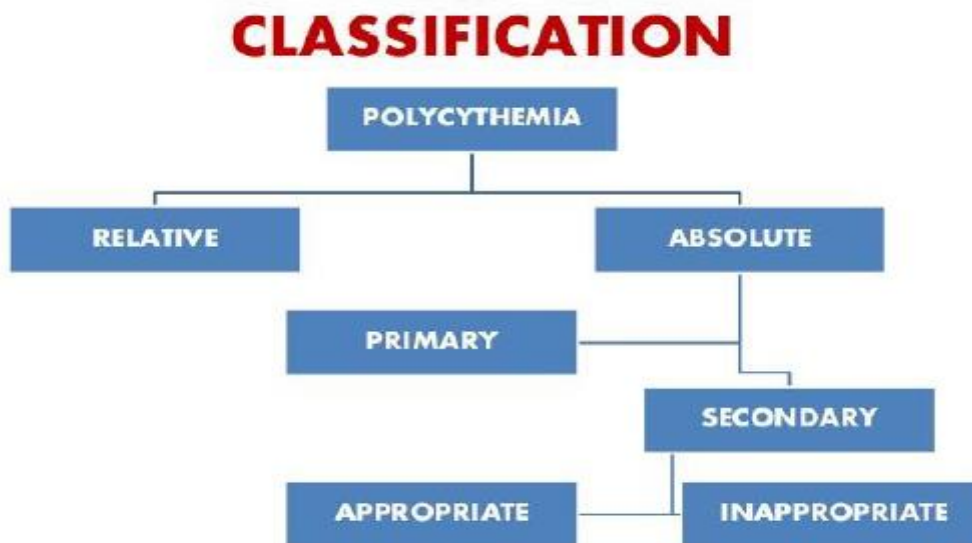




Polycythemia

It is derived from Greek means (too many blood cells), that is referring to increase RBC count, hematocrit and hemoglobin concentration are elevated in peripheral blood, is sometimes called **erythrocytosis**.

There are **two** main forms of Polycythemia:



A-Relative polycythemia (Apparent) caused by most conditions that make acute depletion of plasma volume, making it thicker, it caused by 1-overweight, 2-smoking, 3-drinking too much alcohol and 4-taking diuretics medicines including (tablets for high blood pressure that make person pee more). It can happen as a result of dehydration and stress or **Gaisbock syndrome**.

Apparent polycythemia can improve if the underlying cause is identified and managed, stop smoking or reducing your alcohol intake.

B-True Polycythemia (Absolute) which includes 1- primary Polycythemia (polycythemia Vera) 2- Secondary Polycythemia.

1-Polycythemia Vera (PV) is a stem cell disorder characterized malignant, and neoplastic **marrow disorder**. The most prominent feature of this disease is an **elevated red blood cell mass because of uncontrolled red blood cell production**. This is accompanied by increased white blood cell (myeloid) and platelet (megakaryocytic) production.

It is rare, usually caused by **mutation in JAK2 gene**, is especially controlling the production of blood cells from hematopoietic stem cells, which causes the bone marrow cells to produce too many red blood cells. The affected bone marrow cells can also develop into other cells



found in the blood, which means that people with PV may also have abnormally high numbers of both platelets and white blood cells.

2- Secondary polycythemia is caused by either **appropriate** or **inappropriate increases in the production of erythropoietin** that result in an increased production of erythrocytes. In secondary polycythemia there may be 6 to 8 million and occasionally 9 million erythrocytes per cubic millimeter of blood.

A type of secondary polycythemia in which the production of erythropoietin increases **appropriately** is called **physiologic polycythemia**, that occurs in:

1-individuals living at high altitudes (4275 to 5200 meters), where oxygen availability is less than at sea level, 2-smoking, 3-renal or liver tumors, and 4-heart faults all that result in hypoxia.

General symptoms of polycythemia include:

Not everyone with polycythemia has symptoms – but many do:

1. Headache **2.** Dizziness **3.** Itchiness, especially following a warm bath or shower **4.** Redness of skin and plethoric facial appearance **5.** Shortness of breath **6.** Breathing difficulty **7.** Numbness, tingling, burning or weakness in the hands, feet, arms or legs **8.** Chest pain **9.** A feeling of fullness or bloating in your left upper abdomen due to an enlarged spleen **10.** Fatigue.

Diagnosis of polycythemia:

A-hematological tests:

1- Increase in number of red blood cells, and in some cases an increase in platelets or white blood cells **in peripheral blood.**

2- Hematocrit measurement, the percentage of red blood cells that make up total blood volume.

3- Elevation levels of hemoglobin.

4- Lower than normal levels of oxygen in the blood. (why)?

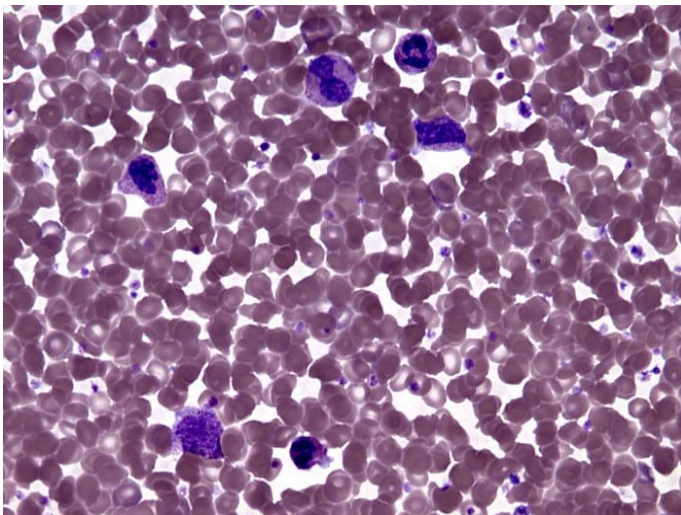
5- Erythropoietin very low levels of erythropoietin (EPO), a hormone that stimulates bone marrow to produce new red blood cells, because the excess red blood cells turn off the production of EPO by the kidneys (negative feedback).

B- bone marrow biopsy:

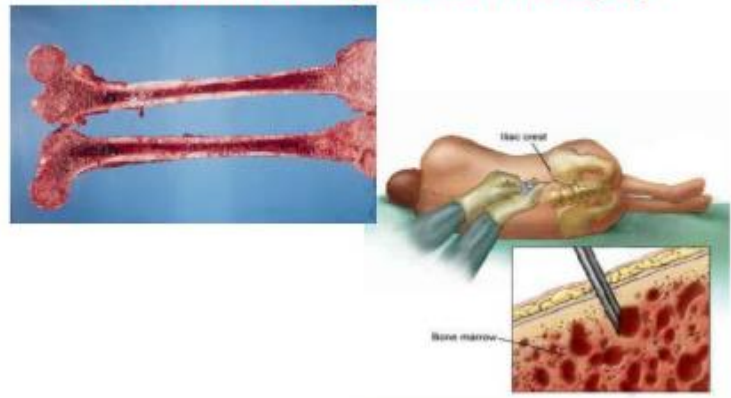
Examination of bone marrow shows that it's producing higher than normal amounts of blood cells, it may be a sign of polycythemia vera.

To identified if the individual has polycythemia vera, analysis of their bone marrow or blood also may show the DNA change (**JAK2 V617F mutation**) that's associated with the disease.

Polycythemia at 40x Magnification



Bone marrow aspiration or biopsy



References

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