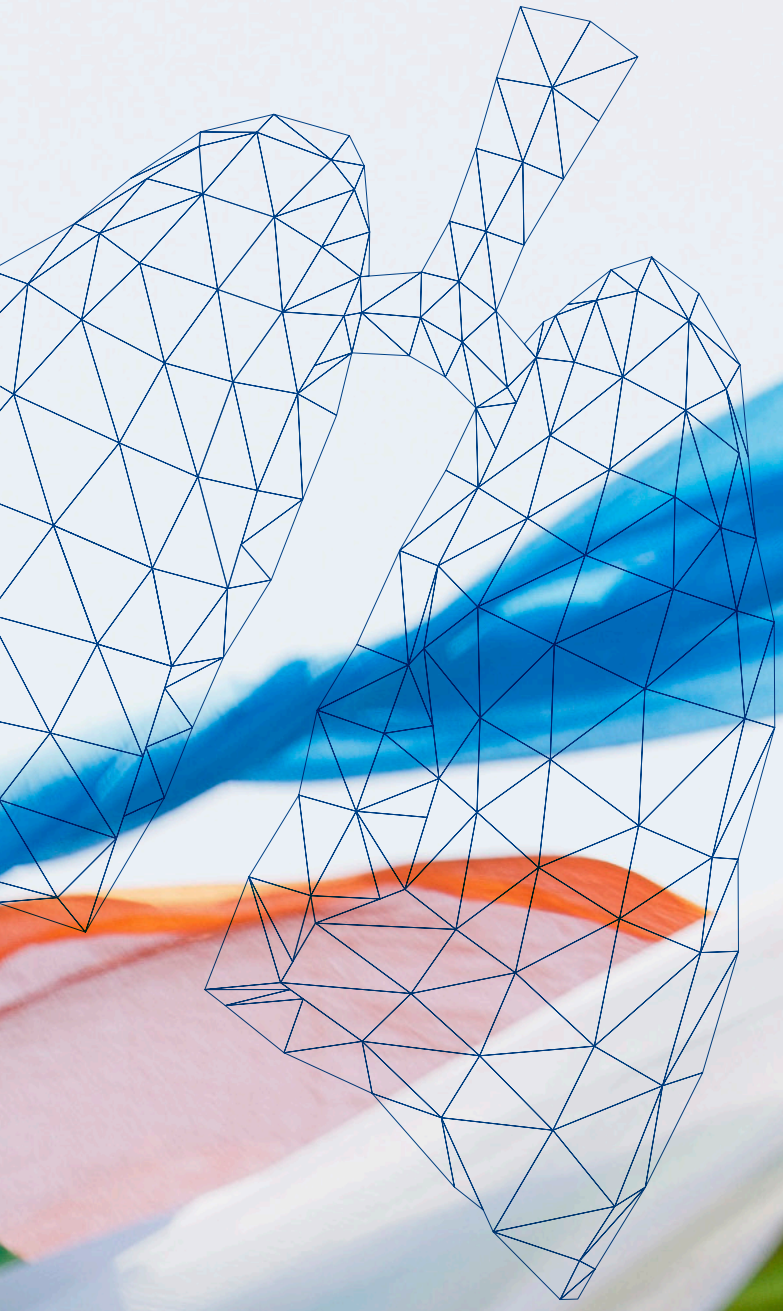
DID YOU KNOW THAT GENETICS MAY BE THE UNDERLYING CAUSE OF YOUR COPD?

Find out about alpha-1 and its link to COPD



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COULD GENETICS BE THE SOURCE OF YOUR COPD?

If you are reading this, you or someone you know is probably living with **chronic obstructive pulmonary disease (COPD)**. COPD defines a group of lung problems that obstruct the airways, making it difficult to breathe. These include emphysema, chronic bronchitis, bronchiectasis, and chronic asthma in adults.

You may be aware that COPD can be caused by external factors or lifestyle choices, such as smoking. But did you know that, in some cases, the cause is genetic? If your COPD is caused by a genetic factor, you have a condition called alpha-1.

Lung problems caused by **alpha-1** are similar to common lung diseases and are **frequently diagnosed as COPD**.

