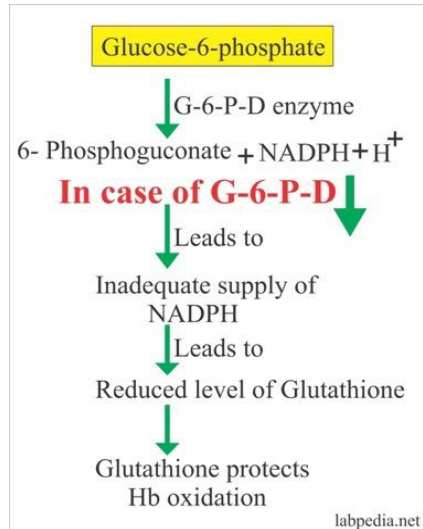




Clinical Pharmacology & Toxicology Pearl of the Week

~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 can 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.

The drugs to **absolutely** avoid include the following (from Dynamed, 2025):

Table 3: Other Drugs With Risk of Hemolytic Anemia in Patients With G6PD Deficiency

Drug Class	Predictable Association
Antimalarial	Pamaquine
Sulfonamides	<ul style="list-style-type: none">• Sulfanilamide• Sulfacetamide• Sulfapyridine*• Sulfamethoxazole
Antipyretic or analgesic	Acetanilide*
Other drugs	<ul style="list-style-type: none">• Ciprofloxacin• Moxifloxacin• Nalidixic acid• Niridazole*• Norfloxacin• Ofloxacin
Other chemicals	<ul style="list-style-type: none">• Naphthalene• 2,4,6-trinitrotoluene

Abbreviations: NA, not applicable; PABA, p-aminobenzoic acid.

* Other medications that should be avoided but are no longer used clinically.

The Clinical Pharmacology (CP) physician consultation service is available Mon-Fri, 8am-5pm. The on-call physician is listed in ROCA on the AHS Insite page. CP consultations are also available through Netcare e-referral and Specialist Link. You can also find us in the [Alberta Referral Directory](#) (ARD) by searching "Pharmacology" from the ARD home page. Click [HERE](#) for more details about the service.

The Poison and Drug Information Service (PADIS) is available 24/7 for questions related to poisonings. Please call 1-800-332-1414 (AB and NWT) or 1-866-454-1212 (SK). Information about our outpatient Medical Toxicology Clinic can be found in [Alberta Referral Directory](#) (ARD) by searching "Toxicology" from the ARD home page. More CPT Pearls of the Week can be found [HERE](#).

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