Electronic Supplementary Material (ESI) for Metallomics

Zinc isotope ratio imaging of rat brain thin sections from stable isotope tracer studies by LA-MC-ICP-MS

Electronic Supplementary Material:

Table ESM 1: Injection timing and Zn tracer dosing during the 14-day feasibility study. Asterisks indicate Zn of natural isotope ratios. Zero dose is a saline solution only.

	^{70}Zn	^{67}Zn		
Rat number	1st Injection	2nd Injection	Dose ^{70}Zn (µg)	Dose ^{67}Zn (µg)
1	Day 7	Day 13	5	5
2	Day 7	Day 12	5	5
3	Day 7	Day 13	15	15
4	Day 7	Day 12	15	15
5	Day 0	Day 13	5	5
6	Day 0	Day 12	5	5
7	Day 0	Day 13	15	15
8	Day 0	Day 12	15	15
9	Day 7	Day 12	15*	15*
10	Day 7	Day 12	0	0

Table ESM 2: Operating and acquisition parameters for the MC-ICP-MS

Parameter	Value	Parameter	Value
Coolant gas	15 L/min	Extraction lens	-2000 V
Auxiliary gas	0.94 L/min	Focus	-614 V
Sample gas	0.78 L/min (argon)	x-deflection	1.46 V
Additional gas	0.74 L/min (helium)	y-deflection	0.12 V
x-position	0.200 mm	Shape	185 V
y-position	0.680 mm	Rotation Quad 1	0 V
z-position	-3.030 mm	Source offset	-10.00 V
RF Power	1021 W	Focus Quad 1	-15.51 V
Resolution	Medium	Rotation Quad 2	0 V
Peak Centre	66.887	Focus Offset	40.00 V
Zoom Focus lens	-2.5 V	Matsuda Plate	0 V
Zoom Dispersion lens	-0.8 V	Guard Electrode	On

Cup Number	Isotope	Position (mm)
L4	^{63}Cu	83.69
L3	^{64}Zn	60.94
L2	^{65}Cu	38.35
L1	^{66}Zn	17.15
C	^{67}Zn	Fixed
H1	^{68}Zn	18.30
H3	^{70}Zn	60.30

Acquisition parameter	Value
Mode	Static
Dwell time	2 s
No of integrations	1
Idle time	1 s
No of blocks/cycles	1 x 130

Table ESM 3: Uncorrected Zn isotope ratios found in different physiological units of the brain

	hippocampus		**amygdala**		**cortex**		**hypothalamus**		**control line 20**		**control line 50**	
	average	SD	average	SD	average	SD	average	SD	average	SD	average	SD
64/66	1.71231	0.00126	1.71327	0.00089	1.71273	0.00121	1.71447	0.00091	1.71214	0.00540	1.71192	0.00108
67/64	0.08774	0.00020	0.08748	0.00016	0.08842	0.00011	0.08849	0.00022	0.08678	0.00019	0.08668	0.00017
67/66	0.15024	0.00040	0.14987	0.00016	0.15143	0.00021	0.15171	0.00035	0.14858	0.00047	0.14838	0.00031
70/64	0.01521	0.00012	0.01518	0.00006	0.01539	0.00013	0.01537	0.00012	0.01377	0.00016	0.01370	0.00011
70/66	0.02604	0.00021	0.02601	0.00010	0.02635	0.00023	0.02635	0.00021	0.02358	0.00027	0.02345	0.00019
70/67	0.17334	0.00142	0.17355	0.00072	0.17402	0.00149	0.17368	0.00140	0.15873	0.00174	0.15802	0.00121
size (n)	61		38		27		30		96		89	

