

Hormone Disorders

# Multiple Pituitary Hormone Deficiency

Patient's Guide



Average readability

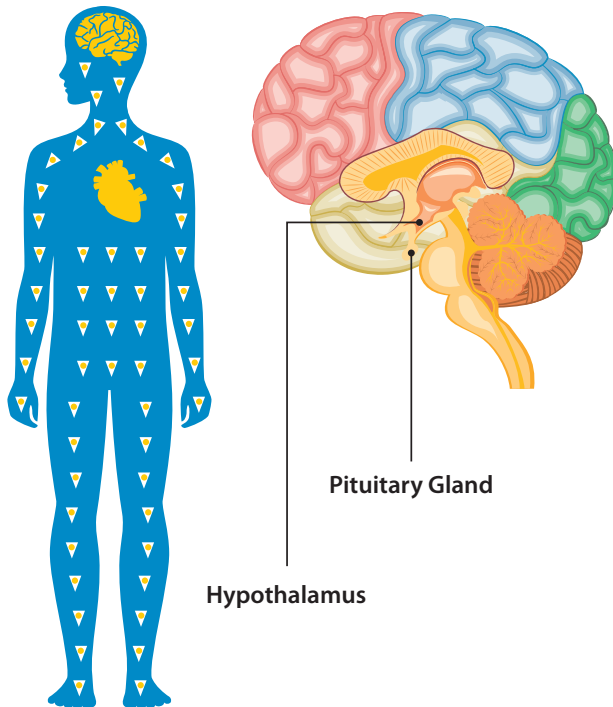


## Introduction

This leaflet is to tie together many aspects of pituitary hormone insufficiencies and their treatment. There are other leaflets in the series, which give more information about each particular hormone deficiency. Your doctor or nurse will give these to you if appropriate.

## What are hormones?

Hormones are messengers used around the body to produce an effect. These regulate various body processes such as growth, hunger, thirst and reproduction. Hormones are produced in two parts of the brain called the hypothalamus and the pituitary gland. Any low level of a hormone is usually the result of problems in the hypothalamus, the pituitary gland or both.



# What is Multiple Pituitary Hormone Deficiency?

Multiple Pituitary Hormone Deficiency (MPHD) occurs when the brain fails to produce sufficient amounts of more than one hormone. These may include some or all of the following hormones:

- **Growth hormone (GH):** This makes children grow
- **Gonadotrophins (FSH & LH):** These make puberty happen and control fertility
- **Thyroid hormones (TSH):** These control the body's metabolism
- **Antidiuretic hormone (ADH):** This controls how much urine you make
- **Adrenocorticotrophic hormone (ACTH):** This keeps blood cortisol levels

## What are the causes of MPHD?

In many cases there is no clear cause to MPHD. In other cases, the cause is due to an inborn abnormality in the brain. In others, certain genetic changes can predict hormone deficiencies. MPHD can also be caused by radiotherapy to the brain or damage to the pituitary and hypothalamus by a cyst/tumour or surgery.

Usually the first hormone to become deficient is growth hormone. This deficiency is then followed by a failure of the gonadotrophins, the thyroid stimulating hormone and the adrenocorticotrophic hormone.

The timing of when these further hormone insufficiencies occur varies between individuals. Some individuals experience a rapid loss of all of the hormones, whereas in others it may take years for all of the insufficiencies to appear.



## How is MPHD treated?

As already mentioned, MPHD results when more than one hormone is deficient in the body. Treatment will consist of replacing these hormones with a synthetic form. This synthetic form is similar to the natural hormone but may last longer in the body. The appropriate treatment for each deficiency in MPHD is described below:

- **Growth hormone (GH) Insufficiency:** The main function of this hormone is to stimulate growth but it also boosts energy and helps you feel well. However, it has other important functions in adulthood. Treatment for this deficiency is by injection. In children, the response to treatment is assessed by monitoring the rate of growth. In adolescents and young adults, other methods may include measures of muscle mass, bone density and overall quality of life.
- **Gonadotrophin (FSH & LH) insufficiency:** These hormones are necessary for the development of puberty. Deficiency of these hormones is treated by sex steroid replacement. In boys this will be as testosterone (injections, tablets or skin gels) and in girls as oestrogen and progestogen (tablets or skin patches). In adulthood, treatment to bring about fertility will be required. This is a more complex treatment which is achieved by injections of GnRH or gonadotrophins according to a fixed plan.



