Correction to: Sex and race differences of cerebrospinal fluid metabolites in healthy individuals

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After publication of our article (Reavis et al., 2021) it came to our attention that the values for CSF melatonin levels in Tables 3 and 4 and in the histogram depicting melatonin levels in Supplemental Online Resource 2 seemed abnormally high. The CSF levels of the metabolites were quantitated by a high-performance liquid chromatography coupled with electrochemical coulometric array detection (LCECA).

Because the CSF melatonin levels were expected to be very low, they were determined using a separate method. The chromatographic data were exported as "digital maps" which allow somewhat greater sensitivity in detecting low concentration values than the use of our peak finding algorithm.

Values from the digital maps are typically initially exported as a % of the pool and appended to the peak tables

to make them compatible with the values in % of pool from standard peak finding algorithms. The actual concentrations for the compounds measured by digital maps in the pool are determined with a separate set of low-level standards. In the case of this study, melatonin concentrations were exported as a % of the pool with a 10 pg/mL standard and these values were used to append the data table from the peak finding algorithm, which is based on a standard of ng/mL. Thus, conversion of % of pool to concentration resulted in the 100-fold error in melatonin values in the tables of our manuscript because they were presented in units of pg/mL instead of ng/mL. This has now been corrected by dividing the values for melatonin by 100.

The corrected melatonin values are presented in Tables 3 and 4 as well as in the histogram provided below. This error does not impact the results presented for melatonin or the conclusions of the article. This error does not affect any of the other metabolomics variables. The authors apologize for this mistake and want to thank Dr. David Kennaway for noticing the inaccuracy.

The original article can be found online at <https://doi.org/10.1007/s11306-020-01757-0>.

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Table 3 Sex differences in CSF metabolite levels (ng/mL) and ratios (medians and 25th and 75th quartiles)

	Women Median (25th–75th)	Men Median (25th–75th)	p-value	N
Metabolite				
2-Hydroxyphenylacetic acid	4.77 (4.21–5.30)	4.98 (4.52–5.62)	0.195	129
3-Hydroxykynurenine	1.03 (0.51–2.82)	0.94 (0.41–3.31)	0.909	129
3-O-methyldopa	1.09 (0.81–1.42)	1.28 (0.68–2.21)	0.386	105
4-Hydroxyphenyllactic acid	43.19 (35.75–58.08)	43.32 (32.49–56.26)	0.670	129
5-HIAA	13.60 (10.61–19.63)	10.26 (6.33–14.21)	0.0011	129
5-HTP	1.13 (0.84–1.39)	1.07 (0.79–1.33)	0.358	129
7-Methylxanthine	2.06 (1.65–2.57)	2.17 (1.67–2.46)	0.585	129
Alpha-Tocopherol	120.82 (100.49–141.71)	126.33 (95.64–152.58)	0.775	129
Anthranilic acid	2.09 (1.66–2.36)	2.16 (1.70–2.36)	0.563	123
Ascorbate	24,127.02 (20,230.46–30,557.56)	23,496.17 (17,300.34–31,353.01)	0.515	129
Cysteine	6.64 (5.36–8.71)	10.5 (7.90–13.62)	< .0001	129
DOPAC	1.17 (0.70–2.03)	1.06 (0.58–1.49)	0.095	117
Guanosine	3.62 (3.06–4.32)	3.40 (2.98–4.01)	0.302	121
Glutathione	12.28 (10.81–13.34)	14.34 (9.88–15.69)	0.062	90
Glutathione disulfide	10.52 (8.20–13.22)	9.95 (7.91–13.84)	0.797	129
Gamma-tocopherol	22.63 (12.37–31.49)	24.56 (15.44–37.10)	0.208	125
HVA	37.76 (26.09–54.75)	34.06 (24.15–45.05)	0.107	129
Hypoxanthine	722.26 (550.38–909.68)	635.42 (508.92–815.96)	0.178	129
Indoleacetic acid	3.47 (2.43–5.67)	2.76 (2.15–5.08)	0.119	126
Indolelactic acid	1.86 (1.35–2.42)	1.91 (1.45–2.62)	0.369	111
Kynurenine	5.07 (3.39–6.30)	4.83 (3.33–6.90)	0.910	129
L-Dopa	0.95 (0.71–1.35)	0.94 (0.69–1.21)	0.473	127
Melatonin	0.0067 (0.0042–0.0093)	0.0065 (0.0042–0.0092)	0.892	128
Methionine	955.53 (796.19–1125.83)	1033.47 (849.31–1251.00)	0.118	129
MHPG	10.39 (8.88–11.76)	10.48 (9.46–11.55)	0.446	129
N-acetylserotonin	1.04 (0.69–1.27)	1.14 (0.88–1.55)	0.049	129
Tryptophol	11.67 (8.37–15.52)	13.10 (9.67–17.92)	0.176	129
Tryptophan	485.29 (417.20–550.93)	493.52 (442.82–566.98)	0.348	129
Tyrosine	2033.30 (1660.71–2283.83)	2023.74 (1744.40–2372.01)	0.298	129
Uric acid	5353.71 (4041.17–7102.65)	9008.48 (7033.92–11,906.72)	< .0001	129
Vanillylmandelic acid	0.76 (0.58–1.00)	0.71 (0.43–1.05)	0.268	128
Xanthine	324.28 (276.36–392.87)	320.78 (276.85–377.55)	0.870	129
Xanthosine	23.74 (20.25–28.26)	23.10 (19.41–28.82)	0.844	129
Ratios				
5-HTP/Trp	0.0024 (0.0018–0.0029)	0.0021 (0.0016–0.0027)	0.147	129
5-HIAA/5-HTP	12.37 (8.47–19.99)	9.49 (6.20–15.96)	0.030	129
Uric/xanthine	16.34 (11.77–19.58)	30.20 (21.61–36.93)	< .0001	129
Xanthine/hypoxanthine	0.47 (0.40–0.57)	0.51 (0.41–0.64)	0.215	129

