



# Alef8

Screening for eight common  
Jewish genetic disorders  
in one blood sample

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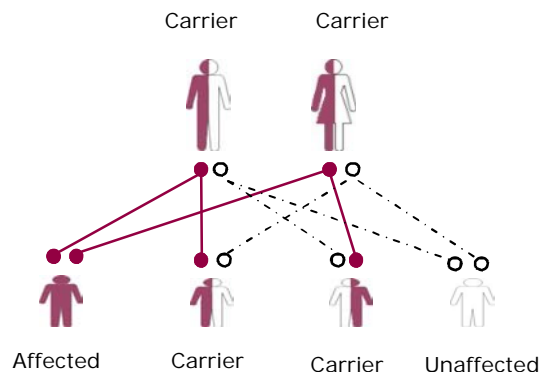
In the UK, most Ashkenazi Jews know that they are at increased risk of having a child with Tay-Sachs disease, but few realise that their chance of carrying another genetic disorder is much higher.

In Israel, it is routine to offer a DNA test that will establish carrier status for several such disorders simultaneously in a single blood sample. **Alef8**, a test for eight disorders is now available from **genome**

## CARRIERS

All genes come in pairs. **Alef8** disorders occur when both genes in a pair are faulty; each disorder is caused by a different gene pair. Carriers have only one faulty gene and so are healthy.

**Carrier couples** Children receive one gene of a pair from each parent. So a child is only affected if (1) both parents are carriers of the same disorder and (2) both pass on their faulty gene, which happens in 25% of pregnancies:



**Family history** Despite the high risk to carrier couples, most affected children are born into families where there is no previous history of the disorder.

**Carrier frequency** The chances of being a carrier of an **Alef8** disorder are:

Tay-Sachs disease	1 in 25
Canavan's disease	1 in 40
Niemann-Pick disease A & B	1 in 90
Bloom's syndrome	1 in 100
Familial dysautonomia	1 in 30
Fanconi's anaemia C	1 in 90
Cystic fibrosis	1 in 30
Mucopolysaccharidosis IV	1 in 100

**Carrier detection rate** Many different faults in a gene can lead to the same disorder. DNA tests are designed to test for the most common faults but inevitably will not detect 100% of carriers. Ashkenazi Jews are genetically more similar to each other than are non-Jews, so the carrier detection rate is very high.

## DISORDERS

**Tay-Sachs disease** A metabolic disorder causing a lipid build-up, which particularly affects the brain, and leads to death in early childhood. *Carrier detection rate 94%.*

**Canavan's disease** A disorder affecting the white matter in the brain. After initial normal development, symptoms start in late infancy, and inevitably lead to death, usually in early childhood. *Carrier detection rate 98%.*

**Neimann-Pick disease A & B** A metabolic disorder causing a lipid build-up in the liver and brain, leading to death in early childhood. *Carrier detection rate 95%.*

**Bloom's syndrome** A disorder resulting in short stature, skin problems and infections. There is an extremely high risk of cancer leading to shortened life expectancy. *Carrier detection rate 95-97%.*

**Familial dysautonomia** A neurological disorder particularly affecting the autonomic system that regulates involuntary functions such as swallowing, temperature and blood pressure regulation. Treatment has improved but average life expectancy remains about 30 years. *Carrier detection rate 99%.*

**Fanconi's anaemia C** A blood disorder characterised by deficiency in red cells, white cells and platelets, and congenital birth defects. There is a high risk of infections and cancer, particularly leukaemia, leading to an average life expectancy of about 30 years. *Carrier detection rate more than 99%.*

**Cystic fibrosis** There are excessive amounts of thick mucus in the lungs and digestive tract. Treatment has improved but average life expectancy is still only 30-40 years. It is common in all Caucasian populations but in Ashkenazi Jews there is a very high *carrier detection rate of 97%.*

**Mucopolysaccharidosis IV** A disorder causing the presence of storage bodies in every cell containing partially broken down lipids. There are severe neurological and eye problems as well as mild to moderate learning disability. *Carrier detection rate 96%.*

## TESTING

This can be done for couples or individuals. For couples the woman's sample is tested first and the man's sample is tested only if the woman is found to be a carrier.

## HOW TO BE TESTED

Contact **genome** by phone or in writing. You will be sent a sampling pack containing vials, request form, payment details and return envelope. Blood sampling can be done by your doctor, or at Leeds Screening Centre, if you live nearby. A result is usually available within 15 working days.

## RESULTS

The chance that an Ashkenazi Jewish *individual* is a carrier of at least one **Alef8** disorder is 1 in 6. However, the chance that an Ashkenazi Jewish *couple* are both carriers of the same disorder is only 1 in 200. If they are each carriers of a different **Alef8** disorder, there is no risk of their children being affected.

## OTHER OPTIONS

**Tay-Sachs disease** The carrier detection rate is slightly higher using biochemical rather than DNA testing. Detection could be increased from 94% to 96% by doing an additional test.

**Gaucher's disease** Some centres in Israel and the USA include this when screening Ashkenazi Jews. It is common with a carrier frequency of 1 in 15. But the disorder is relatively mild, many do not even have symptoms and it is treatable. Hence the UK Gaucher's Association do not recommend screening. However, if requested we will add it to **Alef8** at no extra cost.

## ADDITIONAL TESTS

In Israel, screening is routinely done for fragile X syndrome and spinal muscular atrophy although the gene frequency is the same as for non-Jews. We also offer these tests.

**Fragile X syndrome** The most common cause of severe learning disability after Down's syndrome.

**Spinal muscular atrophy** A debilitating disorder that destroys nerve cells and causes death mainly in infancy.



## MORE INFORMATION

Center for Jewish Genetic Diseases, New York ([www.mssm.edu/jewish\\_genetics](http://www.mssm.edu/jewish_genetics))

National Tay-Sachs and Allied Diseases Association ([www.ntsad.org](http://www.ntsad.org))

**genome** offers a range of screening tests, including those previously carried out at the University of Leeds since 1991, under the direction of Professor Howard Cuckle, a leading international authority on screening.