



**Endo
Compass**
Research roadmap for
better hormone health

The EndoCompass Research Roadmap

Policy priorities for better hormone health in Europe

Tackling high-prevalence endocrine diseases – diabetes, obesity and metabolic conditions

Why this matters for Europe:

- Hormones matter at every stage of life, from early development to older age.
- Some of Europe's most costly health challenges are linked to endocrine disruption, such as diabetes, obesity, thyroid disease, cancer, osteoporosis and infertility, and more than 440 rare endocrine diseases.
- Most Europeans will be affected by an endocrine-related condition in their lifetime, weakening our capacity to live, work and age well.
- Endocrine science is an investment in Europe's future.

Tackling high-prevalence endocrine diseases – diabetes, obesity and metabolic conditions

Why this matters

Diabetes, obesity and metabolic conditions are now one of the most pressing public health challenges in Europe. Their prevalence and impact are reaching pandemic proportions: more than 66 million people in Europe live with diabetes⁵ and more than half of European adults live with overweight or obesity.¹² The toll rises further with comorbidities such as cardiovascular disease, hypertension, kidney disease, 13 types of cancer and mental health conditions. Obesity alone is responsible for around 80% of type 2 diabetes¹³ and contributes to at least 200,000 cases of cancer in Europe each year.¹⁴

With nearly a third of children already overweight or obese,⁴ the implications for the future health of the population are concerning.

These conditions limit how long people live, how well they age and how they participate in work, education and family life. The cost to society is enormous: Europe spends around €141 billion on obesity⁴ and around €193 billion on diabetes each year.⁵ Obesity and diabetes related to endocrine-disrupting chemicals (EDCs) alone cost around €18 billion per year in the EU.¹⁵

Reducing the burden for future generations depends on understanding more about the endocrine and genetic causes and consequences of these conditions and the connections between them throughout the life course.

Europe already recognises the importance of diabetes, obesity and metabolism in programmes such as EU4Health, Horizon Europe, Europe's Beating Cancer Plan, the Safe Hearts Plan and the Innovative Health Initiative. But the growing burden of disease calls for more investment in endocrine research, particularly in basic science, preclinical research and prevention that are currently under-investigated by industry.

This research also has wider scientific and societal returns. Many of the biological pathways involved in metabolic disease also influence cancer risk, reproductive health, immune function and neurological development. Investing here will therefore accelerate discovery in rare endocrine diseases, environmental endocrinology and endocrine cancers, where shared mechanisms are underexplored.





Obesity is responsible for around 80% of type 2 diabetes¹³ and contributes to at least 200,000 cancer cases in Europe each year¹⁴

What research is needed?

The EndoCompass Research Roadmap recommends the following research priorities:

1. Genetic and molecular research

First, we need to further improve understanding of the biological mechanisms underlying obesity and diabetes. Better understanding the drivers of childhood obesity in particular will be essential to develop more effective prevention and treatment strategies. Research should cover the genetic and epigenetic factors that contribute to disease risk and progression, including why individuals respond differently to similar environments or treatments.

For monogenic diabetes (caused by changes in a single gene), this includes improving diagnosis through a coordinated European registry and using stem cell research to investigate disease pathogenesis and rare subtypes. For obesity and type 2 diabetes, research should use whole-genome sequencing, bioinformatics and multi-omics approaches to identify disease mechanisms. This should be supported by shared genetic databases and registries and the application of artificial intelligence and machine learning for analysis.

2. Hormonal communication between the brain and other organs

A second area concerns communication between the brain and peripheral organs. Research is needed to understand how hormonal signalling pathways that regulate appetite, metabolism and energy balance become disrupted. This includes leptin and ghrelin dysregulation, signalling from enteroendocrine cells, and the role of gut hormones such as glucagon-like peptide-1 (GLP-1), peptide YY (PYY) and gastric inhibitory peptide (GIP). We need to learn more about how diet, stress and other environmental exposures influence these pathways by altering melanocortin signalling in the brain to inform preventive and therapeutic innovations.

3. Environmental influences on metabolic disease

Exposure to factors such as diet, psychosocial stress, circadian rhythm disruption, pollution and EDCs across the life course, including during pregnancy, affects hormone regulation and metabolic programming. Long-term cohort studies that integrate environmental data with biological measurements are needed to clarify how these exposures contribute to obesity, diabetes and related conditions over time.

