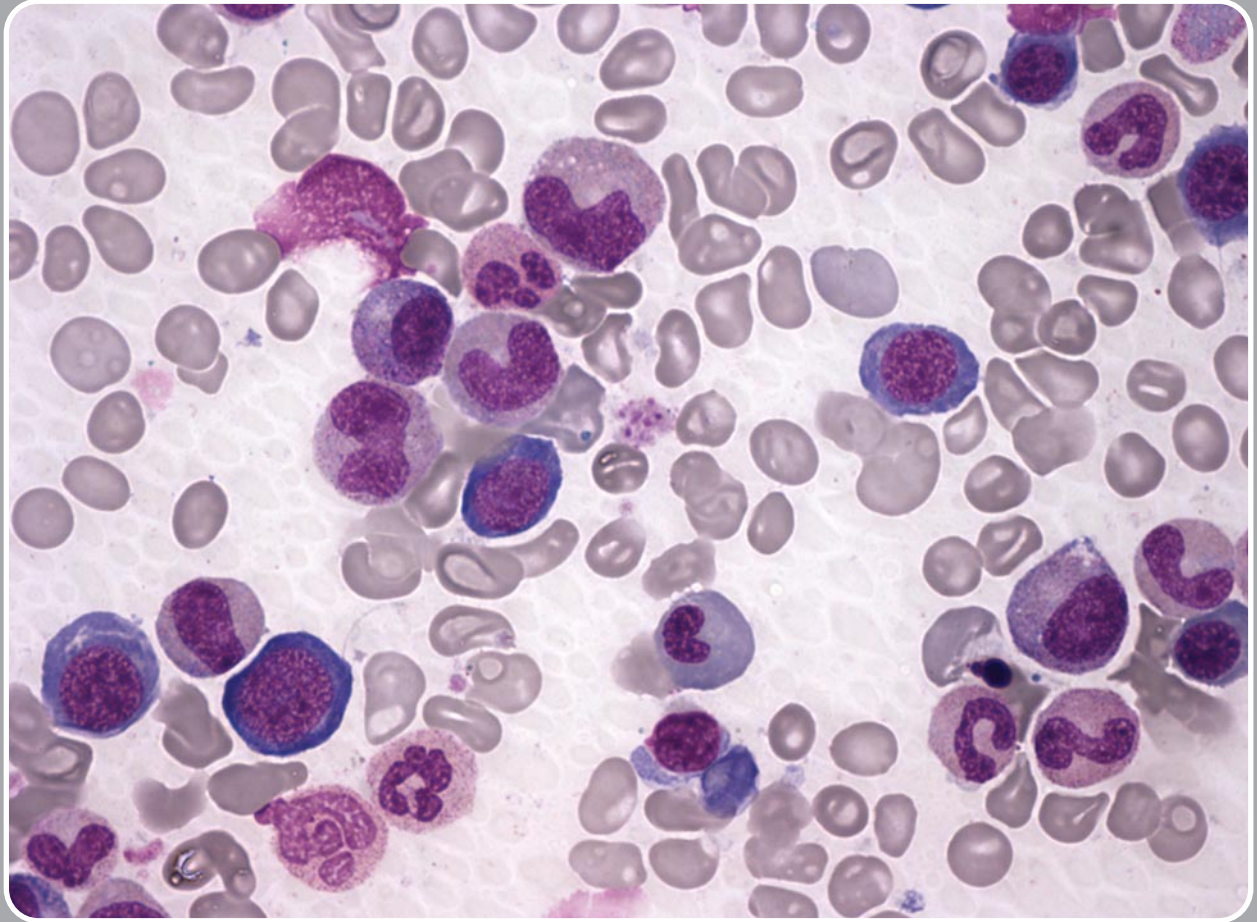


False normal vitamin B₁₂ levels caused by assay error



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A 59-year-old woman with malaise was admitted to hospital with hemoglobin at 9.2 g/dL. Platelets were normal, leukocytes were $3.2 \times 10^3/\mu\text{L}$, reticulocytes were low, and mean corpuscular volume was 128 fL. The peripheral smear showed hypersegmentation and large polychromatophilic erythrocytes. A vitamin B₁₂/folate deficiency was suspected. However, initial laboratory work showed vitamin B₁₂ at 490 pg/mL (normal, 176-949 pg/mL) and folate at 10.3 ng/mL (normal, 2.6-16.0 ng/mL). Bone marrow showed megaloblastic erythroblasts, megaloblastic metamyelocytes with large bone-shaped nuclei, and mature neutrophils with hypersegmentation. Homocysteine and methylmalonic acid were elevated (65.7 μM and 4846 nmol/L, respectively), indicative of a functional vitamin B₁₂ deficiency. In addition, holotranscobalamin, the biologic available form of vitamin B₁₂, was < 1 pmol/L. Antibodies against intrinsic factor were strongly positive.

A diagnosis of vitamin B₁₂ deficiency was still suspected despite the initial vitamin B₁₂ level. An assay from another manufacturer showed the vitamin B₁₂ low at 79 pg/mL (196-863 pg/mL). As a result, a pharmacologic dose of vitamin B₁₂ (1000 mg IM) was given and resulted in a complete clinical and hematologic response.

When a clinical picture, peripheral blood smear, and marrow suggest vitamin B₁₂ or folate deficiency, an initial normal laboratory value may require repeat testing. An assay from another manufacturer affirmed the diagnosis in this case and pointed out an erroneous result by the original test kit.



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