

## Development of Leukaemia, Its Effect on the Body and Immunophenotyping Test

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Leukemia begins in the developing blood cells within the bone marrow. All blood cells start out as hematopoietic (hemo = blood; poiesis = production) stem cells. The stem cells go through multiple stages of development till they attain their adult form.

First, blood stem cells develop into both myeloid cells and lymphoid cells. If blood cells had been to continue to develop completely normally, the adult forms of these cells are as follows

Myeloid cells turn into red blood cells, platelets, and certain types of white blood cells (basophils, eosinophils and neutrophils).

Lymphoid cells develop into certain types of white blood cells (lymphocytes and natural killer cells);

So in the bone marrow, blood cells are starting to multiply and divide into red blood cells, white blood cells and platelets. However, when you have leukemia, one of these blood cell types begins to rapidly multiply, in an out-of-control manner. These abnormal cells – referred to as leukemia cells – begin to take over the space in the bone marrow [1]. They crowd out the other normal cell types which can be trying to develop. This is bad in a number of ways:

Unlike other blood cell types, the leukemia cells are abnormal and serve no beneficial purpose.

The different cell types (red blood cells, white blood cells and platelets) have little or no space and aid to continue to grow and multiply in the bone marrow [2].

These consequences results in few blood cells being made and release into the blood and greater leukemia cells being made and released into the blood. Without an adequate quantity of normal blood cells, your body's organs and tissues will now no longer get the oxygen they need to work properly your body won't be capable of fight off infection or clot blood when needed.

Leukemia cells are usually immature (still developing) white blood cells. In fact, the term leukemia comes from the Greek words for "white" (leukos) and "blood" (haima). An excess number of white blood cells are visible when looking at blood through a microscope and the actual appearance of the blood is lighter to the naked eye [3].

### Immunophenotyping (Flow Cytometry)

This test is used to diagnose leukemia and lymphoma via way of means of evaluating most cancers cells to normal cells in either a bone marrow or blood sample. Immunophenotyping is carried out with a device referred to as a "flow cytometer." A flow cytometry test can measure the number of cells in a sample, as well as unique traits of the cells, such as their length and shape, and identify specific markers at the cell surface. A sample of cells from blood or bone marrow is tagged with a panel of antibodies which can be unique to regions at the cell surface. The cells are stained with a light-sensitive dye and are passed through a laser beam in the flow cytometer. If they have an antibody specific surface marker, the cells mild up and are counted [4].

Leukemia cells will have different antigens on their surfaces,

depending on the form of leukemia. Certain antigens, referred to as "cluster of differentiation (CD) proteins," assist identify the type of leukemia cells.

In addition to its use for diagnosis, flow cytometry is likewise used after remedy for comparing minimal residual disease (MRD), additionally referred to as measurable residual disease. This refers back to the small number of cancer cells that can remain in the body after treatment [5].

### References

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