

EPP is also recessive, but there are two **P** genes. One is common (**P_c**), and causes no real problems, even when someone has two copies (**P_cP_c**). The second gene is rarer (**P_r**), and has a much more severe effect. Usually, people with EPP have one of each (**P_cP_r**) and the combination is severe. In many cases parents are unaffected, since each have only one type (**P_c** or **P_r**). However, the pattern of inheritance can be different in some families, in particular for those with **XLEPP**.

The consequences for families

AIP, VP and HCP: Although there is a 50% chance of inheriting a **P** gene, only about 1 in 5 people affected will be ill, so many people have no idea that they have it. We don't yet know the reasons for this, but we do know about things that can trigger attacks (such as alcohol and drugs). Please see our *Introducing porphyria* and *Acute intermittent porphyria* leaflets for more information on symptoms and treating these conditions.

Blood relatives do need to be tested (preferably via genetic testing) to check whether they have an acute porphyria, so that they can avoid the triggers. (Women are particularly at risk as hormonal changes can cause attacks.)

Familial PCT is also dominant (50% chance of inheritance) with the gene affecting about 1 in 5 of those who have the affected gene. However, many experts think genetic testing for relatives is not useful as PCT needs an environmental risk factor to trigger skin problems, and it is treatable.

CEP, HEP and ADP are recessive forms of porphyria. Because a single **P** gene doesn't cause problems, the parents are usually unaffected. Similarly, the children of those affected are

usually unaffected. However, the effects of these genes can be nasty. With CEP in particular it is advisable to talk to a genetic counsellor.

EPP: Because of the way EPP is usually inherited, it is advisable to test the partner of someone with EPP for the **P_c** 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.

Useful contact details

BPA telephone helpline: 0300 30 200 30

BPA email helpline: helpline@porphyria.org.uk

European Porphyria Network: www.porphyria-europe.com

British Association of Dermatologists: www.bad.org.uk

Medic Alert: www.medicalert.org.uk

Acute porphyria patient experience videos:
www.youtube.com/user/acuteporphyrias/videos

Specialist porphyria testing: is available at laboratories at each of the following porphyria centres (Kings and Cardiff also do genetic testing):

- King's College Hospital, London
- University Hospital of Wales, Cardiff
- Salford Royal Hospital, Salford
- St James University Hospital, Leeds

For an up-to-date list see the British and Irish Porphyria Network (BIPNET) website: www.bipnet.org.uk.

UK Porphyria Medicines Information Service (UKPMIS, previously WMIC): provides advice and a list of SAFE drugs for those with acute porphyrias: www.wmic.wales.nhs.uk/porphyria_info.php. Or 029 2074 3877 / 029 2074 2251.

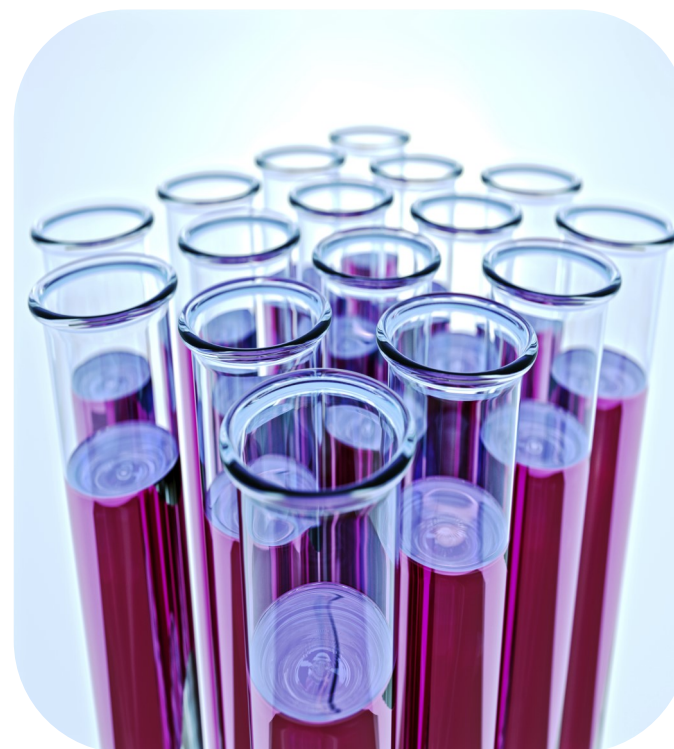
Dundee Cream can help those with photosensitivity: Dundee Pharmaceuticals, Ninewells Hospital, Dundee. DD1 9SY. Tel: 01382 632052.

