Analysis Report

Bruker IVDr Quantification in URine B.I.Quant-UR b™

Sample ID: ALZ_Urine_Rack01_RCM_221214_expno600.100000.10r

Measuring Date: 24-Dec-2014 04:13:02
Reporting Date: 12-Dec-2020 10:20:43, 7 page(s), Version 1.1.0
Quantification Method Version: Quant-UR B.1.1.0

Disclaimer

RESEARCH USE ONLY: This is no clinical diagnostic analysis report. Must not be used for clinical (medical or IVD) diagnosis or for patient management! Additional concentration range information (95% range) provided numerically or graphically in this report must not be used for clinical diagnostic interpretation.

Application of B.I.Quant-UR B 1.1.0 requires use of Bruker's B.I.Methods SOP for urine.

Summary

The following metabolites were found with concentrations outside the 95% range of Bruker Quant-UR B.1.1.0 urine metabolite concentration database:

Amines and derivatives: Trimethylamine (5 mmol/mol Crea),
Amino acids and derivatives: 1-Methylhistidine (24 mmol/mol Crea), Betaine (8 mmol/mol Crea), Glycine (< 34 mmol/mol Crea),
Carboxylic acids: Succinic acid (92 mmol/mol Crea),
Sugars and derivatives: D-Glucose (150 mmol/mol Crea), D-Mannose (100 mmol/mol Crea).

Further detailed information is provided on the following pages.

Contents

1 Creatinine

Compound	Conc. mmol/L	LOD mmol/L	r mmol/L	ρ %	Δ mmol/L	95% Range(*) mmol/L
Creatinine	9.1	0.3	9.136	99	0.763	1 - 19

(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

2 Amines and derivatives

Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
Dimethylamine	0.30	32	31	0.295	100	0.005	$\leq$ 54
Trimethylamine	0.04	5	2	0.041	99	0.007	$\leq$ 3

(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

3 Amino acids and derivatives

Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
1-Methylhistidine	0.22	24	15	0.223	90	2.435	$\leq$ 15
2-Furoylglycine	< 0.35	< 39	39	0.000	0	0.064	$\leq$ 40
4-Aminobutyric acid	< 0.18	< 20	20	0.010	0	0.091	$\leq$ 20
Alanine	0.30	32	10	0.297	93	0.102	11 - 72
Arginine	< 6.8	< 750	750	0.655	13	1.862	$\leq$ 750
Betaine	0.07	8	7	0.073	99	0.047	9 - 78
Creatine	< 0.46	< 50	50	0.000	99	0.763	$\leq$ 280
Glycine	< 0.31	< 34	34	0.230	98	0.050	38 - 440
Guanidinoacetic acid	< 0.94	< 100	100	0.264	49	0.240	$\leq$ 140
Methionine	< 0.16	< 18	18	0.000	0	0.229	$\leq$ 18
N,N-Dimethylglycine	< 0.05	< 5	5	0.014	81	0.005	$\leq$ 15
Sarcosine	< 0.02	< 2	2	0.000	0	0.663	$\leq$ 7
Taurine	< 1.3	< 140	140	0.187	50	0.316	$\leq$ 170
Valine	0.02	2	2	0.020	46	0.100	$\leq$ 7

(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

4 Benzene and substituted derivatives

Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
Benzoic acid	< 0.09	< 10	10	0.000	0 ○	0.543	≤ 10
D-Mandelic acid	< 0.02	< 2	2	0.000	0 ○	0.535	2 - 17
Hippuric acid	< 1.6	< 170	170	1.455	97 ●	0.264	≤ 660

(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

5 Carboxylic acids

Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
Acetic acid	0.09	10	5	0.087	99 ●	0.010	≤ 51
Citric acid	< 0.36	< 40	40	0.032	50 ○	0.266	≤ 700
Formic acid	0.11	12	10	0.112	100 ●	0.009	≤ 43
Fumaric acid	< 0.02	< 2	2	0.002	88 ●	0.001	≤ 3
Imidazole	< 0.44	< 48	48	0.000	0 ○	0.781	≤ 48
Lactic acid	< 0.44	< 49	49	0.232	88 ●	0.079	≤ 110
Proline betaine	< 0.23	< 25	25	0.141	77 ○	0.048	≤ 280
Succinic acid	0.84	92	5	0.845	81 ○	0.296	≤ 39
Tartaric acid	< 0.04	< 5	5	0.019	29 ○	0.038	≤ 110
Trigonelline	< 0.32	< 35	35	0.003	81 ○	0.002	≤ 67

(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

6 Fatty acids and derivatives

Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
2-Methylsuccinic acid	< 0.44	< 48	48	0.000	0 ○	1.797	≤ 48

(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

7 Keto acids and derivatives

Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
2-Oxoglutaric acid	< 0.84	< 92	92	0.000	0 ○	0.299	≤ 92
3-Hydroxybutyric acid	< 0.94	< 100	100	0.025	38 ○	0.311	≤ 100
Acetoacetic acid	< 0.13	< 14	14	0.063	0 ○	0.097	≤ 30
Acetone	< 0.02	< 2	2	0.013	81 ○	0.005	≤ 7
Oxaloacetic acid	< 0.16	< 17	17	0.083	45 ○	0.122	≤ 66
Pyruvic acid	0.09	9	9	0.085	98 ●	0.017	≤ 13