4. New therapeutic strategies

Finally, Europe needs programmes that translate scientific discoveries into effective strategies to prevent and treat disease. These should include identification of genetic and multifactorial risk scores, pharmacological approaches, behavioural interventions and personalised therapies tailored to individual biological profiles. They should also ensure equitable access.

Specific examples are multiple hormone receptor agonists and incretin-based therapies. Genomic and microbiome sequencing can also inform more targeted nutritional strategies and help match interventions to individual metabolic and hormonal responses.

For type 1 diabetes, research should focus on earlier detection, improved insulin delivery and disease-modifying approaches, including cell and gene therapies, as described in the EndoCompass Research Roadmap. For congenital hyperinsulinism, priorities include better screening, glucose monitoring and medical and surgical treatments.

For more information on proposed research priorities in this area, please refer to [EndoCompass project: research roadmap for diabetes, obesity and metabolism](https://ese-hormones.org/endocompass).



EndoCompass

Research roadmap for better hormone health

Investing in hormone health is one of the most effective ways for Europe to prevent and manage disease, support healthy ageing and sustain its health systems and economy.

The endocrine community calls on policymakers to deliver the EndoCompass recommendations and ensure a healthier, more resilient Europe.

To discuss the recommendations in this paper or related policy engagement activities, please contact ESE or ESPE emailing: info@ese-hormones.org or secretariat@eurospe.org

EndoCompass Research Roadmap – Directions for the Future of Endocrine Science was developed as a joint initiative of the European Society of Endocrinology and the European Society for Paediatric Endocrinology. It is published as an open-access supplement in the *European Journal of Endocrinology* and the *Hormone Research in Paediatrics* journal.

Find out more about the EndoCompass Research Roadmap : ese-hormones.org/endocompass.

This document is an extract from *The EndoCompass Research Roadmap – Policy Priorities for Better Hormone Health in Europe*, a wider set of policy recommendations for improving hormone health across Europe. Read the full paper: ese-hormones.org/endocompass-policy-paper

References*

- World Health Organization, "WHO European Regional Obesity Report 2022", 2022 <https://www.who.int/europe/publications/item/9789289057738>
- International Diabetes Federation, "Europe – Diabetes Regional Report 2000–2050" <https://diabetesatlas.org/data-by-location/region/europe/>
- Eurostat, "Overweight and obesity - BMI statistics", 2024 https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Overweight_and_obesity_-_BMI_statistics
- Kershaw, E. and Flier, J., "Adipose Tissue as an Endocrine Organ", *The Journal of Clinical Endocrinology & Metabolism*, 2004, vol. 89, issue 6, pp. 2548–2556 <https://doi.org/10.1210/jc.2004-0395>
- World Health Organization, "The challenge of obesity", 2024 <https://www.who.int/europe/news-room/fact-sheets/item/the-challenge-of-obesity>
- Legler, J. *et al.*, "Obesity, diabetes, and associated costs of exposure to endocrine-disrupting chemicals in the European Union", *The Journal of Clinical Endocrinology & Metabolism*, 2015, vol. 100, issue 4, pp. 1278–1288 <https://doi.org/10.1210/jc.2014-4326>

*Reference numbers follow the numbering used in the full paper.



European Society
of Endocrinology

ESE Office (UK)

Redwood House,
Brotherswood Court,
Great Park Road, Almondsbury
Business Park, Bradley Stoke,
Bristol, BS32 4QW, UK.

T: +44 (0)117 440 6489

E: info@ese-hormones.org
www.ese-hormones.org

ESE Office (Brussels)

c/o Interoffices
Avenue des Arts 56
1000 Bruxelles
Belgium

T: 0032 28 011 365

Follow us:

-  ESEndocrinology
-  EuropeanSocietyofEndocrinology
-  esehormones
-  European Society of Endocrinology

The European Society of Endocrinology is a Company Limited by Guarantee, registered in England and Wales, company registration number: 5540866. Registered charity number: 1123492. Registered office: Redwood House, Brotherswood Court, Great Park Road, Almondsbury Business Park, Bristol BS32 4QW, UK