A Test for the Diagnosis of Polycythemia Vera

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Technology description

Technical Details:
Polycythemia vera (PV) is a stem cell disorder characterized as a panhyperplastic, malignant, and neoplastic marrow disorder. The most prominent feature of this disease is an elevated absolute red blood cell mass because of uncontrolled red blood cell production. This is accompanied by increased white blood cell (myeloid) and platelet (megakaryocytic) production, which is due to an abnormal clone of the hematopoietic stem cells with increased sensitivity to the different growth factors for maturation. Thrombopoietin (TPO) influences the production of multipotent hematopoietic progenitor cells as well as platelets. JHU researchers have discovered that impaired TPO-mediated platelet protein tyrosine phosphorylation was consistently observed in patients with polycythemia vera as well as those with idiopathic myelofibrosis (IMF), in contrast to patients with essential thrombocytosis, chronic myelogenous leukemia, secondary erythrocytosis, iron deficiency anemia, hemochromatosis or normal volunteers. Moreover, the platelet TPO receptor, Mpl, was not detectable by immunoblotting with an antibody to the extracellular domain, by chemical crosslinking of TPO to the surface of platelets, or by flow cytometry using an antibody to the extracellular domain. Impaired TPO-induced protein tyrosine phosphorylation in PV and IMF platelets was uniformly associated with markedly reduced or absent expression of the extracellular domain of Mpl. Thus the reduced detectablility of Mpl by these methods can be used a marker of PV and IMF. The abnormality appears to distinguish PV from other forms of erythrocytosis and may be involved in the platelet function defect associated with PV.

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