Neuroendocrine cancer and genetics

NeuroEndocrine Cancer Australia

Understanding NETs and Genetics

The majority of neuroendocrine cancers occur sporadically, this means there is no known underlying genetic cause. However, it is important to understand there are some neuroendocrine cancers that occur due to genetic disorders or inherited conditions.

Genetic conditions known to be associated with NETs

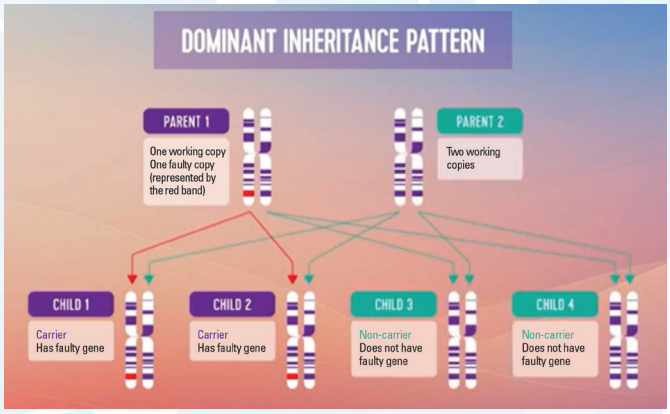
- Multiple Endocrine Neoplasia (MEN)
- Familial Phaeochromocytoma and Paraganglioma Syndrome
- Von Hippel Lindau Disease (VHL)
- Neurofibromatosis Type 1
- Tuberous sclerosis

Some genetic disorders or inherited conditions mean a person is at an increased risk of developing one or more types of neuroendocrine cancer.

Knowledge that a person or family carries a genetic risk of neuroendocrine cancer, empowers them to undergo screening tests and monitoring. In some instances this can lead to earlier diagnosis and treatment of neuroendocrine cancer.

Genetic disorders and inheredited conditions associated with some Neuroendocrine Cancers

There are a number of gene changes, or faults, that can lead to an increased risk of neuroendocrine tumours. These can occur as a new change in a gene (somatic) or can be inherited from a parent (germline). When inherited, neuroendocrine gene faults usually occur in a dominant pattern. This means each child of an affected parent has a 50% chance of inheriting the faulty gene.



Multiple Endocrine Neoplasia (MEN) 1 is the term used for a group of inherited tumours that can occur in more than one place, and can be benign or malignant. The MEN 1 gene is a tumour protection gene. When the gene is faulty, tumours can develop. MEN1 is associated most commonly with NETs of the pituitary and pancreas. People with MEN1 can also develop high calcium from overactive parathyroid glands (hyperparathyroidism).

Multiple Endocrine Neoplasia (MEN) 2 is the term used to describe a faulty RET gene. The RET gene is involved in thyroid, parathyroid and adrenal gland cell growth. NETs that can be most commonly associated with MEN2 are phaeochromocytoma and medullary thyroid cancer. People with MEN2 can also develop high calcium from overactive parathyroid glands (hyperparathyroidism).

Familial phaeochromocytoma and paraganglioma syndrome is the term used when there is a fault with a succinate dehydrogenase (SDHA/SDHB/SDHC/SDHD) gene. These genes are responsible for suppressing tumour development. The presence of a fault in one of these genes is associated with an increased risk of developing phaeochromocytomas, paragangliomas, kidney cancers, pituitary NETs and gastrointestinal stromal tumours (GIST).

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Von Hippel Lindau (VHL) Disease is caused by a fault in the VHL gene. The VHL gene helps to control blood vessel growth. People with VHL disease have an increased risk of developing benign tumours, kidney/renal tumours, phaeochromocytomas and pancreatic NETs, central nervous system and retinal hemangioblastomas, inner ear tumours and GEP NETs.

Neurofibromatosis Type 1 is caused by a fault in a tumour suppressor gene called NF1. Neurofibromatosis type 1 is associated with phaeochromocytoma and GEPNETs. Genetic testing may not be necessary as there are other clinical signs which can assist with diagnosis.

Tuberous sclerosis is caused by a fault in the genes TSC1-TSC2, these genes are involved in regulation of cell growth. Tuberous sclerosis is associated with non-cancerous tumours and a higher risk of developing pancreatic NETs.

Important points

- Genetic counselling and testing is a specialised area of healthcare.
- Genetic counselling is required before genetic testing can be undertaken.
- People diagnosed with a neuroendocrine cancer should ask their specialist whether their neuroendocrine cancer may have a genetic link, especially if they have a family history of neuroendocrine cancer or uncommon cancers.
- Anyone diagnosed with a neuroendocrine cancer should have a detailed family cancer history documented
- A person diagnosed with phaeochromocytoma or paraganglioma should be offered a referral for genetic counselling and, where appropriate, genetic testing.
- A person diagnosed with medullary thyroid cancer should be offered a referral for genetic counselling and where appropriate, genetic testing.
- It is important to understand genetics so that, where appropriate, families can manage their risk of a neuroendocrine cancer

Understanding and information about NETs and genetics is constantly evolving. It is vital to check back in on the topic every few years to see if any more recommendations have been made as more information is discovered through research.

If you need further information or support about genetics and neuroendocrine cancer, contact the **NET nurses at NeuroEndocrine Cancer Australia on 1300 287 363** Monday-Friday 9am-5pm.