

Is myeloma an inherited cancer?

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.

Background

Genes are made up of long strands of DNA. Essentially, they are sets of instructions which together make up the blueprint of life that determines how the body develops, grows and functions.

The body has tens of thousands of genes packaged in structures known as chromosomes. The entire genetic material of humans

(called the ‘genome’) is arranged in 23 pairs of chromosomes and each cell in the body contains all 23 pairs. One chromosome in each pair is inherited from your mother and one is inherited from your father.

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.

Advancements in medical science now mean that you can be screened if there is a reason to think you might have inherited a faulty gene that cause certain diseases. For example, women with a family history of breast cancer can be screened to see if they carry a faulty BRCA2 gene. Having a fault in this gene raises a woman's risk of developing breast cancer from around 10% to up to 85%.

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 variation 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 individuals may inherit a certain combination of genetic variations that puts them at higher risk of developing myeloma but 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.

Are people more likely to develop myeloma if they have a history of myeloma in their family?

It has been observed that there is a slightly higher incidence of myeloma amongst family members than in the general population.

Population studies have shown that immediate family members have approximately double the risk of developing myeloma compared to people with no

family connection. This might sound alarming but it's important to understand what this actually means: instead of a 5 in 100,000 risk of developing myeloma (within the general population), an immediate family member will have a 10 in 100,000 risk. The risk in real numbers is therefore very 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.

What type of research is being done to understand genetic inheritance in myeloma?

A significant amount of research in the UK and internationally is being directed towards understanding genetic inheritance in myeloma.

In recent years, '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 a method used in genetic research to find genetic variations linked to particular diseases or cancers. They involve

the systematic scanning of the entire genetic material (genome) to search for specific genetic differences between different groups of people.

In a GWAS funded by Myeloma UK, researchers at The Institute of Cancer Research 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.

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.

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.

Future directions

Certain inherited genetic variations can increase the likelihood of developing myeloma, but the risk remains very low.

It will be some time before research findings may enable

scientists to develop accurate screening tests, but the continued study of inherited genetics in myeloma is the foundation for future discoveries.

For more information about how genetic research in myeloma will benefit patients, read our FAQs on myeloma genetics research at www.myeloma.org.uk/faq

About this Infosheet

The information in this Infosheet is not meant to replace the advice of your medical team. They are the people to ask if you have questions about your individual situation. All Myeloma UK publications are extensively reviewed by patients and healthcare professionals prior to publication.

Other information available from Myeloma UK

Myeloma UK has a range of Essential Guides, Infoguides and Infosheets available covering many areas of myeloma, its treatment and management.

To order your free copies or to talk to one of our Myeloma Information Specialists about any aspect of myeloma, call the **Myeloma Infoline: 0800 980 3332** or **1800 937 773** from Ireland.

The Myeloma Infoline is open from Monday to Friday, 9am to 5pm and is free to phone from anywhere in the UK and Ireland. From outside the UK and Ireland, call **+44 (0)131 557 9988** (charged at normal rate).

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

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