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## Multiple Myeloma Causes, Risk Factors, and Prevention

Learn about the risk factors for multiple myeloma and if there are things you can do that might help lower your risk.

### 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.

- [Risk Factors for Multiple Myeloma](#)
- [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.

- [Can Multiple Myeloma Be Prevented?](#)

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## Risk Factors for Multiple Myeloma

- Age
- Sex
- Race
- Family history
- Excess body weight
- Having other plasma cell diseases

A risk factor is anything that changes a person's chance of getting a disease such as cancer. Dis chance of getting a ,2uch as

## Excess body weight

Some research has suggested that having [excess body weight](#)<sup>1</sup> increases a person's risk of developing myeloma.

## Having other plasma cell diseases

People with monoclonal gammopathy of undetermined significance (MGUS) or solitary plasmacytoma are at higher risk of developing multiple myeloma than someone who does not have these diseases.

## Hyperlinks

1. [www.cancer.org/cancer/risk-prevention/diet-physical-activity/body-weight-and-cancer-risk.html](http://www.cancer.org/cancer/risk-prevention/diet-physical-activity/body-weight-and-cancer-risk.html)

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## 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. These genes that promote cell growth are called **oncogenes**.
- Others genes that slow down cell growth 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 *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 duplication) or have all or part of a chromosome missing (called a deletion). One common finding in myeloma cells is that parts of chromosome number 17 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 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 **dendritic cells** release a hormone called 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.

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# Can Multiple Myeloma Be Prevented?

For certain types of cancer, risk factors are known for the most of the 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 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.

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