Sex is one of the most powerful modifiers of disease development, with the sexual dimorphic phenomenon being largely attributed to differences in sex steroid hormones. Changes in the gut microbiome have been linked with the development of various diseases that are sexual dimorphic, such as obesity, atherosclerosis, cancers, and fertility. However, the ability of the gut microbiome on modulating the reproductive axis, which critically regulates the sex hormone production, is unclear. The reproductive axis, also known as the hypothalamic-pituitary-gonadal (HPG) axis, includes positive and negative feedback loops orchestrates amongst the hypothalamus of the brain, the pituitary gland, and the gonads (ovaries and testes) to tightly regulate sex hormone homeostasis. Our lab found that the gut microbiota changes rapidly in response to suppression of the upstream regulator of the HPG axis. In addition, we recently discovered that the gut microbiome may be responsive to changes that occur within the reproductive axis and able to suppress sex hormone production. Through understanding these fundamental mechanisms and their impact on disease development, a precision nutrition approach can be taken to develop gut microbiome modulators through dietary strategies to prevent disease and achieve optimal health.

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