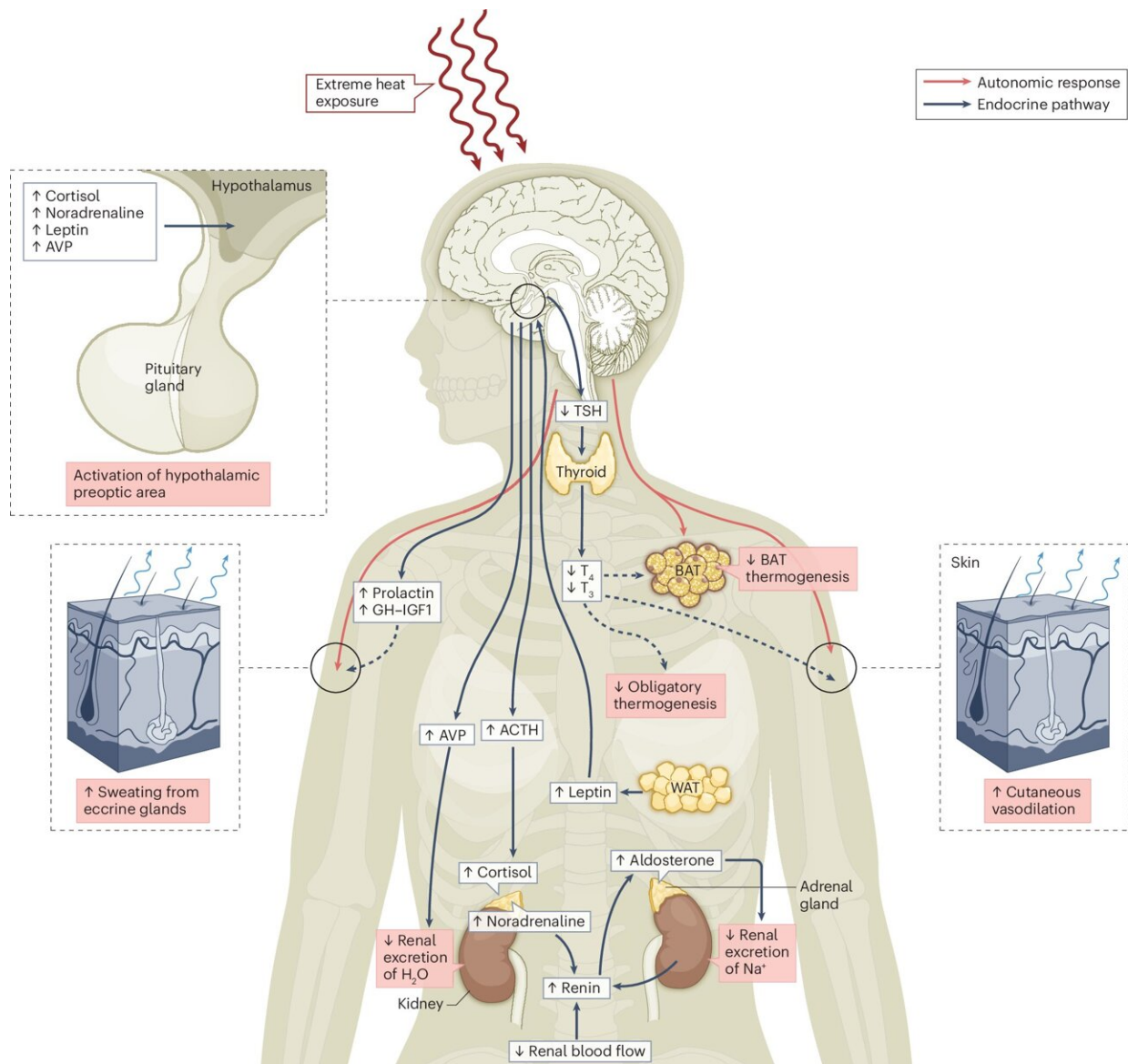


# Exploring the health impacts of climate change on the endocrine system

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Possible involvement of hormones in thermoregulatory adaptation to heat.

