

Press release – 8 July 2021

## Metabolic syndrome: uncovering a biological signature to guide diagnosis

**Developing tools to assist in diagnosing metabolic syndrome (a cluster of metabolic abnormalities that increase the risk of cardiovascular disease or type-2 diabetes) was the goal of INRAE researchers working in collaboration with the CEA, University of Montreal and McGill University. Their three-year study allowed them to identify 26 metabolite modulations, characteristic of this syndrome. The results, published in the 5 July issue of *EBioMedicine - The Lancet*, offer a powerful tool for better diagnosing the syndrome, which affects more than 20% of the French population.**

Improving diagnosis of metabolic syndrome is essential to improve how it is managed. This syndrome is characterised by a cluster of associated metabolic abnormalities, which are risk factors for developing cardiovascular diseases or type-2 diabetes. With the rise of aging populations and increase of sedentary lifestyles, its prevalence is growing worldwide. In France, it affects 20% of the population, but its heterogeneity makes it hard to diagnose. This context shows the necessity for developing new tools for a better diagnosis.

That was the goal of a group of scientists from INRAE and CEA, as part of the French MetaboHUB\* infrastructure, involved in an international cooperation with the Universities of Montreal and McGill, members of the Quebec Network for Research on Aging. They focussed on determining whether or not a metabolic signature of the syndrome does exist. Using innovative approaches and high-performance technologies that made possible an untargeted investigation (study of products of the metabolism), researchers analyzed blood samples from 123 older men (aged 68 - 82) from the Quebec NuAge cohort at a three-year interval. And among the thousands of signals screened within this large-scale study, they showed that no less than 476 metabolites and lipids were modulated in patients suffering from the syndrome. Based on this result, the researchers developed a specific signature of 26 metabolites<sup>1</sup>, robust for future diagnosis.

But their work did not stop there. The data provided by the Canadian cohort included a wide range of information about the volunteers, such as their eating habits, lifestyles, physical exercise, etc. And the scientists demonstrated links between diet, intestinal microbiota, the metabolic signature, and syndrome diagnosis.

This proof of concept study opens the door to new, more robust and precise diagnostic tools. Additional works will allow establishing a simplified procedure for integrating this approach into routine care. Better diagnosing this syndrome will help limit the risks of serious complications such as strokes, cardiovascular problems and type-2 diabetes.

### What is metabolic syndrome?

Metabolic syndrome is a cluster of biological disturbances related to excess abdominal fat. A patient is considered as having metabolic syndrome when they have at least three of the following five conditions:

<sup>1</sup>Metabolites: small molecules found in tissues or biological fluids

- a large waist circumference (over 102 cm for men);
- excess sugar in the blood (hyperglycaemia);
- high blood pressure;
- high blood triglyceride levels (hypertriglyceridemia);
- low levels of HDL cholesterol ( "good" cholesterol).

## References

B. Comte et al., Multiplatform metabolomics for an integrative exploration of metabolic syndrome in older men, *EBioMedicine*, Volume 69, 2021, 103440, ISSN 2352-3964, <https://doi.org/10.1016/j.ebiom.2021.103440>.

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