

**Supplementary data to:**

**Δ-AMINOLEVULINATE DEHYDRATASE AND GLUTATHIONE  
PEROXIDASE ACTIVITY IN ALZHEIMER'S DISEASE:  
A CASE-CONTROL STUDY**

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<http://dx.doi.org/10.17179/excli2019-1749>

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**Supplementary Table 1:**  $\delta$ -ALA-D and GPx activity raw data from control subjects and Alzheimer Disease (AD) patients are presented together with the blood concentrations of Cu, Se and Fe from the same samples previously published by Vaz et al., 2018

AD subject	CDR	MMSE	Age	Years of school	ALA-D (nm PBG/h/mL blood)	ALA-D + DTT (nm PBG/h/mL blood)	Reactivation index	GPx ( $\mu$ mol NADPH/min./mL blood)	Se* mg/L blood	Fe* mg/L blood	Cu* mg/L blood
P1	1	27	80	>4	3.90	5.38	15.06	9.97	0.0052	5.45	0.06
P2	1	16	84	$\leq$ 4	3.23	7.90	34.30	8.04	-	-	0.05
P3	1	18	94	$\leq$ 4	4.04	2.66	39.10	5.95	0.0083	6.33	0.06
P4	1	17	83	$\leq$ 4	3.76	2.95	29.49	22.83	0.0309	6.90	0.05
P5	1	16	90	$\leq$ 4	6.23	7.03	25.89	9.00	0.0398	8.59	0.06
P6	1	20	84	>4	8.44	6.43	42.30	14.63	0.0092	6.65	0.06
P7	1	26	79	>4	3.00	3.30	20.91	11.58	0.0284	8.68	0.10
P8	1	19	64	>4	2.79	1.67	0.00	26.37	0.0250	5.45	0.05
P9	2	9	70	$\leq$ 4	3.32	3.33	34.83	9.00	0.0163	6.49	0.06
P10	2	14	82	$\leq$ 4	4.69	4.02	16.92	24.60	0.0300	7.30	0.06
P11	2	14	70	$\leq$ 4	4.80	3.28	17.99	18.17	0.0359	7.97	0.05
P12	2	10	63	$\leq$ 4	4.76	4.21	42.28	10.45	0.0072	-	0.05
P13	2	14	75	$\leq$ 4	5.76	3.13	26.52	14.63	-	-	0.06
P14	2	15	86	>4	2.41	2.74	65.33	14.95	0.0171	5.76	0.05
P15	2	9	60	$\leq$ 4	3.42	3.30	20.91	6.91	0.0103	6.32	0.06
P16	2	9	77	$\leq$ 4	3.30	3.26	30.98	30.55	0.0344	7.69	0.06
P17	2	14	85	$\leq$ 4	1.83	4.86	45.27	7.07	0.0128	5.86	0.08
P18	2	11	83	$\leq$ 4	2.34	3.04	42.43	9.65	0.0122	6.48	0.10
P19	2	11	76	$\leq$ 4	5.58	1.60	12.50	16.56	0.0276	6.38	0.06
P20	2	9	58	$\leq$ 4	2.13	4.60	25.00	8.36	0.0226	6.76	0.04
P21	2	15	80	>4	2.81	3.86	20.73	14.15	0.0161	-	0.07
P22	3	0	88	$\leq$ 4	1.82	3.71	35.04	24.43	0.0051	5.55	0.06
P23	3	5	86	$\leq$ 4	3.54	3.63	5.79	11.74	0.0056	4.95	0.06
P24	3	7	86	>4	3.78	4.42	25.34	12.22	0.0201	6.00	0.06
P25	3	0	79	$\leq$ 4	2.39	2.01	8.96	30.87	0.0233	6.49	0.06
P26	3	7	65	$\leq$ 4	2.86	3.46	32.37	9.32	0.0194	5.81	0.06
P27	3	7	67	$\leq$ 4	3.54	6.50	14.15	13.34	0.0160	6.44	0.06
P28	3	2	67	>4	2.34	2.77	23.10	12.22	0.0016	5.62	0.06
P29	3	5	80	>4	2.17	5.90	52.37	14.63	0.0244	7.39	0.07
P30	3	0	81	>4	2.13	2.50	27.20	20.10	0.0011	5.43	0.06
P31	3	0	87	>4	3.30	4.62	23.38	10.93	0.0151	5.58	0.06
P32	3	7	80	>4	3.45	4.30	12.09	11.58	0.0267	8.26	0.06
P33	3	0	80	>4	2.39	3.36	28.87	4.50	0.0147	5.83	0.06
P34	3	3	77	>4	2.86	4.31	33.64	29.42	0.0345	-	0.06

ALA-D:  $\delta$ -aminolevulinatase dehydratase; CDR: Clinical Dementia Rating; Cu: Copper; DDT: dithiothreitol; Fe: Iron; GPx: glutathione peroxidase; MMSE: Mini-Mental State Examination; PBG: porphobilinogen; Se: Selenium. \*Previously published by Vaz FNC, Fermino BL, Haskel MVL, Wouk J, de Freitas GBL, Fabbri R, et al. The relationship between copper, iron, and selenium levels and Alzheimer disease. Biol Trace Elem Res. 2018;181:185-91.

