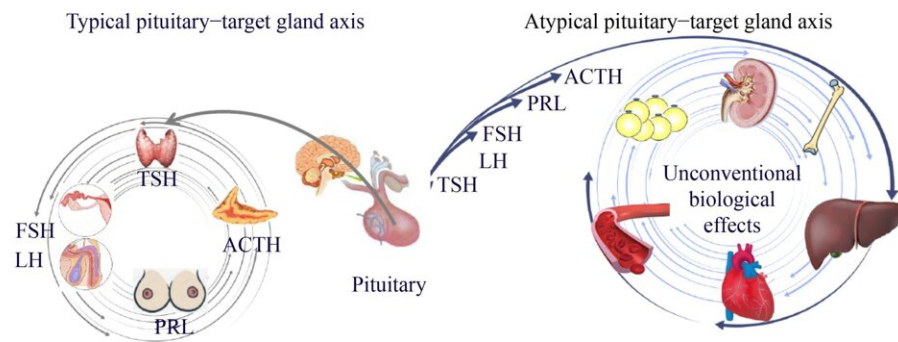


# Study summarizes physiological functions of pituitary hormones in non-classical organs

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Credit: *Frontiers of Medicine* (2023). DOI: 10.1007/s11684-022-0973-7

The hypothalamus–pituitary–target gland axis has been recognized as a fundamental functional framework of the mammalian endocrine system. The anterior pituitary gland synthesizes and secretes multiple hormones, including thyroid-stimulating hormone (TSH), follicle-stimulating hormone (FSH), luteinizing hormone (LH), adrenocorticotrophic hormone (ACTH), prolactin (PRL), and growth hormone (GH).

Each hormone binds to its cognate receptor in its classical target gland (such as the thyroid for TSH, the gonads for FSH and LH, and the [adrenal gland](#) for ACTH) to regulate critical physiological pathways that play a role in growth, development, [energy metabolism](#), immune function, and reproduction among other functions.

In past decades, a number of reports have shown that multiple types of pituitary hormone receptors are widely expressed in non-classical target organs. Thus, each pituitary gland–derived hormone exhibits a wide range of unconventional biological effects in these non-classical target organs.

In a [study](#) published in *Frontiers of Medicine*, the physiological functions of pituitary hormones in these non-classical organs were summarized, a process referred to as an atypical pituitary hormone–target tissue axis. The findings provide new insights into the biological function of pituitary hormones and expand the current knowledge of their targets and the functions they regulate.

The novel concept of atypical pituitary hormone–target tissue axis is a breakthrough and expansion of the traditional biological functions of pituitary hormones. It provides a new view for studying the mutual regulation of hypothalamic–pituitary hormones and peripheral tissue metabolism and opens up a new field exploring the biological function of pituitary hormones.

The new perspective of an atypical pituitary hormone–target tissue axis explains the pathomechanisms of abnormal glucose and [lipid metabolism](#), obesity, hypertension, [fatty liver](#), and atherosclerosis while offering a more comprehensive and systematic insight into the coordinated regulation of environmental factors, genetic factors, and neuroendocrine hormones on human biological functions.

In this manner, the concept of an atypical pituitary hormone–target tissue axis could further enrich and improve the understanding of endocrinology.

Although a substantial number of findings on the actions of pituitary hormones beyond traditional targets have emerged during the last several

decades, many issues remain unresolved, including elucidation of the physiological function and signaling pathway of pituitary hormones in their non-classical targets organs, identification of new biological roles and novel target tissues for pituitary hormones, and demonstration of the pathophysiological and therapeutic implications of atypical pituitary hormone–target tissue axis.

Tissue-specific ablation of pituitary hormones receptor mouse lines is a vital tool for uncovering the various in-vivo activities of a given hormone in specific tissues. Continuous exploration of the physiology of atypical pituitary hormone–target tissue axis is highly important as it could enable the manipulation of the system with greater precision and sophistication than is currently possible and perhaps the discovery of novel therapeutic targets for metabolic disease in human.

**More information:** Chao Xu et al, Atypical pituitary hormone-target tissue axis, *Frontiers of Medicine* (2023). [DOI: 10.1007/s11684-022-0973-7](https://doi.org/10.1007/s11684-022-0973-7)

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