

To understand the different types of porphyria, please read our “**Introduction to Porphyria**” leaflet.

## Testing for porphyria

*Different* porphyrins or porphyrin precursors are permanently raised in each type of porphyria. This is very useful for diagnosis.

However, levels of some porphyrins can be raised in anyone, when they are ill. Unfortunately, in the past, tests have checked raised levels of porphyrins without distinguishing between the different types, sometimes leading to a false diagnosis of porphyria.

For this reason, and because of other difficulties in testing, **diagnostic testing needs to be done by a specialist laboratory**. The only possible exception to this is the check for PBG in urine, which most local hospital laboratories should be able to do.

Since porphyrins are affected by light and degrade easily, test samples must be fresh and the containers wrapped quickly in either foil or black plastic (but label the container with your name *before* wrapping!)

## How is a porphyria diagnosed?

### Diagnosis of an acute porphyria:

- Symptoms of an attack
- PBG test
- Biochemical tests

### Diagnosis of a cutaneous (skin) porphyria:

- Skin symptoms
- Biochemical tests
- (Light sensitivity tests can also be used, but are only done occasionally.)

**PBG in urine** is raised at the start of an **acute attack**. A lab test gives a colour change in the presence of PBG, showing if the level is raised. However, the level can drop quickly, so *the test*

*has to be done at the **start** of the attack to be reliable*. If the PBG level is raised, biochemical tests are used to find the type of porphyria.

**Biochemical tests** to diagnose **all types of porphyria** are done on urine, blood and faeces, to check which porphyrins are raised and in which samples.

Chromatography is often used to separate the different porphyrins, and a variety of tests can be done. One measures fluorescence – the wavelength of light given out when light is shone on the sample. The wavelength shows which porphyrin is present, and its brightness shows the quantity. Levels of porphyrin higher than normal show the type of porphyria.

**Once diagnosed, the person should see a porphyria specialist for advice on how to live with the porphyria, and possible treatment.**

## Diagnosis of an acute attack

Once it is known that someone has an acute porphyria, a **PBG test** can be used to check if symptoms (e.g. pain) are due to an attack. If it is not an attack, other possible causes can be looked for (e.g. abdominal pain could be appendicitis).

## Genetic testing (DNA testing)

Genetic testing is done on a blood sample. **It is not possible to diagnose a porphyria by genetic testing**. (The gene for AIP alone has 10,000 base pairs, and there are seven genes to hunt through. It would be like hunting for a needle in a haystack!)

Once the type of porphyria is known, it is *usually* possible to find the faulty base pair.

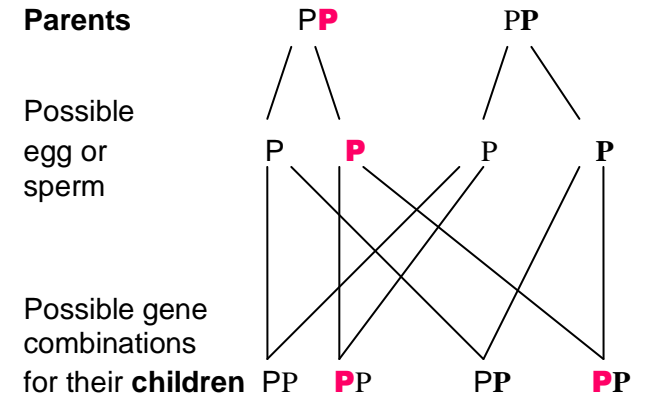
Then **other members of the family** can be checked very quickly for the porphyria. (Umbilical cord blood from a new baby can be tested, but this should be discussed with a porphyria specialist before the birth).

It will help you to understand how genetic testing can be useful, if you understand how the porphyrias are inherited.

## How do we inherit porphyria?

We carry **two** sets of most genes in our cells, one from each parent. When eggs and sperm are formed, they contain only **one** copy of each gene.

So each person has two copies of the gene which determines whether you have a porphyria or not. They will only pass one of these on to a child. Different varieties of the same gene are shown below as different lettering, and **P** is the porphyria variety.



**AIP, VP, HCP & familial PCT are all dominant**. If you have one porphyria gene, you can be ill or have skin symptoms. A second normal gene doesn't help you to stay well. Those with the **P** gene in the diagram could be ill with porphyria.

**CEP, ADP and HEP (a rare form of PCT) are recessive**. One **P** gene doesn't cause problems, as the second gene works properly, keeping you well. So, those with a **P** gene in the diagram wouldn't have porphyria. Two porphyria genes, **PP** (one **P** gene from each parent) *will* cause problems.

**EPP** is also recessive, but there are *two P* genes. One is very common (**P<sub>c</sub>**), and causes no real problems, even when someone has two copies (**P<sub>c</sub>P<sub>c</sub>**). The second **P** gene is rarer, and has a much more severe effect (**P<sub>r</sub>**). *Usually*, people with EPP have one of each (**P<sub>c</sub>P<sub>r</sub>**) and the combination is severe. Their parents are usually not affected, since each of them have only one type (**P<sub>c</sub>** or **P<sub>r</sub>**). *However, the pattern of inheritance can be different in some families.*

### The consequences for families

**AIP, VP and HCP:** These are dominant. So someone with one of these almost certainly has a *parent* who has the faulty gene (and who is at risk of illness). Each of their *children* has a 50:50 chance of inheriting it.

The gene only makes about 1 in 5 people ill, so many people have no idea that they have it. We don't yet know the reasons for this, but we *do* know some things which can trigger attacks (such as alcohol) - see our "*Introduction to porphyria*" and "*Drugs and Porphyria*" leaflets.

**Relatives need a genetic test, to find if they have an acute porphyria, so they can avoid the triggers.** (Women are particularly at risk - hormone changes can help trigger attacks.)

This may not prevent attacks entirely but, if the porphyria is known, an attack can be treated quickly. **Delays in treatment can lead to paralysis and sometimes death.**

**Familial PCT** (the type caused by a porphyria gene) is also dominant with the gene affecting about 1 in 5 of those who have it. However, many experts think genetic testing is not useful - PCT needs an environmental risk factor to trigger skin problems, and it is treatable.

**CEP, HEP and ADP** are *recessive* forms of porphyria. A person with one of these has inherited two porphyria genes, one from each parent. Because a single **P** gene doesn't cause

problems, the parents are usually not affected. Similarly, the children of a person with one of these porphyrias usually only inherit one **P** gene, and are not affected. However the effects of these genes can be very nasty. **With CEP particularly**, it is advisable to talk to a genetic counsellor about genetic testing.

**EPP:** Because of the way this is usually inherited, it is advisable to test the partner of someone with EPP for the **P<sub>c</sub>** gene. It is then possible to predict whether their children could have EPP.

**If in doubt, discuss genetic testing with a porphyria expert, or a genetic counsellor.**

#### Further information:

**BPA leaflets** request from helpline, or download from BPA website

**www.porphyrria.org.uk** BPA (info + link to Cardiff University Hospital's website, which has a printable *drugs* list)

**www.porphyrria-europe.com** European Porphyria Initiative (info plus *drug* safety database)

**MedicAlert** - ☎ 020 7833 3034 or **www.medicalert.org.uk**

#### What does the British Porphyria Association (BPA) do?

Our aims are to:

- Support members, particularly with information (newsletters, leaflets, etc.)
- Increase awareness among the public and medical staff (leaflets, talks by members, etc).
- Support research where possible.

**British Porphyria Association**  
**Helpline:** ☎ 01474 369 231

# Testing for Porphyria

(including genetic testing and inheritance)



British Porphyria  
Association

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