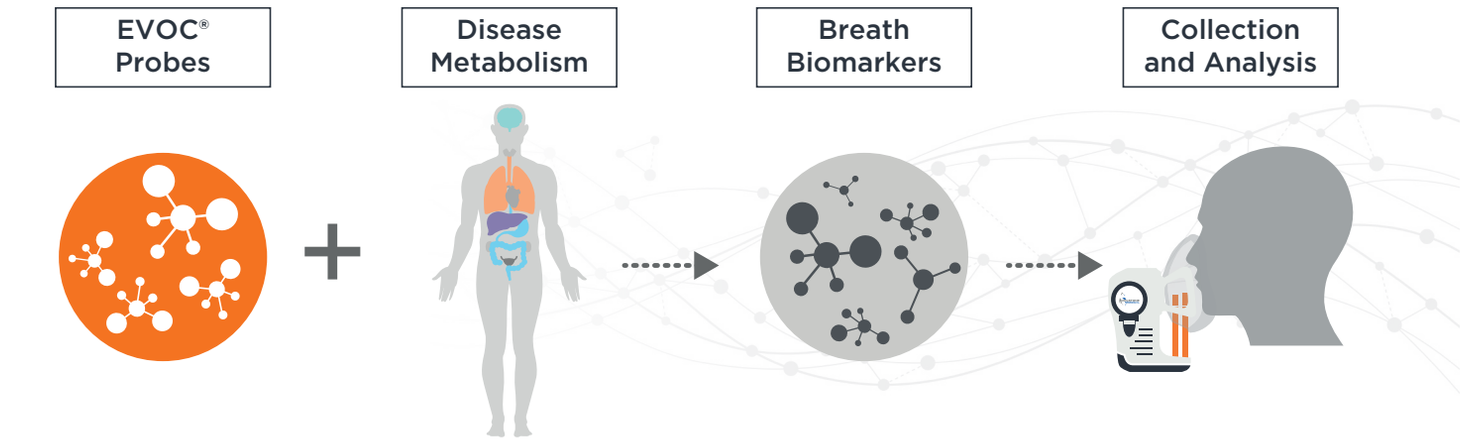
EVOC® Probes

Targeted metabolic probes for non-invasive disease detection

BREATH® BIOPSY

Exogenous volatile organic compound probes (EVOC® Probes) provide a focused alternative to breath biomarker discovery. Probes are developed to target specific disease-relevant metabolic pathways that can be monitored non-invasively using Breath Biopsy®

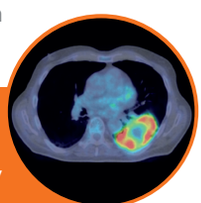


One or more administered EVOC Probes designed to produce distinctive metabolic products

Metabolic processes characteristic of a disease or phenotype

Distinctive metabolic products present on breath support high signal-to-noise detection

Robust, quantifiable, disease-relevant data and interpretation



- Designed based on established links between VOCs and disease pathology
- Enable smaller, more focused trials that can be concluded faster
- Supported by Breath Biopsy for robust, reliable EVOC Probe detection
- Administer several Probes together to monitor multiple metabolic processes

Inspired by Existing Clinical Tests

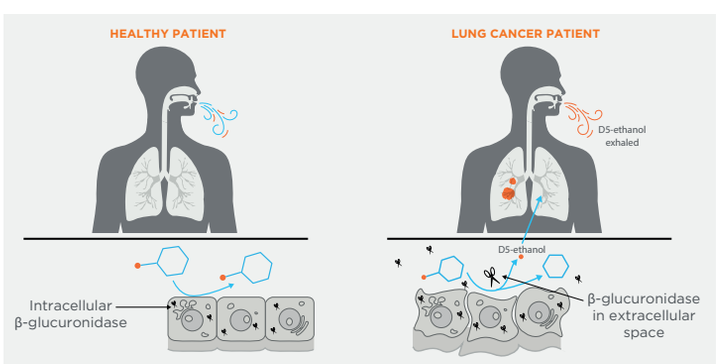
EVOC Probes draw inspiration from widely used clinical methods. Probes such as fluorodeoxyglucose (FDG) detect metabolic changes linked to cancer by using PET scanning.

Similarly, substrates such as fructose, lactose and glucose can be ingested to probe the gut microbiome and detect illnesses such as carbohydrate intolerances and small intestinal bacterial overgrowth.

Proof of Concept: Evolution

Evolution is an ongoing clinical study in which we are evaluating the viability of D5-ethyl-β D-glucuronide as an exogenous volatile organic compound (EVOC) probe for human lung cancers.

D5-ethyl-βD-glucuronide is a substrate for β-glucuronidase, a hydrolyzed enzyme that resides in the lysosome of cells within healthy tissue. D5-ethyl-βD-glucuronide is a hydrophilic compound with low cellular permeability and therefore cannot reach the β-glucuronidase in healthy tissue. In solid tumors however, β-glucuronidase is expressed in the extracellular space and is therefore accessible to the probe. This results in the release of D5-ethanol, a VOC detectable on breath, that is not a product of normal metabolic processes in healthy individuals.



