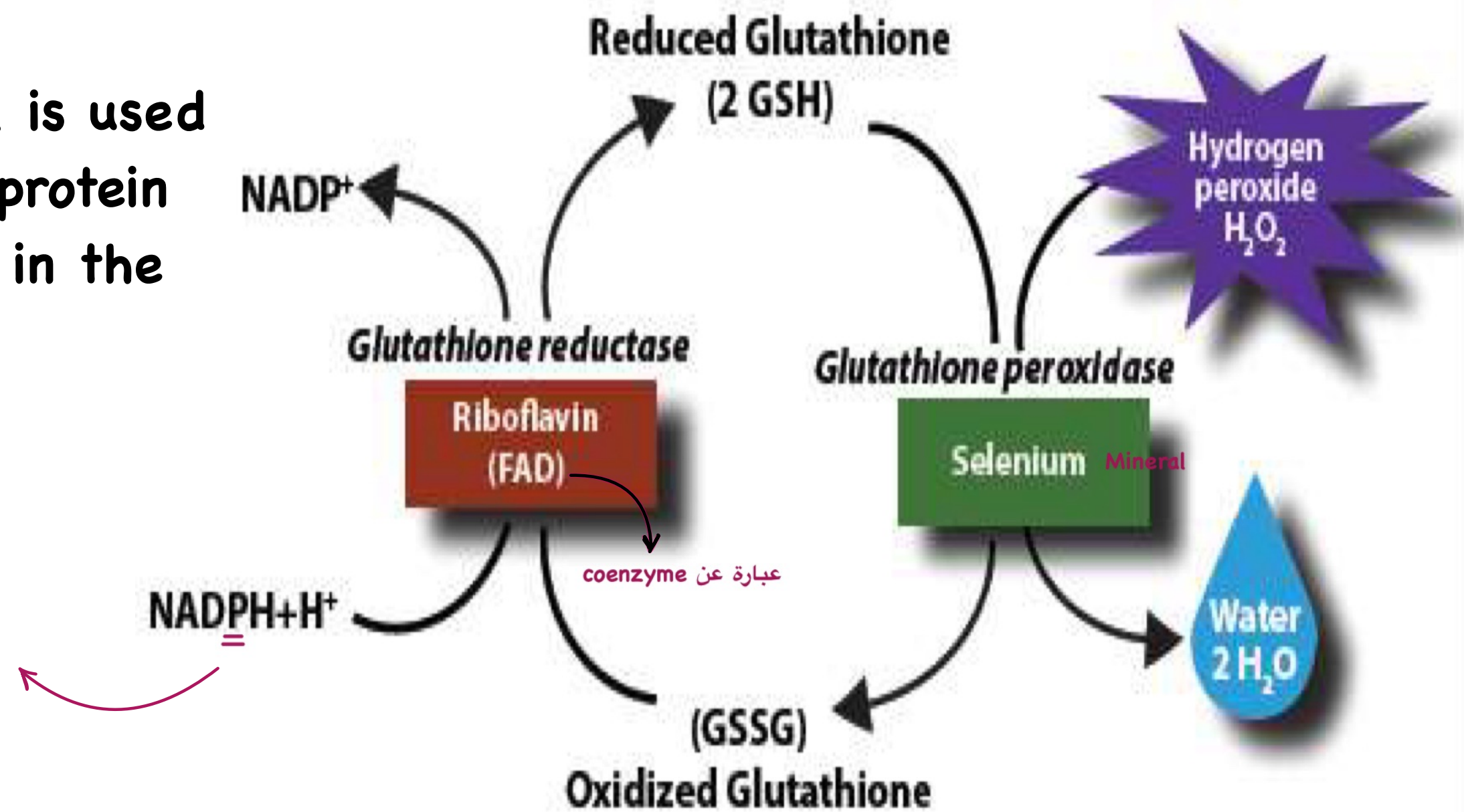
Both stages are important in the RBC, since it needs NADPH for reduction of glutathione, but has limited need for de novo synthesis of nucleotides.

HMP shunt



- The major role of HMP in red cells, is the production of NADPH, which protect these cells from oxidative damage by providing reduced glutathione for removal of H_2O_2 .

