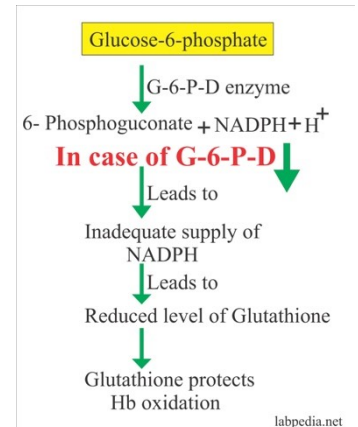




Clinical Pharmacology & Toxicology Pearl of the Week

~Drug-induced Hemolysis in G6PD Deficiency~

- ✓ Glucose-6-Phosphate Dehydrogenase is an enzyme in the Pentose Phosphate Pathway and is critically important to red blood cells.
- ✓ G6PD is involved in regeneration of NADPH, which is necessary for the recycling of glutathione. Glutathione is essential as it protects red blood cells from oxidative stress.
- ✓ G6PD deficiency is due to a recessive, X-linked genetic defect that leads to the absence of G6PD, and therefore a reduced amount of glutathione, putting RBCs at risk of oxidative damage, which leads to RBC hemolysis.
- ✓ While this disease most often affects males due to X-linked carriage, it can also affect females in the setting of either having two X chromosomes with the genetic defect or in X-inactivation, where one of the two X chromosomes is inactivated and the genes from only one X-chromosome are expressed.
- ✓ There is a high disease prevalence in people of African heritage and in tropical and subtropical zones of the Eastern hemisphere where malaria was once endemic.
- ✓ Triggers include stress, infection, foods (fava beans) and drugs. Drugs are particularly dangerous as they have the ability to impose oxidative stress on RBCs, most often via reactive nitrogen or sulfate groups.
- ✓ Hemolytic crises are characterized by acute anemia, elevated unconjugated bilirubin (manifesting as jaundice), dark urine, low haptoglobin levels, Bite cells & Heinz bodies on peripheral smear.
- ✓ Testing for G6PD-deficiency should occur in patients prior to initiation of drugs known to cause significant hemolysis in these patients →




The drug to **absolutely** avoid include the following:

Partial list of medicines and other substances thought to be unsafe or safe in individuals with G6PD deficiency

Medicines and other substances likely to be UNSAFE in moderate to severe G6PD deficiency* [1-3]
Medications
Chlorpropamide
Dabrafenib
Dapsone (diaminodiphenyl sulfone)
Methylene blue (methylthionium chloride) [¶]
Nitrofurantoin, nifuratel [•] and nitrofurazone (nitrofur) ^Δ
Phenazopyridine (pyridium)
Primaquine
Rasburicase and pegloticase
Chemical exposures and foods
Fava beans
Henna compounds (black and red Egyptian)
Naphthalene (mothballs, lavatory deodorant)
Phenylhydrazine
"RUSH" (isobutyl nitrate, amyl nitrate)

(Adapted from UptoDate: "Diagnosis and management of glucose-6-phosphate dehydrogenase (G6PD) deficiency" 2019)

 The Calgary Clinical Pharmacology physician consultation service is available Mon-Fri, 9am-5pm. The on-call physician is listed in ROCA. Click [HERE](#) for clinical issues the CP service can assist with.

 The Poison and Drug Information Service ([PADIS](#)) is available 24/7 for questions related to poisonings. Please call 1-800-332-1414, and select option 1.