Find out more about our Evolution study:

owlstonemedical.com/evoc

Proof of Concept: Ferrandino et al. (2023)

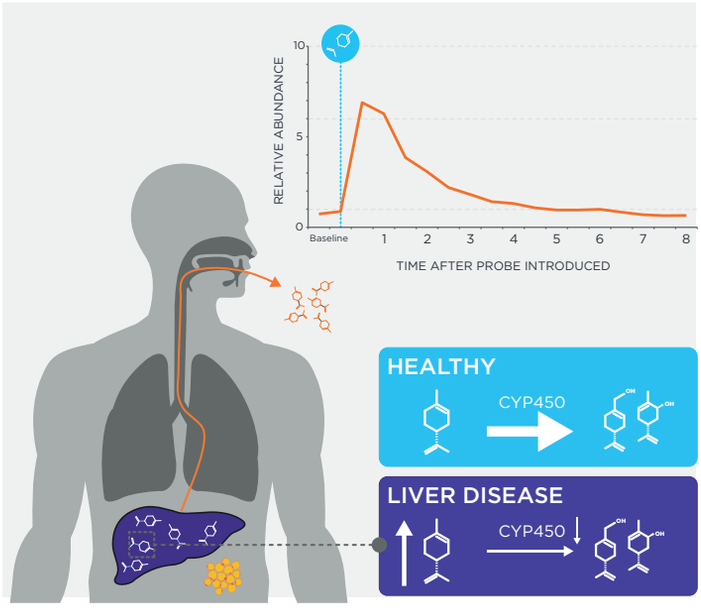
29 subjects with cirrhosis and 29 controls were enrolled in this study, and breath samples were taken using Breath Biopsy® before and at different time points after the administration of 100 mg of limonene. Levels of limonene in the breath samples were measured using our OMNI® platform.

The ingestion of 100 mg limonene induced a spike in breath of >100-fold the baseline levels in all subjects. More than 90% of the subjects showed a limonene maximal breath amount (Cmax) within 20 and 40 min (Tmax). The investigated time course in a semi-logarithmic presentation showed single-phase exponential decay of breath limonene with first-order kinetics (R2 > 0.8) in >90% of the subjects.

Comparisons of all the participants showed that subjects with cirrhosis had higher levels of limonene in the breath at each tested timepoint ($p < 0.001$), with the cirrhosis group presenting with a higher Cmax and bioavailability.

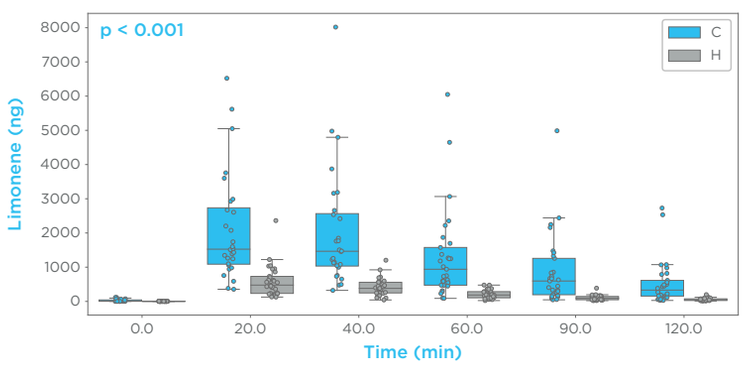
With the high levels of sensitivity and specificity achieved in this study, this demonstrates that a dynamic limonene breath analysis could maximize the diagnostic performance of a breath test for cirrhosis.

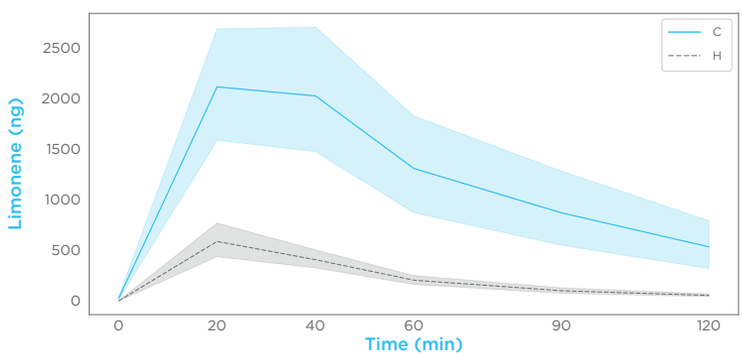
As breath analysis is non-invasive and well tolerated by patients this approach could complement, or even potentially replace current clinical diagnostic techniques due to the suitability for early detection and implementation into primary care.



Read the full paper now:

Ferrandino et al. (2023)
Journal of Clinical and Translational Hepatology
DOI: 10.14218/JCTH.2022.00309





Limonene exhalation shows first-order kinetics and increased bioavailability in subjects with cirrhosis.

Contact us to find out more about collaborating with Owlstone Medical and to discuss incorporating Breath Biopsy in your research.

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