

# Multiple Pituitary Hormone Deficiency

Series N. 11



**Patient's Guide**

**Average Readability Leaflet**

## **Multiple Pituitary Hormone Deficiency - Series 11 (Revised August 2006)**

This leaflet was produced by Fernando Vera MSc and Prof Gary Butler at the Institute of Health Sciences, University of Reading, Reading, UK (August, 2006). Some portions of the text were extracted or modified from the Growth and Growth Disorders Booklet Series (Third edition, 2000)\* and may be used in conjunction with these as they provide a choice of leaflets providing the same information, but for people of different ages and reading abilities. The numbering sequence in each series is the same for easy cross-reference. The original leaflet series can be also obtained from the links given at the end.

All illustrations were created and produced by Fernando Vera MSc.

This leaflet is part of the Hormone Disorders Leaflet Series. The following are also available:

- Series N 3.** Puberty and the Growth Hormone Deficient Child.
- Series N 4.** Precocious Puberty
- Series N 5.** Emergency Information for Children with Cortisol and GH Deficiencies and those Experiencing Recurrent Hypoglycaemia.
- Series N 6.** Congenital Adrenal Hyperplasia
- Series N 7.** Growth Hormone Deficiency in Young Adults.
- Series N 10.** Constitutional delay of growth and puberty
- Series N 11.** Multiple Pituitary Hormone Deficiency
- Series N 12.** Diabetes Insipidus
- Series N 13.** Craniopharyngioma
- Series N 14.** Intrauterine Growth Retardation or Small Gestational Age
- Series N 15.a.** Hyperthyroidism
- Series N 15.b.** Hypothyroidism
- Series N. 16.** Type 2 Diabetes and Obesity

The development of these leaflets was funded (as a service to medicine) by Serono-Merck Ltd, Bedfont Cross, Stanwell Road, Feltham, Middlesex TW14 8NX, UK. Additional help was provided by the Child Growth Foundation ([www.childgrowthfoundation.org](http://www.childgrowthfoundation.org)).

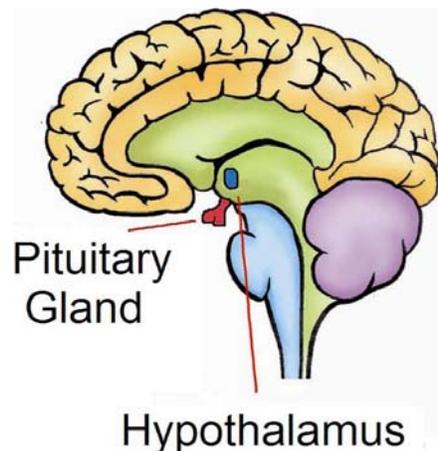
\*Written by Dr Richard Stanhope (Gt. Ormond Street/Middlesex Hospital, London) and Mrs Vreli Fry (Child Growth Foundation)

## 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 they may be helpful.

## 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.
- Gonadotropins (FSH & LH): These make puberty happen and control fertility.
- Thyroid hormones (TSH): This helps control the body's speed of working (metabolism).
- Antidiuretic hormone (ADH): This controls how much urine is made
- Adrenocorticotrophic hormone (ACTH): This helps keep blood sugar levels good for energy.

## 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. 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 gonadotropins, 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 the hormones, whereas in others it may take years for all 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 lasts 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. 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.
- **Gonadotropin (FSH & LH) insufficiency:** These hormones are necessary for the development of puberty. Deficiency of this hormone 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 gonadotropins according to a fixed plan.



- **Thyroid hormone (TSH) insufficiency:** An insufficiency of these hormones 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 hydrocortisone. This 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 DDAVP tablets, intranasal drops or spray.

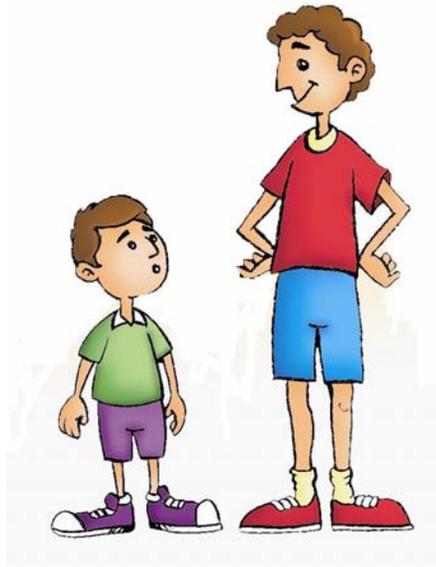
## How is MPHD predicted in children with growth hormone deficiency?

Predicting which children with a deficiency in growth hormone will develop further hormone insufficiencies can be difficult.

Help may be obtained by doing a special x-ray (CT scan) or a magnetic (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 of 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 <http://www.bsped.org.uk>

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

- **European Society for Paediatric Endocrinology**

ESPE Secretariat, BioScientifica  
Euro House 22 Apex Court Woodlands, Bristol BS32 4JT - UK  
Telephone No: + 44 (0) 01454 642208  
Internet: <http://www.eurospe.org/>

- **Child Growth Foundation**

2 Mayfield Avenue, Chiswick London W4 1PW UK.  
Telephone +44 (0) 20 8995 0257  
Internet: <http://www.childgrowthfoundation.org/>

You can also consult your doctor or nurse for additional information in your local area.