Alpha-1 is the major known genetic risk factor for COPD, which means that having alpha-1 makes you more likely to develop COPD. Alpha-1 is often called "genetic COPD" because it can be passed down through families.

WHAT IS ALPHA-1 AND HOW DOES IT AFFECT THE LUNGS?

Alpha-1 antitrypsin deficiency, also known as **AATD** or **alpha-1**, is a hereditary condition. Alpha-1 occurs when there is a severe lack of a protein in the blood called **alpha$_1$ antitrypsin** (AAT), which is mainly produced by the liver. When you have alpha-1, your body either produces no AAT or creates it with the wrong shape.

The main role of AAT is to protect the lungs from inflammation caused by infection and inhaled irritants. When our lungs are exposed to an irritant or even an infection, it can damage the lungs. So, our body sends out something called neutrophil elastase, which is an enzyme that destroys the irritants.

The problem is that neutrophil elastase, if left unchecked, can also destroy healthy lung tissue. That's where AAT comes in. AAT blocks the neutrophil elastase in order to protect the lungs.

If you have alpha-1 there is no or not enough AAT reaching your lungs to stop the neutrophil elastase. This means that healthy lung tissue slowly becomes compromised over time.

Alpha-1 is a disease that people are born with, but as the symptoms develop slowly it is often only identified once it has caused problems to their lungs and/or liver.

Many people can live their whole lives without realising that they have the disease.

HOW MIGHT YOU DEVELOP ALPHA-1?

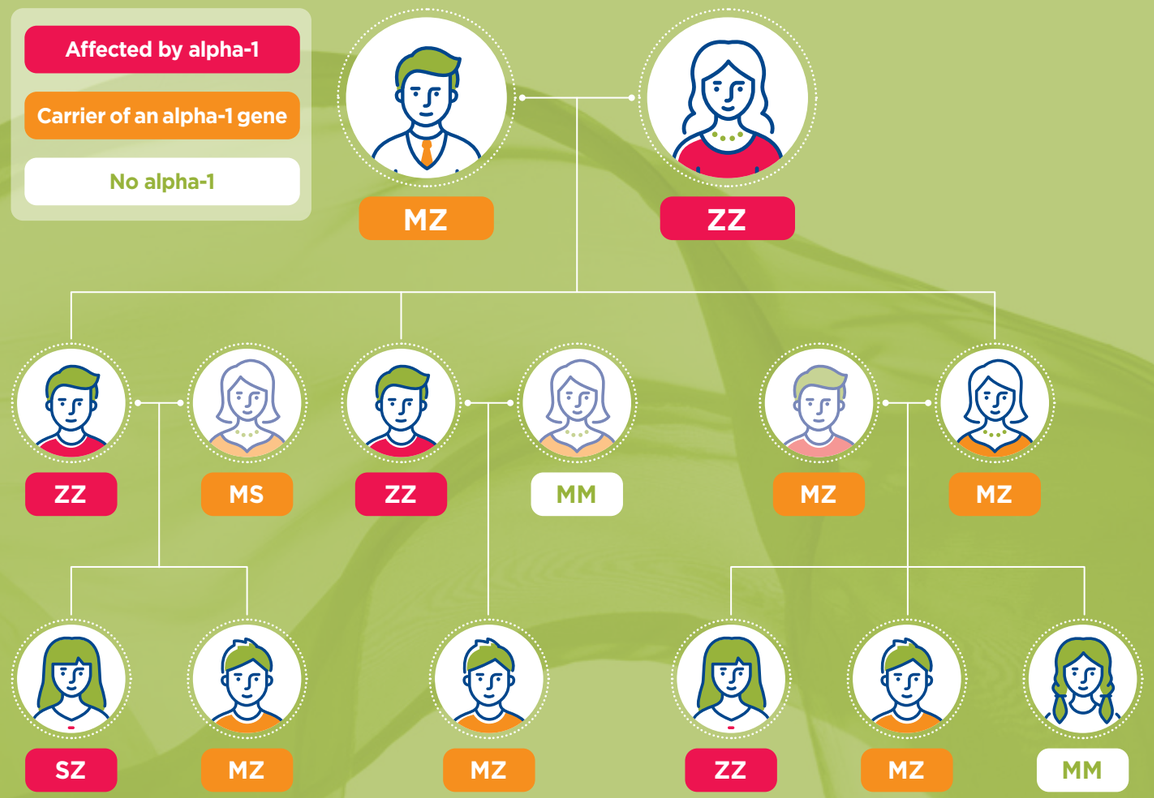
Alpha-1 is a genetic disease. This means if one or both of your parents have a copy of the gene responsible for AATD, you may be at risk for developing the disease; or you may be carrying the defective copy and could potentially pass it on to your own children. Your level of risk depends on the combination of copies of the gene, also known as **alleles**, that you carry.

