

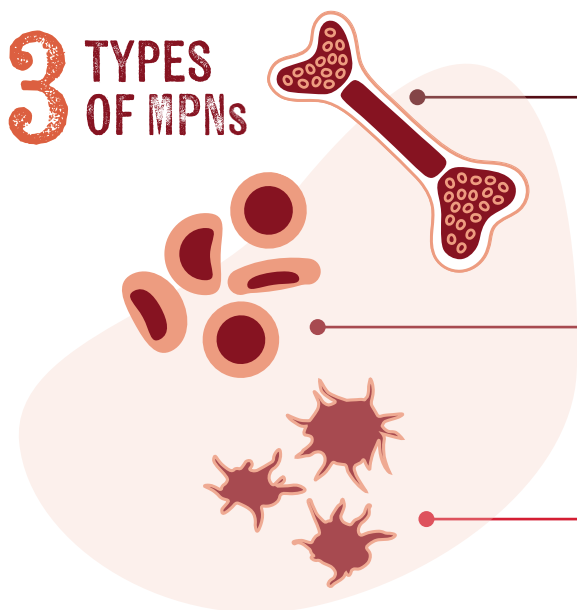
# Myelofibrosis 101

## What is myelofibrosis?

Myelofibrosis (my-ah-lo-fye-BRO-sis; MF) is a rare blood cancer. MF is part of a bigger group of blood cancers called myeloproliferative neoplasms, or MPNs.

MPNs happen when there's a change in certain cells in your bone marrow, which is the spongy tissue inside your bones. This change may lead your body to make too many or too few red blood cells, white blood cells, or platelets.

There are different types of MPNs. Each has unique symptoms and different effects on the body. Three common types are:



### Myelofibrosis

In people with MF, blood cells don't function normally and build up inside the bone marrow. This can lead to inflammation and scarring, which is called fibrosis. Fibrosis can cause your body to make too few blood cells.

### Polycythemia vera (PV)

PV is a type of MPN that happens when your body makes too many red blood cells. In PV, your body may also make too many white blood cells or platelets.

### Essential thrombocythemia (ET)

ET happens when your body makes too many platelets. Having high amounts of platelets in your blood can lead to blood clots.

Both PV and ET can turn into MF. When MF happens on its own, it's called primary MF. When MF develops following PV or ET, it's called secondary MF. Secondary MF is sometimes called "post-PV MF" or "post-ET MF."

MF is a chronic condition, which means that it is long-lasting. Your healthcare team can help you manage MF over time. By working with your healthcare team, you may be able to improve your symptoms.

## You are not alone

### How common is MF?

MF is typically diagnosed in **people 65 or older**, but can occur at a younger age

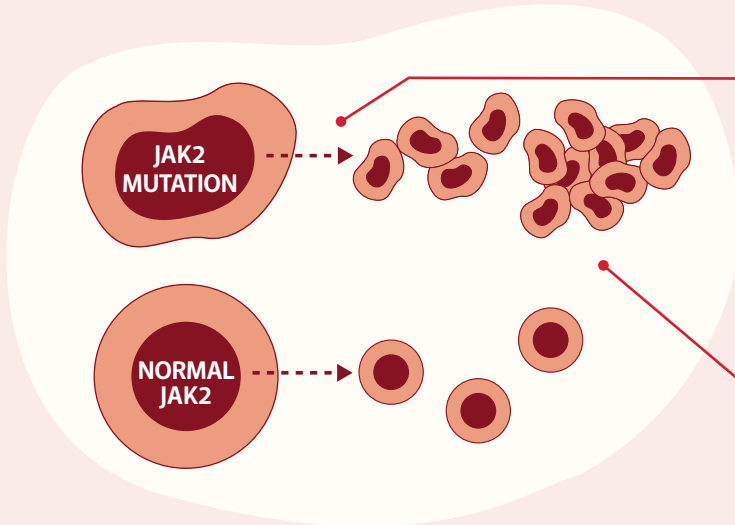


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# What causes MF?

Scientists are still learning about what causes MF. However, certain proteins are thought to be involved in MF. These are called Janus kinases, or JAKs.

