Pacific Biomarkers
The Value of Expertise

EPO (Erythropoietin)

Analyte: Erythropoietin

Specimen Type: Serum, Inquire for additional option(s)

Optimum Volume: 0.5 mL

Stability:

2-8 Degrees C	-20 Degrees C	-70 Degrees C
3 days	TBD	TBD

Reporting Units: mIU/mL

Method: ELISA

Biological or Clinical Significance:

Erythropoietin (Epo) is a glycoprotein hormone consisting of 165 amino acids with four complex carbohydrate chains attached to the peptide at four linkage sites. It has a molecular weight of 36 kilodaltons, 40% attributed to the carbohydrate chains. Epo is the primary regulator of erythropoiesis, stimulating the proliferation and differentiation of erythroid precursor cells in bone marrow. In mammals, the fetal liver produces nearly all of the Epo, in adults, hepatic production drops below 10% and renal secretion accounts for over 90%. The production site is believed to be the proximal renal tubular cells or the peritubular capillary endothelial cells of the renal cortex and outer medulla. Epo adjusts red blood cell production to meet the tissue oxygen demand. Epo exerts its effect in a complex feedback system, in which renal secretion of the hormone is controlled by an oxygen sensor in the kidney that responds to the partial pressure of oxygen in blood. Under conditions of increased peripheral oxygen, Epo levels diminish.

The over-expression of Epo may be associated with certain pathophysiological conditions. Polycythemia exists when there is an overproduction of red blood cells (RBCs). Primary polycythemias, such as polycythemia vera, are caused by Epo-independent growth of erythrocytic progenitors from abnormal stem cells and low to normal levels of Epo are found in the serum of affected patients. On the other hand, various types of secondary polycythemias are associated with the production of higher than normal levels of Epo. The overproduction of Epo may be an adaptive response associated with conditions that produce tissue hypoxia, such as living at high altitude, chronic obstructive pulmonary disease, cyanotic heart disease, sleep apnea, high-affinity hemoglobinopathy, smoking, or localized renal hypoxia. In other instances, excessive Epo levels are the result of production by neoplastic cells. Cases of increased Epo production and erythrocytosis have been reported for patients with renal carcinomas, benign renal tumors Wilms' tumors, hepatomas, liver carcinomas, cerebellar hemangioblastomas, adrenal gland tumors, smooth muscle tumors, and leiomyomas.

Deficient Epo production is found in conjunction with certain forms of anemias. These include anemia of renal failure and end-stage renal disease, anemias of chronic disorders [chronic infections, autoimmune diseases, rheumatoid arthritis, AIDS, malignancies], anemia of prematurity, anemia of hypothyroidism, and anemia of malnutrition. Many of these conditions are associated with the generation of IL-1 and TNF-a, factors that have been shown to be inhibitors of Epo activity. Other

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forms of anemias, on the other hand, are due to Epo-independent causes and affected individuals show elevated levels of Epo. These forms include aplastic anemias, iron deficiency anemias, thalassemias, megaloblastic anemias, pure red cell aplasias, and myelodysplastic syndromes.

Principle of Test Method:

The EPO assay is and IVD kit that employs a sandwich immunoassay technique.