

Crucial sex hormones re-routed by missing molecule

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A hormone responsible for the onset of puberty can end up stuck in the wrong part of the body if the nerve pathways responsible for its transport to the brain fail to develop properly, according to research funded by the Biotechnology and Biological Sciences Research Council (BBSRC).

By tracking how [nerve cells](#) responsible for regulating [sexual reproduction](#) in mice find their way from their birth place in the foetal nose to their site of action in the adult [brain](#), scientists from University College London (UCL) have found that if a certain molecule is missing, then these pathways are not formed correctly and gonadotropin releasing hormone (GnRH) can become lodged in the nose or the forehead, rather than in the brain, where it is needed to control the [menstrual cycle](#) in females and testosterone production in males.

Speaking about the findings, published today (29 November) in *Human Molecular Genetics*, co-investigator Dr Christiana Ruhrberg explains: "We discovered that a molecule essential for the growth of the nerve cables that transmit odour and pheromone signals from the nose to the brain is also crucial in the development of the highways responsible for transporting other [nerve cells](#) that make the sex hormone GnRH. We found that in mice with an inherited deficiency in the molecule SEMA3A, these highways did not lead to the brain, but instead formed impenetrable tangles outside the brain. This means that the nerve cells making GnRH are unable to get to their final destination and instead become stuck in the nose or forehead."

As a result the researchers found that the testes of mice lacking SEMA3A did not grow properly and the adult males were infertile. These findings have important implications for the study of Kallmann's syndrome and related genetic disorders that causes infertility.

Professor Douglas Kell, BBSRC Chief Executive said "This study highlights the importance of understanding the very earliest developmental processes of the brain, including how and where cells develop, how they migrate and how and where they mature. Such fundamental bioscience research helps drive medical advances by providing clues about the development of a variety of disorders which present huge challenges to individuals, their families and our wider society."

Provided by Biotechnology and Biological Sciences Research Council

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