Causes, Risk Factors, and Prevention

Risk Factors

A risk factor is anything that affects your chance of getting a disease such as cancer. Learn more about the risk factors for multiple myeloma.

- What Are the Risk Factors for Multiple Myeloma?
- Do We Know What Causes Multiple Myeloma?

Prevention

For some types of cancer, risk factors are known for the majority of cases. For example, smoking causes most lung cancers. This provides an opportunity for prevention.

With multiple myeloma, few cases are linked to risk factors that can be avoided, so there is no known way to prevent most multiple myelomas from developing.

What Are the Risk Factors for Multiple Myeloma?

A risk factor is anything that changes a person’s chance of getting a disease such as cancer. Different cancers have different risk factors. For example, exposing skin to strong sunlight is a risk factor for skin cancer. Smoking is a risk factor for lung cancer and many other cancers. But risk factors don’t tell us everything. People who have no risk factors can still get the disease. Also, having a risk factor, or even several, does not mean that a person will get the disease.
Scientists have found few risk factors that may affect someone’s chance of getting multiple myeloma.

**Age**

The risk of multiple myeloma goes up as people age. Less than 1% of cases are diagnosed in people younger than 35. Most people diagnosed with this cancer are at least 65 years old.

**Gender**

Men are slightly more likely to develop multiple myeloma than women.

**Race**

Multiple myeloma is more than twice as common in African Americans than in white Americans. The reason is not known.

**Radiation**

People who were exposed to radiation from an atomic bomb blast had a higher risk of multiple myeloma. Exposure to lower levels of radiation may also increase the risk of multiple myeloma. At most, this accounts for a very small number of cases.

**Family history**

Multiple myeloma seems to run in some families. Someone who has a sibling or parent with myeloma is 4 times more likely to get it than would be expected. Still, most patients have no affected relatives, so this accounts for only a small number of cases.

**Workplace exposures**

Studies looking at workplace exposures and multiple myeloma risk have found no clear links.
Obesity

A study by the American Cancer Society has found that being overweight or obese increases a person’s risk of developing myeloma.

Having other plasma cell diseases

Many people with monoclonal gammopathy of undetermined significance (MGUS) or solitary plasmacytoma will eventually develop multiple myeloma.

- References
  See all references for Multiple Myeloma

Do We Know What Causes Multiple Myeloma?

Scientists still do not know exactly what causes most cases of multiple myeloma. However, they have made progress in understanding how certain changes in DNA can make plasma cells become cancerous. DNA is the chemical that carries the instructions for nearly everything our cells do. Some genes (parts of our DNA) contain instructions for controlling when our cells grow and divide. Certain genes that promote cell division are called oncogenes. Others that slow down cell division or make cells die at the right time are called tumor suppressor genes. Cancers can be caused by mistakes, or defects, in the DNA called mutations that turn on oncogenes or turn off tumor suppressor genes.

Recent studies have found that abnormalities of some oncogenes (such as MYC) develop early in the course of plasma cell tumors. Changes in other oncogenes (such as the RAS genes) are more often found in myeloma cells in the bone marrow after treatment, and changes in tumor suppressor genes (such as the
gene for \textit{p53}) are associated with spread to other organs.

Myeloma cells also show abnormalities in their chromosomes. In human cells, DNA is packaged into chromosomes. Although normal human cells contain 46 chromosomes, some cancer cells may have extra chromosomes (called a \textit{duplication}) or have all or part of a chromosome missing (called a \textit{deletion}). One fairly common finding in myeloma cells is that parts of chromosome number 13 are missing. These deletions appear to make the myeloma more aggressive and resistant to treatment.

In about half of all people with myeloma, part of one chromosome has switched with part of another chromosome in the myeloma cells. This is called a \textit{translocation}. When this occurs in a crucial area next to an oncogene, it can turn the oncogene on.

Researchers have found that patients with plasma cell tumors have important abnormalities in other bone marrow cells and that these abnormalities may also cause excess plasma cell growth. Certain cells in the bone marrow called \textit{dendritic cells} release a hormone called \textit{interleukin-6 (IL-6)}, which stimulates normal plasma cells to grow. Excessive production of IL-6 by these cells appears to be an important factor in development of plasma cell tumors.

- References

See all references for Multiple Myeloma

Can Multiple Myeloma Be Prevented?

For some types of cancer, risk factors are known for the majority of cases. For example, smoking causes most lung cancers. This provides an opportunity for prevention. For other cancers, such as cervical cancer, pre-cancers can be detected early by a screening test (such as the Pap test) and treated before they develop into an invasive cancer.
With multiple myeloma, few cases are linked to risk factors that can be avoided. There is no known way to prevent multiple myeloma from developing in those people with monoclonal gammopathy of undetermined significance or solitary plasmacytomas.

- References
  See all references for Multiple Myeloma

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