- **Thyroid hormone (TSH) insufficiency:** An insufficiency of this hormone leads to an under active thyroid gland. This will affect growth as well as slowing many other mental and metabolic functions in the body. Replacement treatment for this insufficiency is a daily tablet.
- **Adrenocorticotrophic hormone (ACTH) insufficiency:** This hormone helps to produce cortisol. This is important for general well-being and for maintaining the correct blood pressure and sugar balance in the body. Replacement treatment is usually given in the form of tablets. In children, a normal growth rate will show that the correct dose is being given. If too much is given, the growth rate will be affected and will slow down.
- **Antidiuretic (ADH) hormone insufficiency:** This hormone, which is also known as vasopressin, is responsible for keeping the body's water balance. Without vasopressin the body will not retain fluids, even if we drink large amounts of liquid. A deficiency of this hormone leads to a condition known as "water diabetes". Treatment for water diabetes is in the form of DDAVP tablets, intranasal drops or spray.

## How is MPHD predicted in children with growth hormone deficiency?

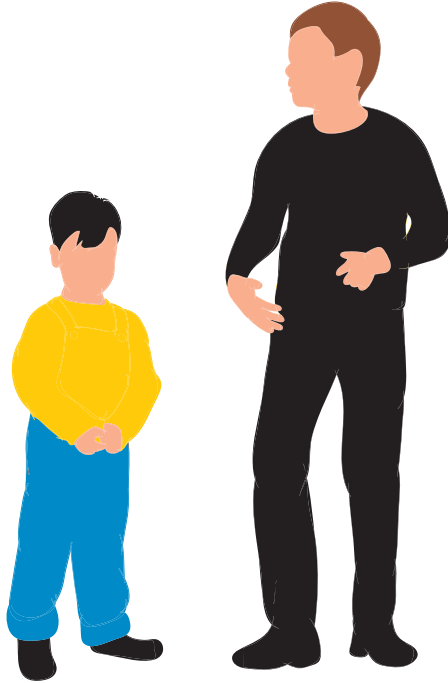
Predicting which children with a deficiency in growth hormone will develop further hormone insufficiencies can be possible if some genetic changes are identified.

Help may be obtained by doing a magnetic brain (MRI) scan. These tests will show the size and appearance of the pituitary gland. These results may help in deciding the diagnosis. Children with abnormality of brain development (i.e. septo-optic dysplasia) will usually have MPHD.



Some children will have additional symptoms such as:

- A slowing down of their rate of growth
- Hypoglycaemia (low blood sugar)
- A failure to go into puberty



The first tests will assess the pituitary gland to see how many of the hormones are insufficient. However, the loss of hormones can occur over a number of years. Due to this, it may be necessary to repeat these tests every few years.

In addition, a check of hormone levels will be needed just before puberty. This is done to see if additional treatment should be given. A further hormone check should be done when growth has stopped. This is to confirm which hormones are insufficient before treatment in adulthood.

## What are other sources of useful information?

The goal of this leaflet was to provide a basic overview of MPHD.

Further information, including this and other leaflets can be freely downloaded from the British Society for Paediatric Endocrinology and Diabetes Website at [www.bsped.org.uk](http://www.bsped.org.uk)

Educational material can also be found by contacting the following organisations:

- **European Society for Paediatric Endocrinology**  
Starling House  
1600 Bristol Parkway North  
Bristol  
BS34 8YU  
[espe@eurospe.org](mailto:espe@eurospe.org)  
Telephone +44 (0) 1454 642246  
[www.eurospe.org](http://www.eurospe.org)
- **British Society of Paediatric Endocrinology and Diabetes**  
[bsped@endocrinology.org](mailto:bsped@endocrinology.org)  
<https://www.bsped.org.uk/>
- **Child Growth Foundation**  
[info@childgrowthfoundation.org](mailto:info@childgrowthfoundation.org)  
Telephone +44 (0) 208 995 0257  
[www.childgrowthfoundation.org](http://www.childgrowthfoundation.org)
- **The Endocrine Society**  
[www.endo-society.org](http://www.endo-society.org)

You can also consult your specialist team for additional information in your local area.



# Multiple Pituitary Hormone Deficiency

(Revised November 2019)

This leaflet is part of the **Hormone Disorders Series**

The following are also available:

Growth Hormone Deficiency

Puberty and the Growth Hormone Deficient Child

Precocious Puberty

Emergency Information for Children with Cortisol and GH Deficiencies and those Experiencing Recurrent Hypoglycaemia

Congenital Adrenal Hyperplasia

Growth Hormone Deficiency in Young Adults

Constitutional Delay of Growth and Puberty

Diabetes Insipidus

Craniopharyngioma

Intrauterine Growth Retardation or Small for Gestational Age

Hyperthyroidism

Hypothyroidism

Type 2 Diabetes and Obesity

The development of these leaflets was funded (as a service to medicine) by Merck. They are based on the original booklets series devised by the UK Child Growth Foundation and the BSPED, and the previous adaptations for easy and average readability levels by ESPE.



**MERCK**