NHS
Greater Glasgow and Clyde

Information for Patients and Families about

Multifactorial Inheritance

What is multifactorial inheritance?

Some health conditions are caused by a combination of genetic and environmental factors. This is called multifactorial inheritance.

- Genetic factors are the instructions (genes) we inherit from our parents. Genes act like a recipe, guiding how our body develops and functions. One or two small genetic changes may have little effect on their own, but when several are combined, they can increase the chance of developing a condition.
- Environmental factors include things such as diet, smoking and alcohol use. Because family members often share both genes and environments, a condition may appear more often in certain families.

How can I inherit a multifactorial condition?

The way multifactorial conditions are passed on is complex. Rather than following a simple pattern, the risk is influenced by the combination of many small genetic changes and environmental exposures. Having a relative with a condition may increase your own risk, but it does not mean you will definitely develop it.

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Common multifactorial conditions include:

- Birth anomalies e.g. cleft palate and congenital heart disease.
- Developmental conditions e.g. autism spectrum, ADHD and Tourette syndrome.
- Mental health conditions e.g. schizophrenia and bipolar disorder.
- Hypermobile Ehlers Danlos syndrome.
- Autoimmune conditions e.g. rheumatoid arthritis and ulcerative colitis.
- Atopic conditions e.g. asthma and eczema.
- Cardiovascular conditions e.g. ischaemic heart disease and high blood pressure.
- Diabetes.
- Neurological conditions e.g. multiple sclerosis and dementia.

Why can't genetic testing give me any answers?

The purpose of genetic testing is to make or confirm a diagnosis, identify affected family members, and inform decisions about things such as treatment and family planning. However, for multifactorial conditions:

- There is not usually a single genetic cause that can be identified with a test. Diagnosis is often made from symptoms and, or other medical investigations.
- Tests cannot measure environmental influences, which are an important part of the risk assessment.
- Each gene usually has only a small effect, making it difficult to say which ones are contributing to any given condition.

If you are concerned about your family history or your risk of developing a multifactorial condition, speaking to your GP may be helpful. This might help you understand risk factors and how to manage them, to help prevent the onset of certain conditions.

Living with a multifactorial condition

If you are diagnosed with a condition that follows a multifactorial inheritance pattern, it's important to work with your healthcare team to manage the condition and reduce its impact on your quality of life. Your doctor may suggest lifestyle changes, medication, or other treatments that can help you manage the condition and improve your overall health.

Key points to remember:

- Multifactorial inheritance involves a combination of genetic and environmental factors.
- Having a family history of a condition may increase your risk, but lifestyle and environmental factors also play a role.
- Predicting inheritance is difficult, and the severity can vary even within the same family.

Further information

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