

Hair Hormonal Profiles as a Biomarker of Physiological and Pathological Conditions

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Over the last two decades, hair has emerged as a valuable non-invasive matrix for assessing endocrine status. Unlike blood or urine, hair provides information on long-term hormone exposure, reducing the variability associated with ultradian and circadian rhythms. In addition, hair is easy to collect and store, and remains stable over time (1).

This study is based on the ORISCAV-LUX2 study conducted in Luxembourg. We analysed 9 cm of each participant's hair, which reflects their hormone exposure over the previous nine months, assuming an average hair growth rate of 1 cm per month (2). Hormone levels were measured using a method developed and validated in our laboratory (3). This method allowed us to quantify 37 hormones in hair, enabling us to make a comprehensive assessment of the hormonal profile, including estrogens, androgens, progestogens, corticosteroids, thyroid hormones, and melatonin. The aim was to investigate whether distinct hair hormonal profiles were associated with specific health-related characteristics.

Preliminary results showed that hair hormonal profiles can reflect both physiological and pathological conditions. In males, distinct hormonal profiles were associated with body composition, differentiating between individuals with higher or lower body fat levels. In females, specific hormonal profiles were associated with breast cancer. These findings suggest that endocrine signatures measured in hair may help to identify both physiological characteristics and disease-related alterations.

Hair-based hormonal profiling is therefore a promising tool for evaluating endocrine homeostasis and detecting hormonal dysregulation associated with different health conditions. The identification of condition-specific hormonal profiles may contribute to the future implementation of hair hormone analysis in clinical practice.

References

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Biosketch

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