

Is myeloma an inherited cancer?

Essentials Infosheet

This Infosheet explains that myeloma is not an ‘inherited’ cancer in the sense that most people understand the term, but that inherited genetic variations can affect a person’s risk of developing myeloma.

Genetics

These key words may be helpful when you are reading this Infosheet:

- **Genes** – the sets of instructions which make up the ‘blueprint’ for living things. Our genes control how our body develops and functions, and they are responsible for characteristics such as hair and eye colour
- **DNA (deoxyribonucleic acid)** – is the material that makes up genes
- **Chromosomes** – genes are packaged into structures called chromosomes inside the cells. Each human cell has 23 pairs of chromosomes. One of each pair is inherited from each parent

- **Genome** – means the complete set of genetic information for a living thing. In a human this includes up to about 20,000 genes
- **Genetics** – is the study of genes, the characteristics they control, and heredity
- **Heredity** – means how characteristics are passed down from parent to child



Read more about genetics and how it relates to myeloma in the [Genetics and myeloma Infoguide](#) from Myeloma UK

Inherited cancers and other diseases

Some diseases and types of cancer are caused by a faulty version of a single gene, inherited from one or both parents.

Examples include cystic fibrosis, muscular dystrophy and certain types of breast cancer.

People can be screened in many cases if they might have inherited one of these faulty genes.

Very few diseases or cancers, however, are caused by a single faulty gene.

In general, the vast majority of cancers are caused by many genetic changes which occur in the cancerous (or malignant) cells. These changes are referred to as 'genetic variations'.

Genetic variations may be inherited from our parents, be caused by an environmental factor or toxin, or occur spontaneously for reasons that are not known.

This is a very complex area that is not well understood for most cancers, including myeloma.

Is myeloma an inherited cancer?

No, not in the sense that is caused by a single inherited gene.

Recent studies have shown that there are some inherited genetic variations which can increase the likelihood that a person will develop myeloma. However, their effect is very small.

This means that people may inherit a certain combination of genetic variations that puts them at higher risk of developing myeloma. However, the inherited genetic variations are only a small part of the puzzle.

It is certain that other genetic and environmental factors are needed before myeloma develops.

Am I more likely to get myeloma if someone in my family has it?

It has been found that people have a slightly higher risk of developing myeloma if they have a close relative who has myeloma. That means a brother, sister or parent.

Studies showed that people who had a close relative with myeloma had approximately double the risk of developing myeloma compared with those who had no immediate family affected.

This may sound alarming, but it is important to understand what it actually means. The risk of developing myeloma is generally about 1 in 10,000 per year (averaged across all age groups, with a higher risk in older age groups). In close relatives of myeloma patients, this risk would be about 2 in 10,000 per year. The risk in real numbers is therefore still small.

This means people may inherit genetic variations that increase their chances of developing myeloma, but it doesn't mean that

they will definitely get it. In fact, their chances of developing it still remain very low.

Will people be able to be screened in the future to see if they have an increased risk of developing myeloma?

Possibly, but not in the short term. The current focus is to gain further knowledge about the different inherited genetic variations in myeloma; this will lead to a deeper understanding of how myeloma develops and potentially to better ways of diagnosing, treating or even preventing it.

There is also research underway on possible ways to screen for myeloma. There is more about this in the **Future directions** section (next page).

Future directions

Researchers are trying to understand genetic inheritance in myeloma better.

In recent years, studies called 'Genome-Wide Association Studies' (GWAS) have been used to look at genetic variation in normal cells from both myeloma patients and people without myeloma. GWAS are used to find genetic variations linked to particular diseases or cancers. They involve scanning the entire genetic material (genome) to search for specific genetic differences between different groups of people.

Researchers using GWAS have been able to identify certain inherited genetic variations that only occur in myeloma patients and, as a result, are said to be associated with developing myeloma. This GWAS research has been supported by Myeloma UK among other funders.

These discoveries have been very important as they have sent myeloma research in new directions that could, ultimately, lead to better treatments.

However, at this stage, the research has had little influence on our understanding about whether or not someone is likely to develop myeloma. The reason for this is that the inherited genetic variations that have been discovered have very little impact on developing myeloma; there are other factors, both genetic and environmental, needed before myeloma develops. These recent discoveries are, therefore, a very small piece in a very big and complex puzzle.

An important research area is looking at ways to make screening for myeloma more feasible. Research funded by Myeloma UK is looking at the biology of two conditions which develop before myeloma without any symptoms. These conditions are called MGUS and smouldering myeloma. The research projects in Birmingham and London aim to improve our understanding of which patients with MGUS and smouldering myeloma are at higher risk of progressing to myeloma. The goal would then be a targeted screening programme for those patients at

higher risk of progression, and possible earlier drug treatment for some patients at higher risk.

A study called the PROMISE study in the USA, is following up patients with MGUS, to identify factors which predict higher risk of progressing to myeloma. People in the study are followed up before they develop MGUS, and are people who are at higher risk of doing so because they have close relatives with myeloma (or because they are from an African American ethnicity).

Key points

- Some diseases including some cancers are caused by a faulty version of a gene inherited from one or both parents, and are called 'inherited' diseases
- Most cancers, including myeloma, are **not** directly inherited in this way
- There is some increase in a person's risk of developing myeloma if a close relative (brother, sister or parent) has myeloma
- The risk is doubled in close relatives compared to the general population, but the risk is still small, about 2 in 10,000 per year
- Research is continuing into the genetic changes which may increase the risk of developing myeloma
- At present there is no screening test to see if people are at increased risk of myeloma

About this Infosheet

The information in this Infosheet is not meant to replace the advice of your healthcare team. They are the people to ask if you have questions about your individual situation.

For a list of references used to develop our resources, visit myeloma.org.uk/references

We value your feedback about our patient information.

For a short online survey go to myeloma.org.uk/pifeedback or email comments to patientinfo@myeloma.org.uk

Other information available from Myeloma UK

Myeloma UK has a range of information booklets available covering all aspects of myeloma and related conditions. Download or order them from myeloma.org.uk/publications

To talk to one of our Myeloma Information Specialists about any aspect of smouldering myeloma, call our Myeloma Infoline on **0800 980 3332** or **1800 937 773** from Ireland.

The Infoline is open from Monday to Friday, 9am to 5pm and is free to phone from anywhere in the UK and Ireland.

Information and support about myeloma is also available around the clock at myeloma.org.uk



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We're here for everything a diagnosis of myeloma brings

Get in touch to find out more about how we can support you

Call the Myeloma Infoline on

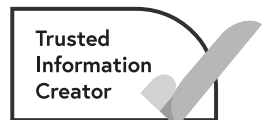
 **0800 980 3332**

Email Ask the Nurse at

 **AskTheNurse@myeloma.org.uk**

Visit our website at

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