Credit: *Nature Reviews Endocrinology* (2024). DOI: 10.1038/s41574-024-01017-4

In a new study, endocrinologists and researchers from the Nuffield Department of Women's & Reproductive Health (NDWRH) at the University of Oxford, the London School of Hygiene & Tropical Medicine, the William Harvey Research Institute (WHRI) at Queen Mary University of London and the National University of Singapore have emphasized the critical need for further research into the effects of heat exposure on the endocrine system.

The study, "[Endocrine effects of heat exposure and relevance to climate change](#)," is published in *Nature Reviews Endocrinology*.

With [climate change](#) increasing seasonal temperatures and causing more frequent heat waves, understanding these effects has become more crucial than ever.

Hormones play a role in nearly all [biological functions](#), yet the influence of environmental factors on hormone release and action is not well characterized. Researchers from the University of Oxford, the London School of Hygiene & Tropical Medicine, the William Harvey Research Institute at Queen Mary University of London, and the National University of Singapore have highlighted the urgent need for more research into the effects of heat exposure, particularly in the context of climate change increasing seasonal temperatures and causing more heat waves.

Hormones influence how we adapt to changes in environmental temperature by controlling processes such as conservation of body water, sweating, and heat generation from cell metabolism. A [review of studies](#)

published from the 1940s onwards indicates that heat exposure affects hormones involved in processes ranging from the stress response, blood glucose control, fertility, and breast milk production. However, many of these studies involved short-term heat exposure in non-human animal models or in healthy human volunteers such as military recruits.

Our review highlights the gap in evidence regarding the impact of sustained heat exposure on the [endocrine system](#), which is particularly relevant to the increasing numbers of people living with endocrine conditions such as diabetes mellitus or thyroid disorders, who may have limited tolerance to higher temperatures. Heat waves increase the risk of hospitalization for these patients, which also increases the burden of heat on the [health](#) system.

Lead author, Professor Fadil Hannan from the Nuffield Department of Women's & Reproductive Health at the University of Oxford, stated, "We know very little about whether increased heat exposure due to climate change could affect endocrine health. We require research involving both the endocrine and global health research communities to assess the impact of rising temperatures and heat waves on endocrine patients.

"This is particularly important for patients living in hot climates, who may have inadequate access to cooled environments. A better understanding of these effects will enable interventions to be developed for endocrine patients most at risk from heat extremes."

Certain hormonal disorders can disrupt the body's ability to regulate temperature, making it harder to cool down and increasing the risk of heat-related illnesses. Co-author, Professor Jason Lee, at the National University of Singapore, adds, "As the world grapples with the escalating threats of climate change, unraveling the intricate relationships between heat exposure, endocrine function, and human health is not only a

scientific imperative but a moral obligation to protect the vulnerable and ensure the well-being of generations to come."

The management of heat risks is becoming increasingly important and this review highlights the need to educate health professionals about environmental hazards. Co-author, Associate Professor Sari Kovats at the NIHR Health Protection Research Unit in Environmental Change and Health at LSHTM, adds, "We need to do better to manage heat risks in patients with diabetes and other endocrine disorders."

Heat waves are increasing in frequency and severity with major impacts on health, Co-author, Professor Rajesh Thakker from the University of Oxford and Queen Mary's William Harvey Research Institute states, "Climate change with increasing [heat](#) exposure are major global challenges confronting us, yet we know little about their effects on health, and identifying these gaps in our knowledge is important for planning strategies and future research for the benefit of humankind."

**More information:** Fadil M. Hannan et al, Endocrine effects of heat exposure and relevance to climate change, *Nature Reviews Endocrinology* (2024). [DOI: 10.1038/s41574-024-01017-4](https://doi.org/10.1038/s41574-024-01017-4)

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