The **normal** AAT protein is made from the **M allele**. The most common defective alleles are the **S and Z**. Anybody who has one normal and one variant AAT allele, such as MZ, are called carriers.

There are many different possible genetic variant combinations, but the most frequent are:

ALLELE COMBINATION	PATIENT DESCRIPTION	ALPHA-1 LEVELS	RISK OF LUNG AND/ OR LIVER DISEASE
MM	Normal	Normal levels	
MS	Carrier	Normal to low levels	Most studies do not show an increased risk of disease. It is unclear whether there is a risk of getting disease symptoms, but you are carrying an abnormal AAT gene.
MZ	Carrier	Moderately low to low levels	**Mild to moderate AAT Deficiency** — may get disease symptoms and you are carrying an abnormal AAT gene.
SS	Alpha-1	Moderately low to low levels	Most studies do not show an increased risk of disease. It is unclear whether there is a risk of getting disease symptoms, but you are carrying two abnormal AAT genes.
SZ	Alpha-1	Low levels	**Severe deficiency** — could get the disease and you are carrying two abnormal AAT genes.
ZZ	Alpha-1	Very low levels	**Severe deficiency** — could get the disease and you are carrying two abnormal AAT genes.

EXAMPLE OF HOW ALPHA-1 IS INHERITED



If you have alpha-1, then it is possible that someone else in your family has it as well.

Bear in mind that you can only see the physical symptoms of alpha-1 once damage has already occurred to your liver and/or lungs. It's important to have a diagnosis as early as possible!

HOW MIGHT YOU BENEFIT FROM ALPHA-1 TESTING?

Getting tested for alpha-1 is a straightforward process and is recommended for everyone who has COPD to help your doctor in identifying the source of your condition.

If you are diagnosed with alpha-1, it means that your doctor now knows the main cause of your disease and can look to manage it appropriately:

- There are **lifestyle** changes you can make that may help prevent further complications
- You might also be eligible for **treatment** to slow the progression of the disease.

And if the test is negative, your doctor will rule out alpha-1 as a possible cause of your COPD and will be able to focus on other possible causes.

HOW DOES THE TESTING WORK?

Testing for alpha-1 is fairly simple, quick and highly accurate. The diagnosis of alpha-1 is usually determined by laboratory tests. Your doctor will require only a small blood sample in order to know how much AAT protein you have in your blood and which AAT genes you have.

Genetic testing can also be done through a mouth swab test. Your doctor will help you decide which test is more convenient for you.

Remember: early detection helps to slow down disease progression.

WHO SHOULD BE TESTED?

If you have alpha-1 or carry a defective copy of the gene, your **immediate relatives** (your children, parents, brothers and sisters) are at risk of having the S or Z genes. Other relatives who have lung or liver disease are also considered at greater risk. It is therefore important that they are also tested for AATD.

In addition to patients with COPD (emphysema and/or chronic bronchitis), testing is **also advised** for anyone with the following **medical conditions**:

- Bronchiectasis
- Unexplained liver disease
- Liver disease with a family history of liver disease
- Panniculitis, a skin disease

Speak with your doctor to find out more about testing for alpha-1.

WHERE TO FIND ADDITIONAL SUPPORT

Whether you are thinking about getting tested or have already been diagnosed, there is more helpful information available. The area where you live may have support groups and/or patient organisations that can offer you guidance and support.

Patient organisations are the best place to share experiences and to learn more about living with AATD.

- You can find out if there is a support organisation in your country here: **www.alpha-1global.org**
- Additional information and resources about alpha-1 can be found here: **www.alpha1.org**

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