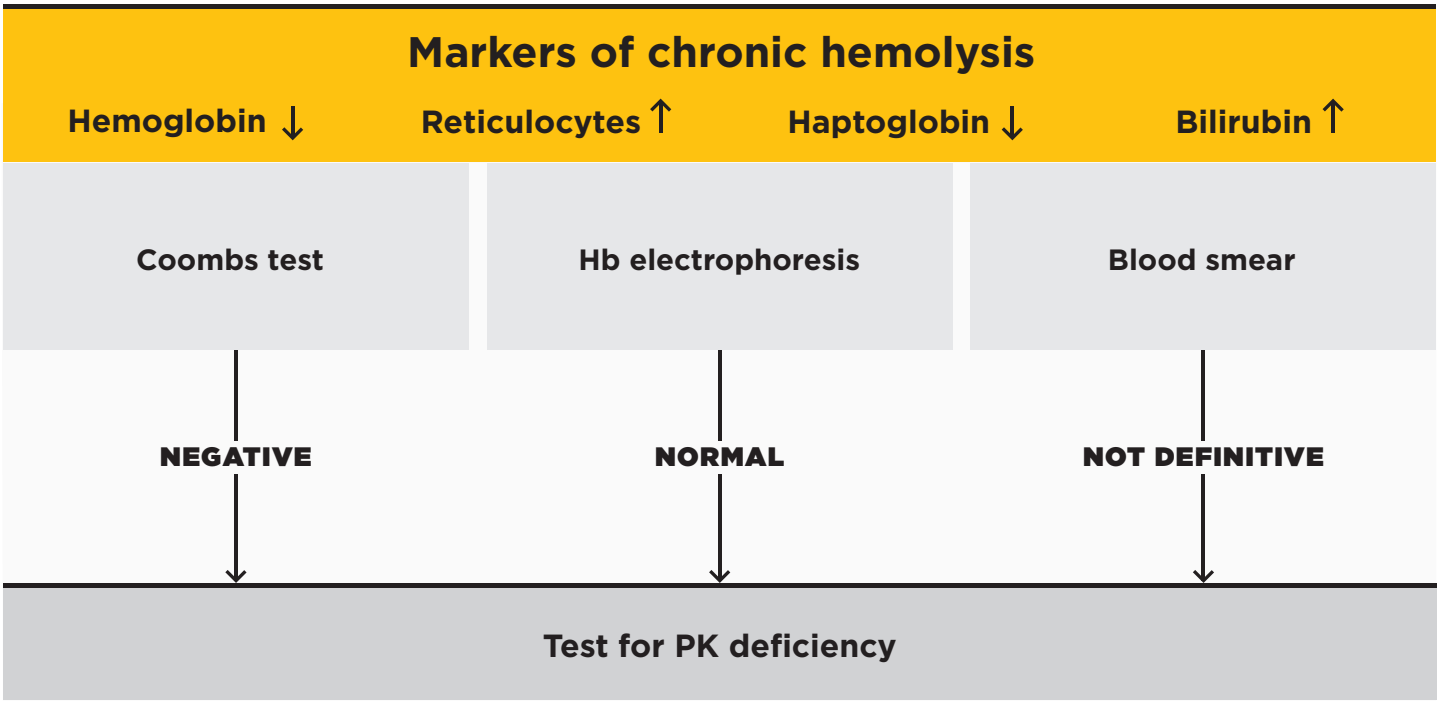
Is PK deficiency behind your patient's hemolytic anemia?

Pyruvate kinase (PK) deficiency is an under-recognized cause of hemolytic anemia. It should be considered in patients with chronic hemolysis when evidence of acquired hemolytic anemias, red cell membrane defects, or hemoglobinopathy is lacking.[1]

The diagnostic pathway[1-3]



Genetic testing and PK enzyme activity are complementary tests for the diagnosis of PK deficiency.[1]

Patients with PK deficiency experience a range of symptoms and complications that can occur regardless of age, transfusion status, or degree of anemia. Some complications, such as gallstones and osteopenia, pose severe long-term burden while others, such as iron overload, may be life-threatening. That's why diagnosis is key.[2,3]

Features of PK deficiency

Differential diagnosis

Hematologic features are non-specific and overlap with other hemolytic anemias, contributing to potential delayed diagnosis or misdiagnosis.[1,4] Examples include:

Acquired hemolytic anemia[5]	Hemoglobinopathies[5]	Membrane disorders[5]	Enzyme disorders[5,6]
• Autoimmune hemolytic anemia • Paroxysmal nocturnal hemoglobinuria	• Beta-thalassemia • Sickle cell anemia • Sickle cell trait	• Hereditary elliptocytosis • Hereditary spherocytosis	• G6PD deficiency • Hexokinase deficiency • **PK deficiency**

G6PD=glucose-6-phosphate dehydrogenase.