## JAKs can contribute to MF in the following ways:



### JAK2 gene mutation

About half of people with MF have a change in their DNA, called a mutation, in a gene called *Janus kinase 2*, or *JAK2*. Scientists have found other gene mutations that lead to MF, including the myeloproliferative leukemia virus proto-oncogene (MPL) mutation and the calreticulin (CALR) mutation. Sometimes, MF can happen in people with no genetic mutations.

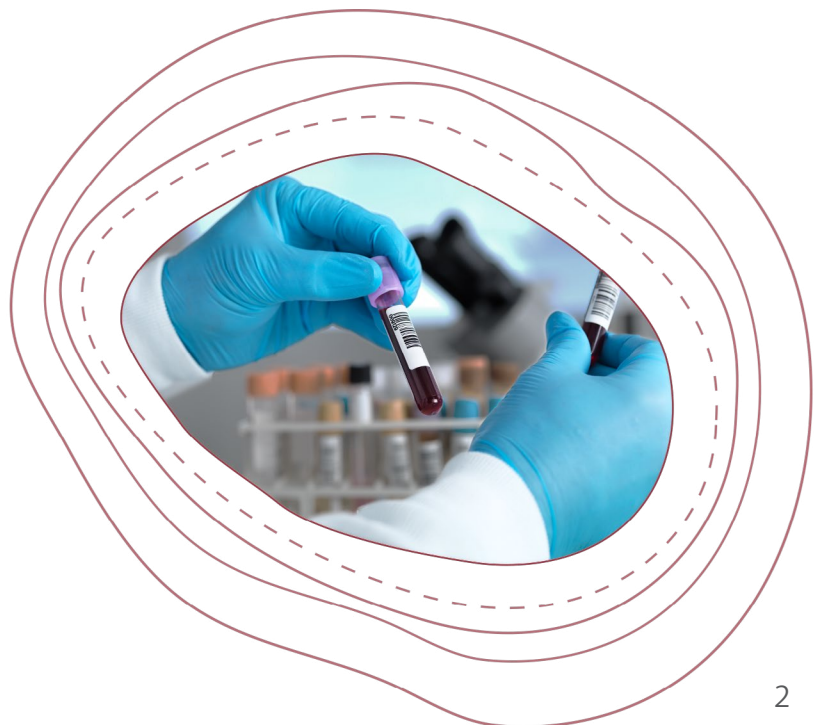
### Overactive JAK proteins

The *JAK2* gene tells your cells to make JAK proteins. In some people, these JAK proteins are too active. This can cause your body to make the wrong number of blood cells and creates inflammation. Other overactive proteins may also cause MF and are being studied.

You can have a *JAK2* mutation and overactive JAK proteins at the same time, or you may have overactive JAK proteins but no genetic mutation. Your healthcare team can partner with you to help you understand your MF and your treatment options.

Scientific understanding of the role of JAKs in MF has helped advance research of the disease

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# What are the symptoms of MF?

The symptoms of MF can be different for each person, which means you may not experience all of them. Some of the key signs and symptoms are anemia, enlarged spleen, low platelets, and other symptoms.



## Anemia

Red blood cells carry oxygen to all the cells in your body. Having a low red blood cell count is called anemia. Your doctor may call it low hemoglobin.

### Anemia can cause symptoms like:

- Tiredness/fatigue
- Weakness
- Shortness of breath
- Migraines

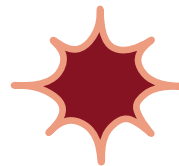


## Enlarged spleen

Your spleen acts like a filter for your blood. Having an enlarged spleen is called splenomegaly.

### Splenomegaly can cause symptoms like:

- Feeling full too fast
- Pain under the left ribs
- Severe abdominal discomfort



## Low platelet count

Platelets are important to help your blood clot. Having a low platelet count is called thrombocytopenia.

### Thrombocytopenia can cause symptoms like:

- Bleeding easily
- Bruising easily
- Bleeding for a long time when cut



## Other symptoms

MF can cause different symptoms because it affects the body in many ways.

### Other symptoms of MF may include:

- Tiredness/fatigue
- Abdominal pain
- Itchy skin
- Night sweats
- Bone pain
- Weight loss

Your symptoms can change over time. It's important to keep track of your symptoms and communicate any new or worsening symptoms with your healthcare team

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MMLPINF230015 July 2023  
Produced in USA.