Leukaemia Foundation Factsheet

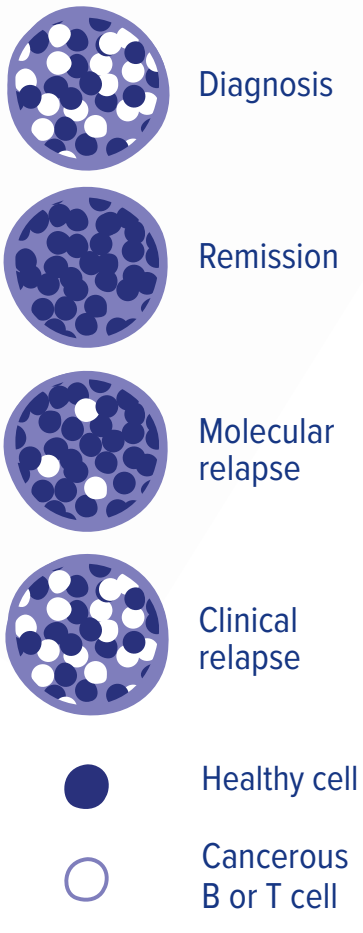
Minimal Residual Disease

What is Minimal Residual Disease?

When you have treatment for blood cancer, your treatment team will speak to you about treatment goals such as “complete remission” (CR). When you achieve a CR, it indicates that the treatment has been successful, and the bone marrow or scans show no evidence of blood cancer. Other terms that might be used are clinical or hematological (morphologic) remission.

Minimal residual disease (MRD) assessment is an additional method of looking for very low levels of blood cancer after treatment for diseases such as acute and chronic leukaemia, lymphoma or multiple myeloma. MRD refers to the small amount of cancer cells remaining after achieving a complete remission (CR) with chemotherapy or stem cell transplant that are not able to be detected by traditional methods such as looking down the microscope at the bone marrow.

If these minimal residual cancer cells remain, they present a higher risk of regrowing and causing your cancer to relapse compared to the situation where they are no longer present.



Why monitor minimal residual disease?

A significant reason to check for presence of MRD in blood cancers, is that it measures your response to optimal drug therapy at the deepest possible level of detection. Absence (negativity) of MRD in bone marrow (BM) after completion of induction drug therapy appears to predict for very good outcomes.

If there is still disease detected after treatment, it is referred to as “MRD positive”. Sometimes, the treatments may be extended, or changed, in this circumstance with the goal of reducing the cancer cells to a lower level, hopefully becoming “MRD negative.” Another possibility in patients who are MRD positive is that the MRD testing may be done more frequently to monitor very closely what the disease is doing.

MRD testing is one key factor that may alter the risk of relapse, with other important factors including age, blast count at diagnosis, type of disease at diagnosis, and presence of chromosome abnormalities.

How is it tested?

Modern, highly sensitive methods are used with testing of both bone marrow samples and peripheral blood (blood taken from a vein).

The science behind looking for the MRD is complex. Techniques called Polymerase Chain Reaction (PCR) and next generation sequencing (NGS) are performed on bone marrow samples at the time of initial diagnosis. These tests are looking for genetic mutations in the blood cancer cells. If there are mutations present, they can then be looked for again following treatment to determine if there is minimal residual disease present, even if the blood cancer cells can no longer be seen under the microscope. Minimal residual disease monitoring is readily available in many circumstances and may be done on blood tests or bone marrow.

Next generation genetic flow cytometry (NGF) is also used which looks at the bone marrow samples for abnormal proteins on the surface of the blood cancer cells. By determining how many cells have these abnormal proteins detected, it is possible to measure the number of residual cancer cells. Using these tests, it’s easier to quantify whether a patient has MRD following standard treatment.

What does it mean for me?

Ultimately, MRD is a marker that helps your treatment team to choose the best treatment for you, to prevent the cells from coming back and regrowing. That means MRD provides important information leading to the best treatment for the best potential response and overall outcome.

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