Acquired methemoglobinemia and methemoglobinemia due to deficiency of *CYB5R3* are more common than the M hemoglobins. *CYB5R3* is required for the reduction of methemoglobin by NADH. Affected individuals with "toxic" methemoglobinemia can be cyanotic and symptomatic. As in carboxyhemoglobinemia, $O_2$ transport is reduced and reflected by the left-shift in the hemoglobin-$O_2$ binding curve. *CYB5R3* deficiency usually affects only erythrocytes (type I), causing a mild disorder; when all cells are affected (type II), a severe disease results. Intravenous methylene blue is the preferred treatment in symptomatic patients with acquired methemoglobinemia and 40–60% methemoglobin. The usual dose is 1–2 mg/kg. Alternative treatment with ascorbic acid is preferable in people who are glucose-6-phosphate dehydrogenase deficient. Methylene blue interferes with co-oximetry, reducing the value of co-oximetry for monitoring treatment.

Many drugs and chemicals can induce methemoglobin in the absence of *CYB5R3* deficiency. Dapsone and topical anesthetics such as benzocaine are the most common offending agents.

## FURTHER READING


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