British Porphyria Association

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Testing and inheritance (including genetic testing) Information leaflet



Testing for porphyria

An accurate diagnosis of porphyria is vital so that patients and their families can learn about the best ways to deal with their condition. However, testing often causes confusion among patients and medical professionals alike.

If diagnosed, it is advisable to see a porphyria specialist for advice on how to live with your porphyria, and the best possible treatments.

In each type of porphyria, there is a distinctive pattern of porphyrins in blood, urine and faeces, which is very useful for diagnosis. However levels of porphyrins may be normal in people with porphyria who do not have current symptoms. Also porphyrin levels may be raised in people with other medical conditions who do not have porphyria. For these reasons, diagnostic testing is best done by a specialist porphyria laboratory. The only possible exception to this is the check for PBG in urine, which some local hospital labs are able to do.

Porphyrins are affected by light and degrade easily. Test samples must be fresh and protected from light by wrapping containers quickly in either foil or black plastic.

Diagnosis of an ACUTE porphyria

If *suffering from symptoms* that could potentially be caused by acute porphyria, the first test that should be done is a urine porphobilinogen (PBG) test. In some acute porphyrias the levels of PBG can drop very quickly after the onset of the attack, therefore the test needs to be done at the start of the attack to be reliable. If the PBG level is raised, this will be followed by further biochemical testing (see next section) to confirm which porphyria is present.

If there is a *family history* of acute porphyria, you

will need a referral to a porphyria specialist for screening. There are two possible methods:

- Biochemical testing
- Genetic testing—but this is only possible if a definitely affected family member has already had genetic testing.

Diagnosis of a CUTANEOUS (SKIN) porphyria

If *suffering from symptoms* of photosensitivity, a skin porphyria may be suspected. This can be confirmed by biochemical testing (see below). **Family screening** may be done depending on which skin porphyria is at play. See overleaf for more details.

Testing methods

Biochemical tests: are done on urine, blood and faeces, and are used to diagnose all types of porphyria by checking which porphyrins are raised in which samples.

Genetic/DNA testing: is done on a blood or saliva sample. *It is not feasible to use this method for diagnosis*, since there are too many genes and possible faults. Biochemical testing is used together with an assessment of symptoms. Once a porphyria is known, a genetic test can often find the fault in the gene.

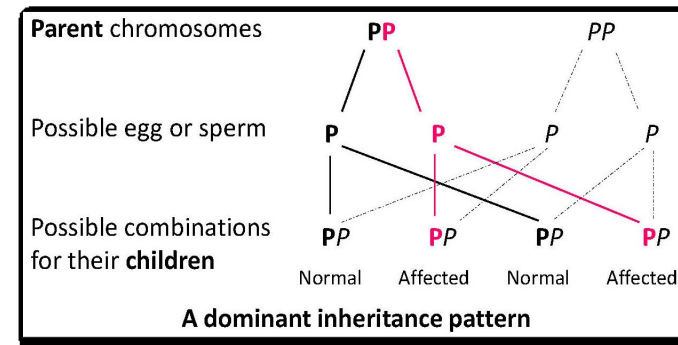
If the fault is found, other members of the family can then be checked relatively quickly. New babies of gene carriers can be tested at birth (umbilical cord testing), or tested in the months after birth very easily with swabs taken from the mouth. Please speak to your porphyria specialist if you would like to do this.

How do we inherit porphyria?

Human body cells each contain 23 **pairs** of chromosomes. These chromosomes carry our genes. We get one set of chromosomes from each of our parents, one set from the mother, the other from the

father. Which chromosome we get from each pair is completely random, but will determine whether or not a porphyria is passed on to a child.

Porphyria genes can be dominant or recessive depending on the type of porphyria. The inheritance pattern for a dominant gene is shown here: **P** is the porphyria gene, **p** is the normal gene.



AIP, VP, HCP and familial **PCT** all occur due to dominant genes. If you have one of these porphyria genes (**P** in the diagram), you could be ill or have skin symptoms. There is a 50% chance of inheriting one of these porphyrias if one of your parents has porphyria.

CEP, ADP and HEP (a rare form of PCT) occur due to recessive genes. One **p** gene doesn't cause problems, as the second gene works properly. So, those with one **p** gene in the diagram wouldn't have porphyria. Two porphyria genes, **pp** (one from each parent) will cause problems.

