Breath Biopsy Conference

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Sessions: Applications of Breath Analysis

# Applications of breath analysis ketones after induction by L-lysine can detected metabolic (biological) age

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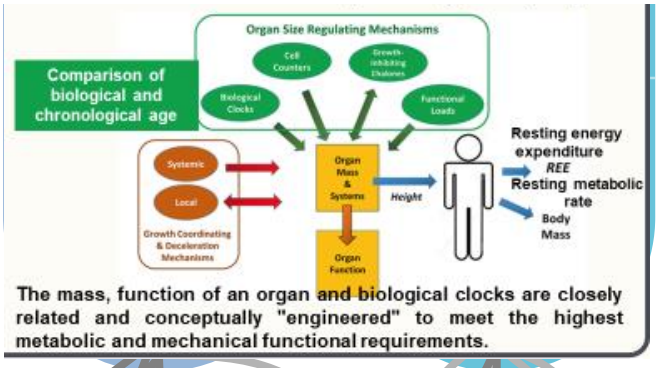
Amino acids have been claimed to be ketogenic, but it is not clear which of them are ketogenic in humans. PubMed, Science Direct, CINAHL, MEDLINE, Alt Health Watch, Food Science Source and EBSCO Psychology and Behavioral Sciences Collection electronic databases were searched online. Various purported lysine and ketogenic effects were searched with different combination terms. Unexpected result - no study found in humans.




**The presented study results allow us to determine the conjugation of lysine-induced ketosis and the biological (metabolic) clock**

## Key positions

**L-lysine-induced ketosis AND metabolic (biological) age**

There was a prospective, observational, open-label, single-center pilot study. Volunteers (N=10, men and women without any known metabolic disturbances) were orally given L-Lysine. Baseline ketosis and on 30, 60, 90, 120, 150, 180 min after lysine consumption was measured by KETONIX® device(FDA Status-Registered Class 1).

Area Under Curve (AUC) ketones in exhaled air at L-lysine doses 1,0 g and 2,0 g indicates the presence of a dose-dependent effect; 2,0 g AUC was significantly (4 times) higher compared to 1.0, and maximum ketones ppm was 6 ppm at 1,0 g and 16 ppm at 2,0 g, at baseline level mean 3,3 ppm (95%CI = 1,8-4,8). Individual L-lysine ketosis intensity (rate) allowed to establish the presence fast inductors, medium and slow.

[1] Yury Marakhouski, Olga Zharskaya. A new non-invasive test with the potential to liver metabolic dysfunction assess. P 148, GASTRO 2021 Prague Abstract Book, GUARANT International spol. s r.o. December 2021, ISBN 978-80-907442-9-5

Ketosis was assessed by the content (ppm) of ketones in the exhaled air (KETONIX® device) before and at equal time intervals after the use (per os) of 2.0 grams of L-lysine (KETO-Lysine). Biological (metabolic) clock was calculated by the difference between chronological age (CHR-age) minus biological (metabolic) age (MET-age). MET-age was determined using tetrapolar spectral and vector bioimpedansometry (BIM).

75 people (mean CHR-age - 42,0(95%CI = 38,2 - 45,8). Subjects are randomly selected without examination and immediately tested for ketosis (KETO-Lysine). All participants were divided into 2 groups based on the cut-off value of keto AUC: group with values below 600 (suspected older metabolic age compared to chronological – KETO-MET-older) and group with values above 600 (KETO-MET-younger). Then, MET-age was determined using tetrapolar spectral and vector bioimpedansometry (BIM – BIM-MET-age) and blood biochemical and hematological parameters analysis was performed.

Receiver Operating Characteristic Curve (ROC)

ROC Data for Condition = values difference chronological age minus biological using the Binormal ROC Curve in comparison with ketones AUC values in exhaled air

| AUC ketones | Sensitivity | Specificity | Likelihood Ratio |
|---|---|---|---|
| 615 | 0,81 | 0,91 | 9,0 |

**Cut-off value: ketones AUC values below 615 indicate an older MET-age v.s. chronological ages .**

| Criterion | Binormal Estimate of AUC | AUC's Standard Error | Z-Value to Test AUC > 0.5 | 1-Sided Prob Level |
|---|---|---|---|---|
| AUC ketones | 0,93 | 0,006 | 21,98 | 0,0000 |

**The KETO-MET-younger group has significantly more younger metabolic age [45,6 (95%CI=41,1 -50,2 v.s. 50,1 (95%CI= 45,8-54,3)] by BIM (BIM-MET-age).**

**Moreover, in the KETO-MET-older group a significant change was found: higher blood levels of glucose, ALT, alkaline phosphatase(AP), cholesterol, and highly sensitive CRP(hsCRP).**