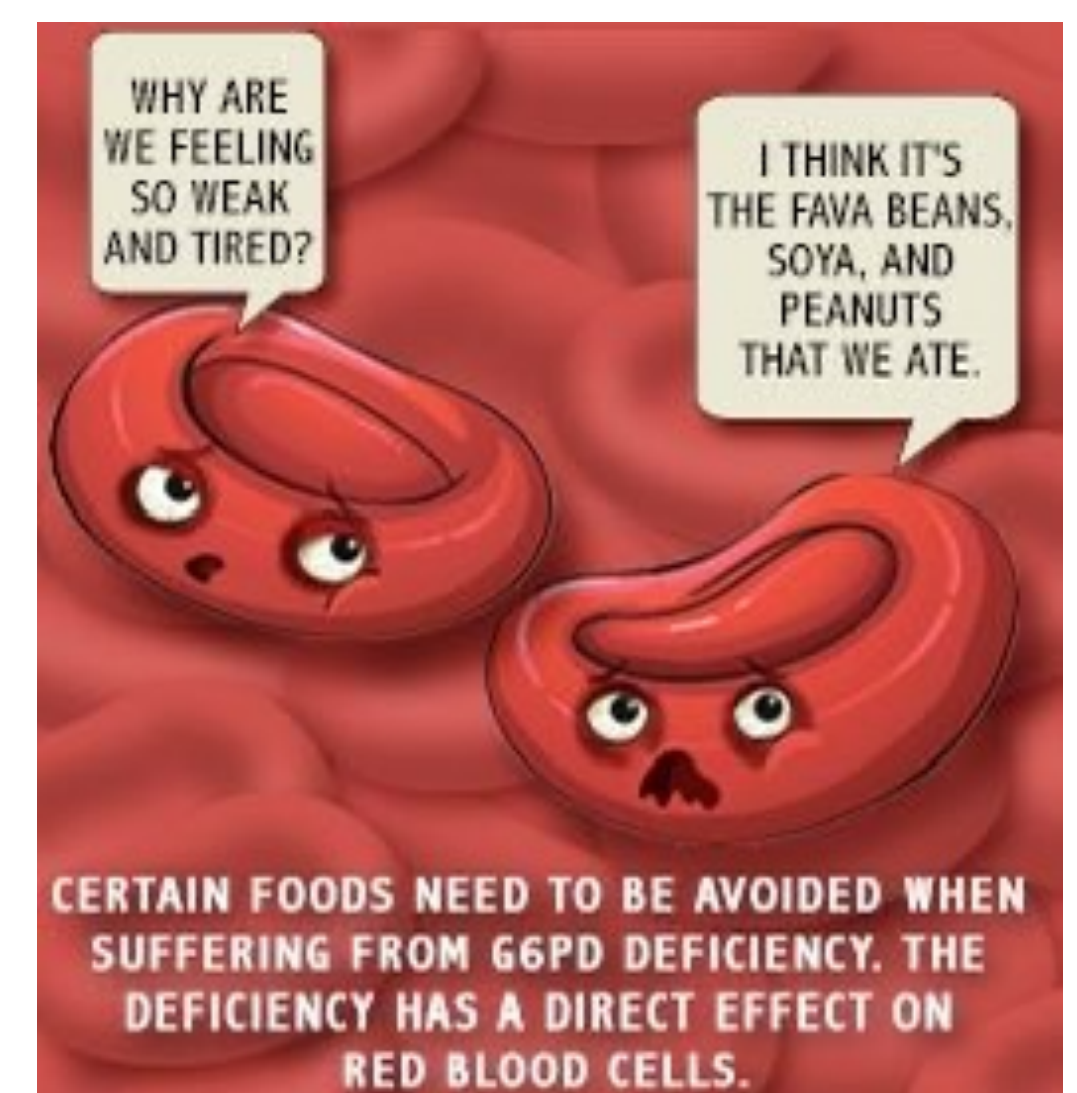
Most of the NADPH formed in the red cell is used by glutathione reductase which is a flavoprotein enzyme (contains FAD) to maintain GSH in the reduced state



Favism

*Favism is an X-linked recessive disorder , involving a deficiency in glucose-6- phosphate dehydrogenase (G6PD) , an enzyme that is essential for the survival of red blood cells .

This enzyme deficiency lead to decreased concentration of NADPH , so the RBCs capacity to protect themselves from oxidative damage is decreased



- Administration of certain drugs (premaquine, aspirin or sulfonamides), which stimulate the production of H_2O_2 or eating fava beans (contain oxidizing agents as divicine and isouramil) produce lysis of the fragile red cells.
- Treatment** : Avoid fava beans & oxidizing drugs. Blood transfusion is done after crisis.