

Human Volatilomics with a GC/IMS

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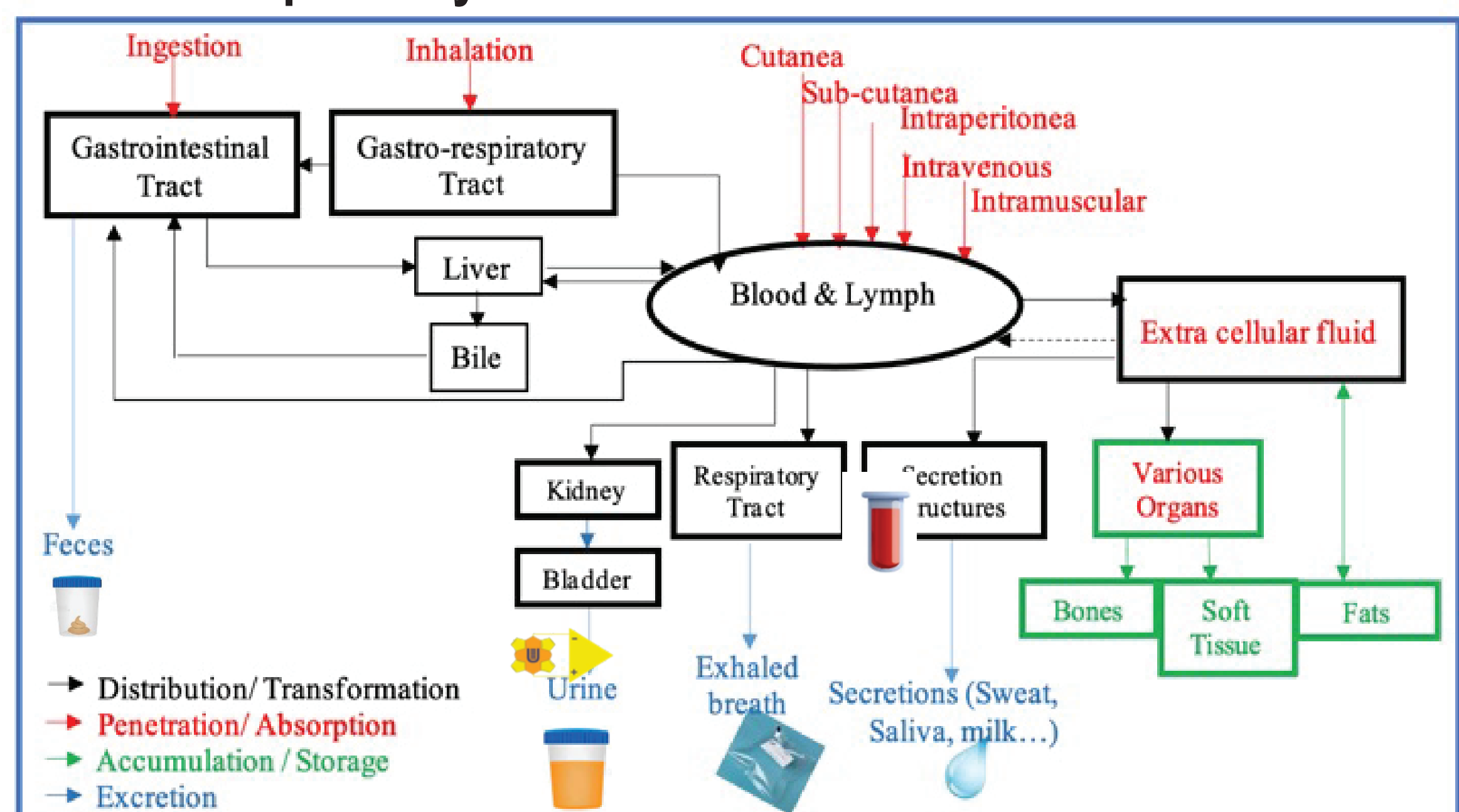
Volatilomics is the subcategory of metabolomics focused on the analysis of volatile organic compounds released by living organisms. Human volatilome is very rich in terms of both quantity and quality of molecules (Drabińska N et al. 2021 J. Breath Res. 15 034001).

Diseases are associated to alterations of the volatilome profile, rather than in few individual compounds. This characteristic has led the instrumental volatilome analysis to shift from the quantification of few individual compounds to the measure of chemical fingerprints.

This approach produces multivariate data that, once properly classified with machine learning algorithms, may lead to disease diagnosis

Gas Chromatography-Ion Mass Spectrometer (GC/IMS) is a suitable machine for human volatilomics.

Volatilome pathways



Case study: Urines Headspace Analysis for Lung Cancer diagnosis

Lung cancer mainly affects breath volatilome, however metabolic alterations could also be found in other samples (Di Natale C et al. 2019 J. Clin. Med. 8, 235).

We investigated this hypothesis measuring the VOCs of urines from 46 lung cancer patients and 81 healthy controls.

Samples, collected at the **Istituto Europeo Oncologico** (Milano, Italy), were frozen and delivered to the University of Rome Tor Vergata where they were measured with the **GC/IMS FlavourSpec®** (G.A.S., Dortmund, Germany).

Data analysis identified a pool of 8 VOCs that once classified with a support vector machine algorithm provides a sensitivity of 89% and a specificity of 92%. Furthermore, the abundance of these VOCs correlates with cancer progression.

Full story is reported in: Gasparri et al. 2022. J. Breath Res. 16, 046008