**Supplementary Table 1 (cont.):**  $\delta$ -ALA-D and GPx activity raw data from control subjects and Alzheimer Disease (AD) patients are presented together with the blood concentrations of Cu, Se and Fe from the same samples previously published by Vaz et al., 2018

Control subject	Paired CDR	MMSE	Age	Years of school	ALA-D	ALA-D + DTT	Reactivation index	GPx	Se*	Fe*	Cu*
					(nm PBG/h/mL blood)	(nm PBG/h/mL blood)		( $\mu$ mol NADPH/min./mL blood)	mg/L blood	mg/L blood	mg/L blood
C1	Controls paired with CDR1 patients	25	87.00	$\leq 4$	4.62	6.89	33.02	36.13	0.0019	3.90	0.06
C2		29	83.00	$> 4$	5.26	4.55	0.00	20.77	0.0312	6.82	0.06
C3		21	83.00	$\leq 4$	4.42	2.54	0.00	27.54	0.0436	7.30	0.06
C4		29	63.00	$> 4$	2.30	4.79	52.04	19.13	0.0208	5.87	0.09
C5		22	79.00	$\leq 4$	3.98	5.75	30.75	22.58	0.0108	4.94	0.07
C6		22	86.00	$\leq 4$	2.42	4.22	42.67	20.32	0.0326	7.19	0.07
C7		24	93.00	$\leq 4$	3.78	3.86	1.97	20.77	0.0476	-	0.06
C8		21	89.00	$\leq 4$	4.54	6.47	29.82	32.52	0.0207	5.26	0.06
C9	Controls paired with CDR2 patients	30	77.00	$> 4$	4.57	3.08	0.00	32.70	0.0122	4.41	0.05
C10		22	78.00	$\leq 4$	5.19	4.17	14.03	26.77	0.0254	5.46	0.06
C11		22	85.00	$\leq 4$	1.62	5.02	0.00	23.03	0.0495	9.57	0.07
C12		28	66.00	$> 4$	2.08	7.28	38.54	24.87	0.0051	7.28	0.05
C13		28	69.00	$> 4$	5.21	5.22	8.09	20.77	0.0117	4.41	0.05
C14		28	69.00	$> 4$	3.71	3.84	16.38	14.90	0.0275	7.96	0.06
C15		22	77.00	$\leq 4$	2.61	5.14	15.19	30.70	0.0273	7.06	0.06
C16		26	82.00	$\leq 4$	1.68	3.45	0.00	32.06	0.0289	-	0.07
C17		22	81.00	$\leq 4$	3.86	5.15	16.89	27.22	0.0269	6.51	0.06
C18		23	79.00	$\leq 4$	3.83	4.76	18.91	28.90	0.1160	13.60	0.05
C19		23	57.00	$\leq 4$	2.14	4.55	15.95	30.03	0.0267	5.98	0.05
C20		25	85.00	$\leq 4$	5.75	2.61	18.26	15.80	0.0222	6.18	0.05
C21		22	79.00	$\leq 4$	2.17	3.98	0.00	36.13	0.0166	5.28	0.05

ALA-D:  $\delta$ -aminolevulinatase; CDR: Clinical Dementia Rating; Cu: Copper; DDT: dithiothreitol; Fe: Iron; GPx: glutathione peroxidase; MMSE: Mini-Mental State Examination; PBG: porphobilinogen; Se: selenium. \*Previously published by Vaz FNC, Fermino BL, Haskel MVL, Wouk J, de Freitas GBL, Fabbri R, et al. The relationship between copper, iron, and selenium levels and Alzheimer disease. Biol Trace Elem Res. 2018;181:185-91.

**Supplementary Table 1 (cont.):**  $\delta$ -ALA-D and GPx activity raw data from control subjects and Alzheimer Disease (AD) patients are presented together with the blood concentrations of Cu, Se and Fe from the same samples previously published by Vaz et al., 2018

Control subject	Paired CDR	MMSE	Age	Years of school	ALA-D	ALA-D + DTT	Reactivation index	GPx	Se*	Fe*	Cu*
C22	Controls paired with CDR3 patients	26	76.00	≤4	2.17	5.65	30.90	38.38	0.0597	8.78	0.06
C23		25	79.00	≤4	3.34	6.17	47.63	23.04	0.0009	5.67	0.06
C24		29	84.00	>4	2.69	4.13	2.10	20.32	0.0372	7.11	0.07
C25		28	65.00	>4	2.43	6.89	45.44	24.42	0.0271	8.26	0.07
C26		24	63.00	≤4	2.30	5.65	0.00	30.25	0.0213	5.34	0.06
C27		28	80.00	>4	0.95	8.75	3.49	24.83	0.0425	8.16	0.09
C28		25	83.00	≤4	2.61	6.09	50.71	20.32	0.0411	8.29	0.10
C29		23	79.00	≤4	2.25	3.58	22.12	31.60	0.0330	7.31	0.06
C30		22	79.00	≤4	2.66	4.87	31.85	30.24	0.0211	5.69	0.06
C31		22	83.00	≤4	1.75	4.95	5.25	23.48	0.0325	8.30	0.06
C32		23	59.00	≤4	1.40	4.48	0.00	12.06	0.0131	5.96	0.06
C33		23	79.00	≤4	3.45	6.09	21.89	24.38	0.0358	6.85	0.06
C34		24	75.00	≤4	3.06	5.95	3.28	24.83	0.0399	9.02	0.06

ALA-D:  $\delta$ -aminolevulinatase; CDR: Clinical Dementia Rating; Cu: Copper; DDT: dithiothreitol; Fe: Iron; GPx: glutathione peroxidase; MMSE: Mini-Mental State Examination; PBG: porphobilinogen; Se: selenium. \*Previously published by Vaz FNC, Fermino BL, Haskel MVL, Wouk J, de Freitas GBL, Fabbri R, et al. The relationship between copper, iron, and selenium levels and Alzheimer disease. Biol Trace Elem Res. 2018;181:185-91.