Features of PK deficiency, continued

Laboratory findings

Lab values of patients with PK deficiency typically show[1,3]:

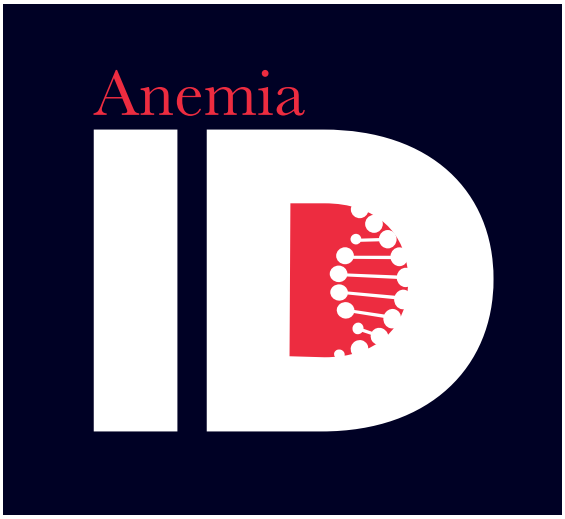
Decreased ↓	Elevated ↑
• Hemoglobin/hematocrit • PK activity • Haptoglobin	• Reticulocytes • Bilirubin • Ferritin

Clinical presentation

Patients can present with a wide range of symptoms, many of which are common to other anemias[5,7,8]:

- Anemia
- Fatigue/ weakness
- Iron overload
- Jaundice
- Abdominal pain
- Bone pain and fractures
- Dyspnea
- Exercise intolerance
- Gallstones
- Splenomegaly

An accurate diagnosis is essential for patient care. Test to Know.



For patients with unspecified chronic hemolysis where PK deficiency is suspected, now you can test with **Anemia ID**.

Anemia ID is a free program that provides a next-generation sequencing (NGS) panel consisting of approximately 50 genes known to cause hereditary anemias, including PK deficiency.

Learn more by visiting **AnemiaID.com**.

This program is only available to residents of the United States.

All testing provided to patients through Anemia ID is paid for by Agios Pharmaceuticals. While Agios provides financial support for this program, all tests and services are performed by PerkinElmer Genomics. Agios receives contact information for healthcare professionals who submit tests under this program and limited de-identified aggregate data.

Anemia ID is sponsored by Agios in partnership with PerkinElmer Genomics. Other laboratories may also offer genetic testing.

Agios is committed to better understanding PK deficiency and the burden experienced by those living with the disease, and to creating disease-modifying medicines to treat rare genetic metabolic disorders, such as PK deficiency, that are unaddressed by existing therapeutic approaches.

References: 1. Bianchi P, Fermo E, Glader B, et al. Addressing the diagnostic gaps in pyruvate kinase deficiency: consensus recommendations on the diagnosis of pyruvate kinase deficiency. *Am J Hematol*. 2019;94(1):149-161. **2.** Al-Samkari H, van Beers EJ, Kuo KHM, et al. The variable manifestations of disease in pyruvate kinase deficiency and their management. *Haematologica*. 2020;105(9):2229-2239. **3.** Grace RF, Layton DM, Barcellini W. How we manage patients with pyruvate kinase deficiency. *Br J Haematol*. 2019;184(5):721-734. **4.** Nassin ML, Lapping-Carr G, de Jong JLO. Anemia in the neonate: the differential diagnosis and treatment. *Pediatr Ann*. 2015;44(7):e159-e163. **5.** Lazarus HM, Schmaier AH, eds. *Concise Guide to Hematology*. 2nd ed. Springer; 2019. **6.** Nonspherocytic hemolytic anemia due to hexokinase deficiency. Genetic and Rare Diseases Information Center (GARD) website. https://rarediseases.info.nih.gov/diseases/3672/hexokinase-deficiency-hemolytic-anemia. Updated February 1, 2013. Accessed October 16, 2020. **7.** Boscoe AN, Yan Y, Hedgeman E, et al. Comorbidities and complications in adults with pyruvate kinase deficiency. Poster presented at: The American Society of Hematology (ASH) Annual Meeting, December 7–10, 2019. Orlando, FL. **8.** Grace RF, Cohen J, Egan S, et al. The burden of disease in pyruvate kinase deficiency: patients' perception of the impact on health-related quality of life. *Eur J Haematol*. 2018;101(6):758-765.

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