

Hormones and Acquired Brain Injury

Injury

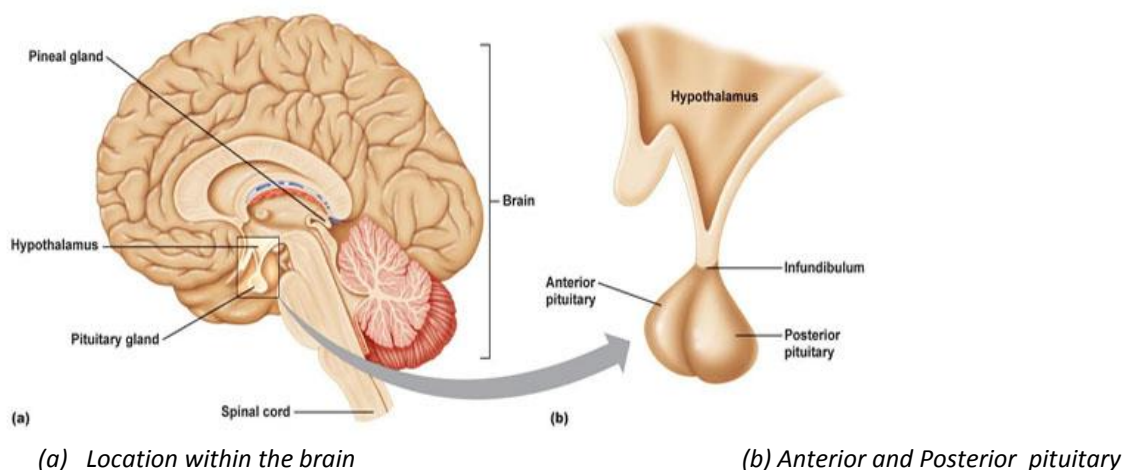
The Child Brain Injury Trust is a national charity supporting anyone affected by childhood acquired brain injury. The following information has been developed to help the reader understand more about brain injury and some of the associated issues. Every effort has been taken to ensure the information is accurate and up to date. If you require more immediate support or assistance please contact our **Helpline 0303 3032248** or email helpline@cbituk.org where we will be able to respond to your specific enquiry and offer support.

Hormones and Acquired Brain Injury (ABI)

This Factsheet is to help families and young people affected by childhood acquired brain injury better understand about hormones and how they can be affected following an ABI.

Acquired brain injury (ABI) can affect your pituitary gland or hypothalamus, these are small structures at the base of the brain. The pituitary gland is important as it produces many of its own hormones and controls hormones produced elsewhere in your body. The hypothalamus regulates the pituitary gland. Together they are vital in managing:

- growth
- hunger
- thirst
- puberty and sexual maturity
- sexual functioning and libido
- energy levels
- weight



Due to the position of the pituitary and hypothalamus at the top of the spinal cord they are vulnerable to damage in ABI. Depending on the specific site of your child's brain injury there can be a change in the amount of hormones produced – less or more. If production of all the pituitary hormones is affected this is called pan-hypopituitarism¹. The symptoms of altered hormone levels can initially be similar to the other effects of a brain injury such as depression, tiredness, visual changes and headaches so hormone imbalance may be difficult to recognise.¹

Below are some of the specific hormone related conditions that your child may be affected by:

Neurogenic Diabetes Insipidus (DI): A disorder where the kidneys are unable to retain water and instead produce large amounts of urine, which makes your child feel very thirsty despite drinking normal amounts of water.ⁱⁱⁱ DI is not caused by a problem with the kidneys, it is caused by a lack of water-retaining hormone called Anti-Diuretic Hormone which is made by the pituitary gland.ⁱⁱⁱ DI is not the same as diabetes mellitus and does not cause high blood sugar levels.

Growth Hormone Deficiency: Growth hormone is made in the pituitary and travels around in the blood affecting many organs but its main role in childhood is to promote the growth of bones and lean body mass.ⁱⁱⁱ Deficiency or hyperactive thyroid can lead to your child's growth being affected – they may be smaller or larger than average for their age and may have increased/decreased fat tissue around the waist. High 'bad' cholesterol is also a side-effect of growth hormone deficiency which may increase the risk of your child having a heart attack or stroke later in life.ⁱⁱ However treatment with hormones can correct these effects.

Thyroid Stimulating Hormone Deficiency: Thyroid stimulating hormone is needed to ensure your child's thyroid functions normally. If your child's body does not have enough of this hormone they may experience :ⁱⁱ

- memory problems
- weight gain
- tiredness
- low mood
- muscle aches
- feeling cold
- dry hair or skin
- numbness or tingling in hands and feet

Adrenocorticotrophic Hormone Deficiency: Adrenocorticotrophic hormone is important as it stimulates the production of the body's natural steroid, cortisol. Cortisol is exceptionally important for regulating processes in the body. Deficiency can lead to several problems including:ⁱⁱ

- weakness and tiredness
- altered mood
- disturbance to the body's natural salt balance
- weight loss
- low or fluctuating blood pressure, causing light-headedness

Sex Hormone Deficiency: Various sex hormones involved in sexual development in males and females are produced by the pituitary gland so levels of these may be reduced in ABI causing: ⁱⁱ

- reduced growth (of bones, lean muscle mass and reproductive organs)
- reduced body hair
- irregular periods, loss of periods or failure to start having periods in females
- improper development of penis and testes, or impotence in males
- reduced fertility
- reduced sex drive

Issues such as failure to develop and reach sexual maturity may not be recognised for a while, particularly as many parents find it embarrassing to discuss these issues with their children and young people are reluctant to discuss this with their family or friends. Hormone replacement therapy is available to correct a deficiency in sex hormones.

Sex Hormone Excess: This is rarer than sex hormone deficiency. It is usually caused by damage to areas of the brain that control the amount of hormones the hypothalamus and pituitary make. ⁱⁱⁱ This damage allows too much hormone to be released. Effects of too many sex hormones include earlier sexual maturity. Girls may start developing breasts and pubic hair and begin to menstruate early. Similarly boys may develop sexually while still at primary school. In either case this can cause peers to ask questions and a child may become the focus of teasing. Speaking to your GP who may refer your child to a paediatric endocrinologist (a doctor with specialist knowledge of hormones) can be helpful as this may need specific treatment. It will also be helpful to gain support and understanding from schools and teachers in how to cope with things such as changing for sports and generally managing questions from other children and parents.

Do remember that only some young people may have problems with damage to their pituitary gland following ABI. The extent and type of difficulties that may arise will differ between individuals. Blood tests can reveal if there is a problem and hormone replacement treatment may be given if there is.

If you are worried discuss your concerns with your GP who may refer your child to a paediatric endocrinologist. Talking about sexuality with your adolescent children can be difficult. If it seems appropriate show them this leaflet and if necessary suggest they talk to their GP or someone they trust.

Dedicated to Christopher Mark Lane 25/9/1976 – 26/08/2008

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ⁱ Hammond, F. and Shapiro, R. Pituitary Deficiency and Brain Injury. Traumatic Brain Injury, 2009.

ⁱⁱ [Kohno H](#), [Ueyama N](#), [Yanai S](#), [Ukaji K](#), [Honda S](#). Beneficial effect of growth hormone on atherogenic risk in children with growth hormone deficiency. [J Pediatr](#). 1995 Jun;126(6):953-5.

ⁱⁱⁱ Einaudi, S., Bondone, C. The effects of head trauma on hypothalamic–pituitary function in children and adolescents. *Current Opinion in Pediatrics* 2007, 19:465–470.