

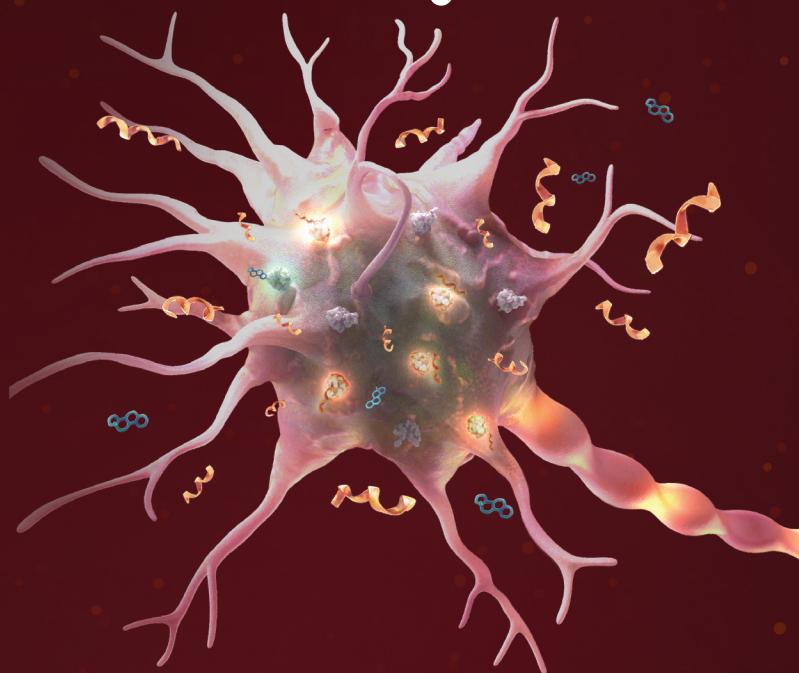
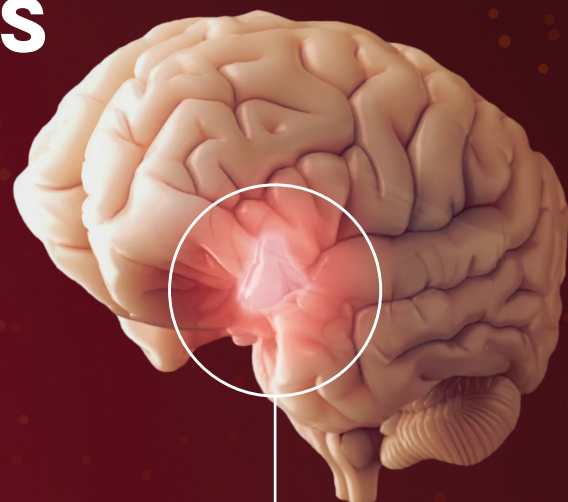
# NEURONAL INFLUENCE IN MENOPAUSAL VMS

Natural menopause is a physiologic event and an important stage of a woman's life, but up to 80% of women will experience the burden of Vasomotor Symptoms (VMS) due to menopause, commonly known as hot flashes and night sweats.<sup>1,2</sup>

## Inside the source of a hot flush

### THERMOREGULATORY HOMEOSTASIS IS ALTERED BY THE HPO (HYPOTHALAMIC- PITUITARY-OVARIAN) AXIS

- 1** The hypothalamus communicates via the pituitary with the ovaries, causing the ovaries to release estrogen, which creates a negative feedback loop.<sup>3</sup>
- 2** Estrogen-sensitive neurons in the hypothalamus project to the thermoregulatory center, which triggers peripheral heat dissipation mechanisms (normal cooling).<sup>4,5</sup>
- 3** Low estrogen levels in menopause lead to loss of negative feedback, and neuronal activity increases, causing a hypersensitive response (ie, vasodilation, sweating) and resulting in VMS.<sup>4-6</sup>



**References:** **1.** Santoro NF. Menopause. In: Crandall CJ, Bachman GA, Faubion SS, et al., eds. Menopause Practice: A Clinician's Guide. 6th ed. Pepper Pike, OH: The North American Menopause Society, 2019:1-21. **2.** Thurston RC. Vasomotor symptoms. In: Crandall CJ, Bachman GA, Faubion SS, et al., eds. Menopause Practice: A Clinician's Guide. 6th ed. Pepper Pike, OH: The North American Menopause Society, 2019:43-55. **3.** Mittelman-Smith MA, Williams H, Krajewski-Hall SJ, McMullen NT, Rance NE. Role for kisspeptin/neurokinin B/dynorphin (KNDy) neurons in cutaneous vasodilation and the estrogen modulation of body temperature. *Proc Natl Acad Sci U S A* 2012;109(48):19846-51. **4.** Padilla SL, Johnson CW, Barker FD, Patterson MA, Palmiter RD. A neural circuit underlying the generation of hot flashes. *Cell Rep* 2018;24(2):271-7. **5.** Krajewski-Hall SJ, Miranda Dos Santos F, McMullen NT, Blackmore EM, Rance NE. Glutamatergic neurokinin 3 receptor neurons in the median preoptic nucleus modulate heat-defense pathways in female mice. *Endocrinology* 2019;160(4):803-16. **6.** Krajewski-Hall SJ, Blackmore EM, McMinn JR, Rance NE. Estradiol alters body temperature regulation in the female mouse. *Temperature* 2018;5(1):56-69.



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