(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

8 Purine, Pyridine and Pyrimidine derivatives

Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
1-Methyladenosine	< 0.04	< 5	5	0.000	0 ○	0.135	≤ 5
1-Methylnicotinamide	< 0.29	< 32	32	0.008	18 ○	0.008	≤ 32
Adenosine	< 3.5	< 390	390	0.000	0 ○	1.847	≤ 390
Allantoin	0.16	18	17	0.164	84 ○	0.057	≤ 47
Allopurinol	< 0.09	< 10	10	0.018	71 ○	0.028	≤ 11
Caffeine	< 0.41	< 45	45	0.378	85 ●	0.496	≤ 61
Inosine	< 0.17	< 19	19	0.026	65 ○	0.035	≤ 19

(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

9 Sugars and derivatives

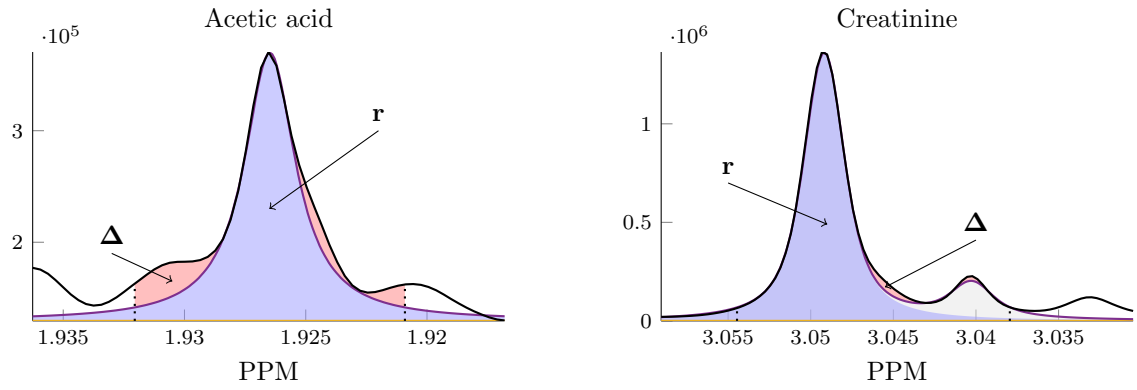
Compound	Conc. mmol/L	Conc. $\frac{\text{mmol}}{\text{mol Crea}}$	LOD $\frac{\text{mmol}}{\text{mol Crea}}$	r mmol/L	ρ %	Δ mmol/L	95% Range(*) $\frac{\text{mmol}}{\text{mol Crea}}$
D-Galactose	< 0.39	< 43	43	0.182	22 ○	0.058	≤ 44
D-Glucose	1.4	150	34	1.360	100 ●	0.047	≤ 140
D-Lactose	< 0.87	< 96	96	0.254	97 ●	0.070	≤ 96
D-Mannitol	< 1.7	< 180	180	0.000	0 ○	8.057	≤ 180
D-Mannose	0.93	100	6	0.928	87 ●	0.409	≤ 8
Myo-Inositol	< 41	< 4400	4400	0.000	0 ○	4.763	≤ 4400

(*) Gray horizontal boxes represent 95% concentration range, black vertical lines represent sample value.

10 Explanations

This section contains the definition of the parameters used above. In the section 10.1 a short manual, how to interpret the results, is presented. The section 10.3 contains the exact definitions of the parameters $\mathbf{r}$, ρ and $\mathbf{\Delta}$.

10.1 How to read the result



(a) Single signal fitting.

(b) Simultaneous fitting of two signals.

Figure 1: Examples of fitting.

In the figure 1(a), the black line, the blue line and the yellow line represent the original spectrum, the calculated signal fit and its baseline, respectively.

The blue area relates to the metabolite concentration to be determined and the red area represents a residue.

In case of the signal overlap a different approach is used: two or more overlapping signals are being fitted simultaneously. The most iconic example of such signals are the ones generated by $\mathrm{CH_3}$ groups of Creatinine and Creatine. In such a case, the blue line and the grey area relate the sum of all fitted signals. The blue area corresponds to the concentration of the metabolite of interest (cf. figure 1(b)).

10.2 Result parameters

a) **Conc.** is the final result concentration of the metabolite,

b) **LOD** is the *limit of detection* of the given metabolite,

c) $\mathbf{r}$ is the *raw concentration* i.e. the concentration equivalent of the resulting signal fit prior to comparing to **LOD** (relates to the blue area, cf. α)),

d) ρ is the correlation of lineshape metabolite signal with calculated fit characterizing the match between metabolite signal and fit (cf. β)). Depending on the value of ρ, the following *flag* is displayed:

- ●, if the correlation is 95%,
- ●, if the correlation is in between 85% and 95%,
- ○, if the correlation is less than 85%,

e) **Δ** is the concentration equivalent of the difference between metabolite signal and calculated fit (residue corresponding to the the red area, cf. γ)).

10.3 Detailed definitions

Let s, f and b denote the functions describing the *raw spectra*, *fitted curve* and *(fitted) baseline* respectively. These functions are chosen such that $s \approx f + b$. Moreover, let I be a relevant PPM interval and P_N be the proton number for given metabolite/signal.

α) $\mathbf{r}$ (*raw concentration*) is defined as

$$\mathbf{r} = \frac{1}{P_N} \int_{\mathbb{R}} f(\xi)\, \mathrm{d}\xi.$$

β) ρ is the *correlation* of the functions s and $f + b$, i.e.

$$\rho = \max\left(0, \operatorname{corr}\left(\overline{s}, \overline{f + b}\right)\right),$$

where $\overline{s}$, $\overline{f + b}$ are numerical representations of the functions s and $f + b$ on sufficiently fine mesh of the interval I.

γ) **Δ** is the the area between the raw signal s and the fitted data $f + b$ on the interval I expressed in the terms of the concentration, i.e.

$$\mathbf{\Delta} = \frac{1}{P_N} \int_I |s(\xi) - f(\xi) - b(\xi)|\, \mathrm{d}\xi.$$