

## How hormones effect the teenager

Starting as early as age 7 or 8, the body begins to produce the hormones that are responsible for the changes of puberty. Puberty is not a singular process that can be tracked through one hormonal system. It involves a suite of changes whose various components are loosely synchronised.

Teenage hormones are the chemicals that cause the physical growth and sexual development that will carry the teen through into adulthood. As these substances take hold of the body and they/you will notice that these emotions, moods and sexual feelings are much stronger.

Teens may also feel more impulsive and more inclined to take risks, like experimenting with drugs or alcohol, driving without a license or having unsafe sex.

Adolescence can be a risky time. Although all of the changes they experience in puberty are natural and healthy, teens don't always react to these changes in a safe or healthy way. Teen hormones have an impact not only on their bodies and minds, but also on their behaviour.

### The Physical Effects of Teen Hormones

Without teenage hormones, normal physical and sexual development wouldn't be possible. At the beginning of puberty, the brain releases a hormone called gonadotropin-releasing hormone (GnRH). GnRH triggers the pituitary gland — a small but significant gland that controls the production of several major hormones. Therefore puberty is a process with multiple components, including changes in at least three different hormone systems.

- 1) The first system involves a cascade of hormones that activates the gonads (ovaries and testes) to mature and begin to produce high levels of oestrogen and testosterone. This process is called "gonadarche," the endocrine events that result in reproductive capability and fertility.
- 2) A second set of hormonal changes is called "adrenarche." The main action here centres on the release of testosterone-like hormones from the outer part of the adrenal glands, which sit atop the kidneys. These adrenal hormone levels usually begin to rise by 6 to 9 years of age (typically before gonadarche) and steadily increase for more than a decade, peaking in the early 20s. This hormonal system contributes to adolescent changes in skin (including acne), as well as the development of pubic and underarm hair.
- 3) A third group of changes involves growth hormone (GH), which is released in pulses from the pituitary gland, near the base of the brain. The rate and patterns of GH secretion undergo changes during puberty in ways that contribute significantly to the rapid physical growth in adolescence.

The significant changes are:

- Both boys and girls will grow taller and put on weight and muscle mass.
- Girls will begin to have menstrual periods and will develop fuller breasts and wider hips as the teenage girl hormones do their work.
- Boys will develop larger sex organs and will be able to ejaculate (release sperm).
- Both boys and girls will develop body hair on the legs, under the arms and over the sex organs.
- Both boys and girls will produce stronger body odours and may develop acne or other skin problems.

### How Teen Hormones Affect Mood

Teen hormones affect teenagers' moods, emotions, and impulses as well as their body. The mood swings that teens experience are caused by fluctuations in oestrogen, progesterone, and testosterone. Puberty also brings changes in other hormone systems. For example, the regulation of cortisol, a major stress hormone, undergoes modifications during puberty.

When adults process an emotion — if they see an angry face, for example — multiple places in their brains will turn on. One area is the limbic system — a group of small brain areas deep in the brain where emotion processing starts. Adults also show activity in the prefrontal cortex. This is that area behind the forehead that plays a role in making decisions. The limbic system may advise an adult to scream or fight. The prefrontal cortex helps to keep unwise urges in check.

The brain of a young teen isn't just a bigger version of a small kid's. It isn't a smaller version of an adult's, either. As children grow, their brains morph. Some areas mature and build connections. Other areas may disconnect or get trimmed away. Brain areas that process emotions mature very quickly. The prefrontal cortex does not. This leaves the emotion-processing centres on their own for a while.

The amygdala (Ah-MIG-duh-lah) is an area deep within the limbic system that deals with emotions such as fear. Adolescents activate the amygdala more in emotional situations meanwhile, their prefrontal cortex is not yet ready to take control over emotional processing.

The brain releases dopamine when something makes us feel good, whether it's receiving a teacher's compliment or finding a £20 note. Dopamine levels in general peak during adolescence. In teenagers, the strength of this "feel good" response helps explain why they often give in to impulsive desires.