Table 4 Race differences in CSF metabolite levels (ng/mL) and ratios (medians and 25th and 75th quartiles)

	African American Median (25th–75th)	White Median (25th–75th)	p-value	N
Metabolite				
2-Hydroxyphenylacetic acid	4.94 (4.41–5.48)	4.84 (4.30–5.26)	0.643	129
3-Hydroxykynurenine	1.80 (0.49–3.51)	0.72 (0.50–1.37)	0.018	129
3-O-methyldopa	1.22 (0.82–1.88)	1.04 (0.69–1.45)	0.069	105
4-Hydroxyphenyllactic acid	43.32 (31.25–57.56)	43.97 (36.09–55.90)	0.543	129
5-HIAA	12.33 (8.99–17.95)	11.76 (8.41–16.00)	0.334	129
5-HTP	1.01 (0.79–1.36)	1.16 (0.85–1.34)	0.498	129
7-Methylxanthine	1.98 (1.61–2.38)	2.20 (1.84–2.80)	0.037	129
Alpha-Tocopherol	116.99 (94.60–137.53)	132.56 (111.66–151.31)	0.007	129
Anthranilic acid	2.13 (1.59–2.38)	2.12 (1.71–2.32)	0.907	123
Ascorbate	25,197.53 (19,613.42–30,802.89)	23,585.38 (15,970.69–30,411.53)	0.354	129
Cysteine	7.87 (5.60–9.57)	9.01 (6.67–12.91)	0.029	129
DOPAC	1.18 (0.74–1.91)	0.99 (0.59–1.45)	0.110	117
Guanosine	3.34 (2.96–4.18)	3.60 (3.16–4.27)	0.099	121
Glutathione	12.64 (9.75–15.63)	12.88 (11.69–14.89)	0.768	90
Glutathione Disulfide	9.60 (8.03–13.24)	11.19 (8.40–13.72)	0.166	129
Gamma-Tocopherol	21.19 (14.84–33.92)	25.20 (12.24–35.91)	0.519	125
HVA	36.54 (25.94–54.58)	34.41 (25.21–45.63)	0.503	129
Hypoxanthine	669.10 (530.06–835.36)	640.87 (513.24–911.57)	1.000	129
Indoleacetic acid	2.63 (2.01–4.08)	4.83 (2.76–6.41)	<.0001	126
Indolelactic acid	1.87 (1.35–2.43)	1.91 (1.58–2.52)	0.406	111
Kynurenine	4.30 (3.13–5.92)	5.83 (4.84–7.31)	<.0001	129
L-Dopa	0.95 (0.70–1.26)	0.94 (0.71–1.27)	0.861	127
Melatonin	0.0059 (0.0039–0.0083)	0.0080 (0.0049–0.0098)	0.036	128
Methionine	974.01 (806.38–1221.82)	982.47 (843.03–1169.90)	0.909	129
MHPG	10.58 (9.32–11.55)	9.95 (8.44–11.70)	0.182	129
N-acetylserotonin	1.06 (0.85–1.33)	1.10 (0.78–1.49)	0.610	129
Tryptophol	11.56 (8.03–16.43)	12.76 (10.34–17.61)	0.111	129
Tryptophan	484.05 (419.09–565.47)	491.69 (435.12–556.50)	0.531	129
Tyrosine	2025.29 (1696.14–2347.68)	2008.01 (1686.39–2363.03)	0.883	129
Uric acid	6749.83 (4619.79–8800.71)	7572.44 (5374.56–11,723.86)	0.081	129
Vanillylmandelic acid	0.75 (0.46–1.05)	0.74 (0.52–0.98)	0.953	128
Xanthine	311.72 (266.49–355.13)	354.36 (305.15–412.95)	0.0012	129
Xanthosine	23.97 (20.59–29.34)	23.24 (17.83–25.84)	0.062	129
Ratios				
Indoleacetic acid/tryptophan	0.0057 (0.0041–0.0086)	0.0090 (0.0056–0.0128)	0.0001	126
Anthranilic acid/indoleacetic acid	0.69 (0.45–1.03)	0.43 (0.29–0.70)	0.0002	121
Kynurenine/tryptophan	0.0088 (0.0065–0.0125)	0.0119 (0.0094–0.0149)	0.0002	129
Anthranilic acid/kynurenine	0.48 (0.33–0.68)	0.34 (0.25–0.45)	0.0002	123
3-Hydroxykynurenine/Kynurenine	0.48 (0.11–0.98)	0.12 (0.07–0.18)	0.0004	129
Uric/xanthine	20.89 (14.48–30.61)	20.05 (14.84–33.76)	0.615	129
Xanthine/hypoxanthine	0.47 (0.40–0.58)	0.53 (0.46–0.66)	0.016	129

Reference

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