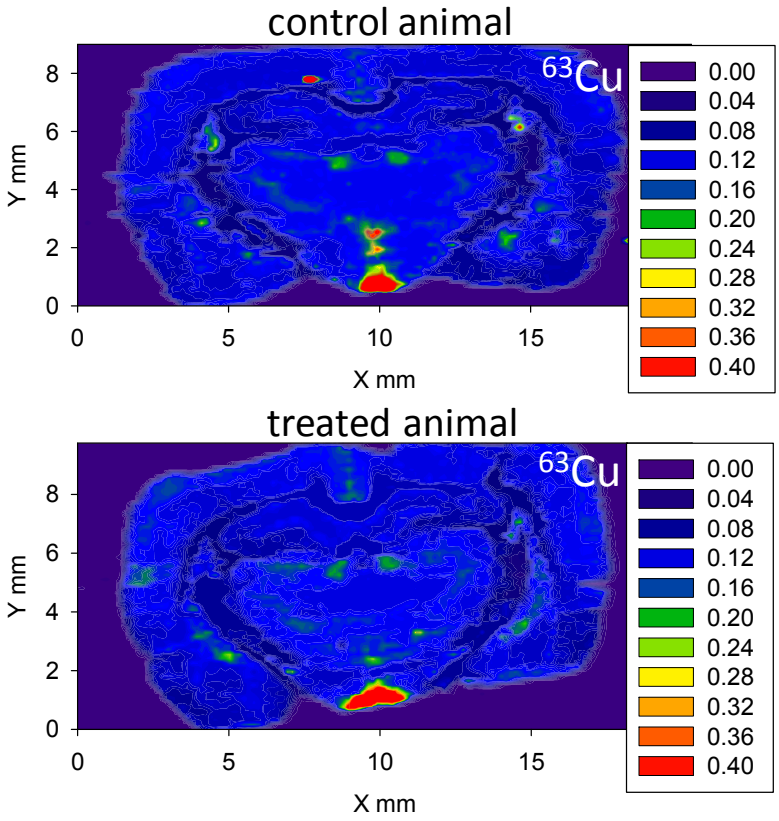

Figure ESM 1: Qualitative ^{63}Cu distribution in rat brain obtained by LA-MC-ICP-MS.

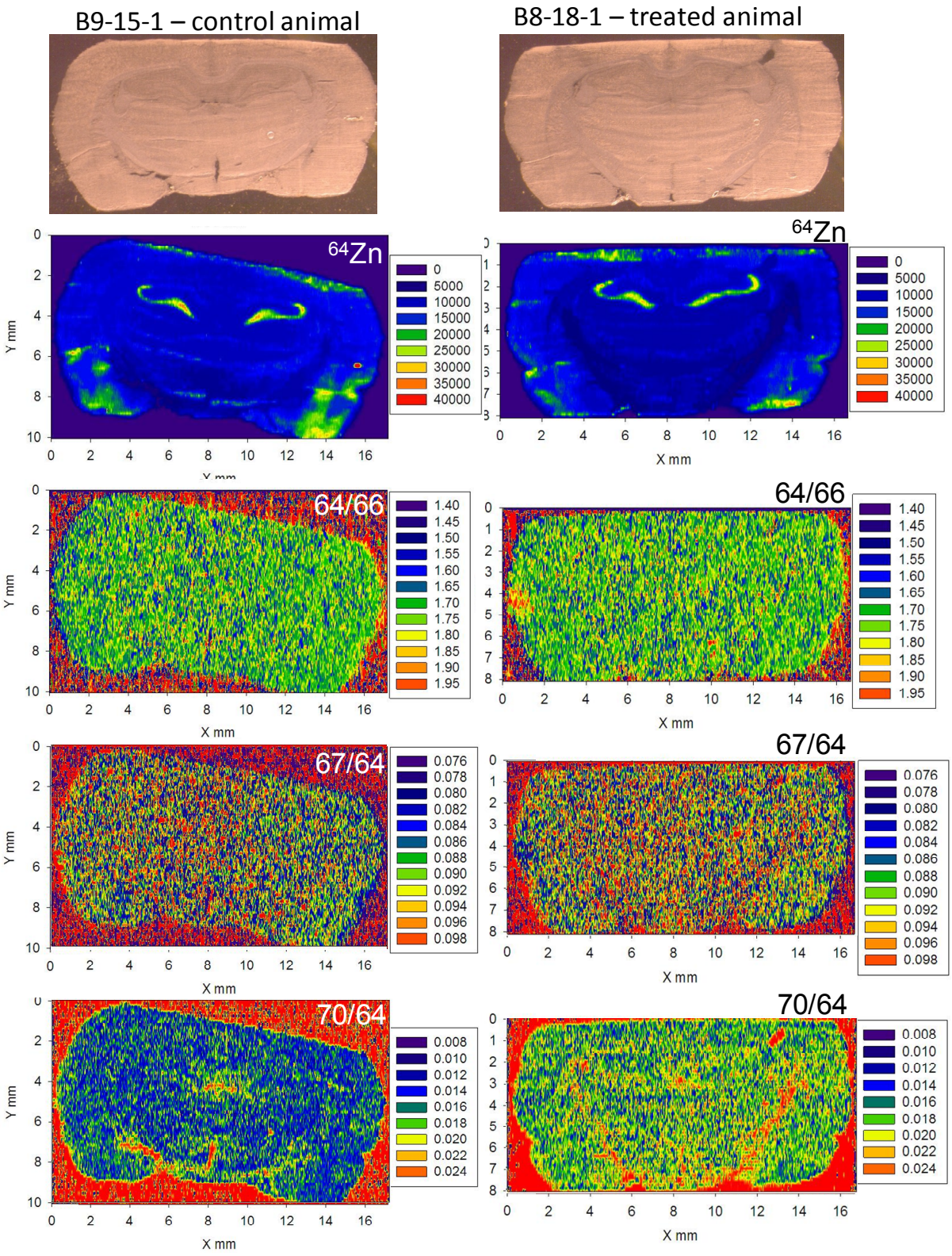

Figure ESM 2: Bio-images displaying Zn isotope ratios in thin sections of rat brain obtained by LA quadrupole ICP-MS. Natural isotope ratios are 64/66=1.742, 67/64=0.08436 and 70/64= 0.01235. Treated animal was injected with 15 µg ^{70}Zn on day 0 and 15 µg ^{67}Zn on day 12.

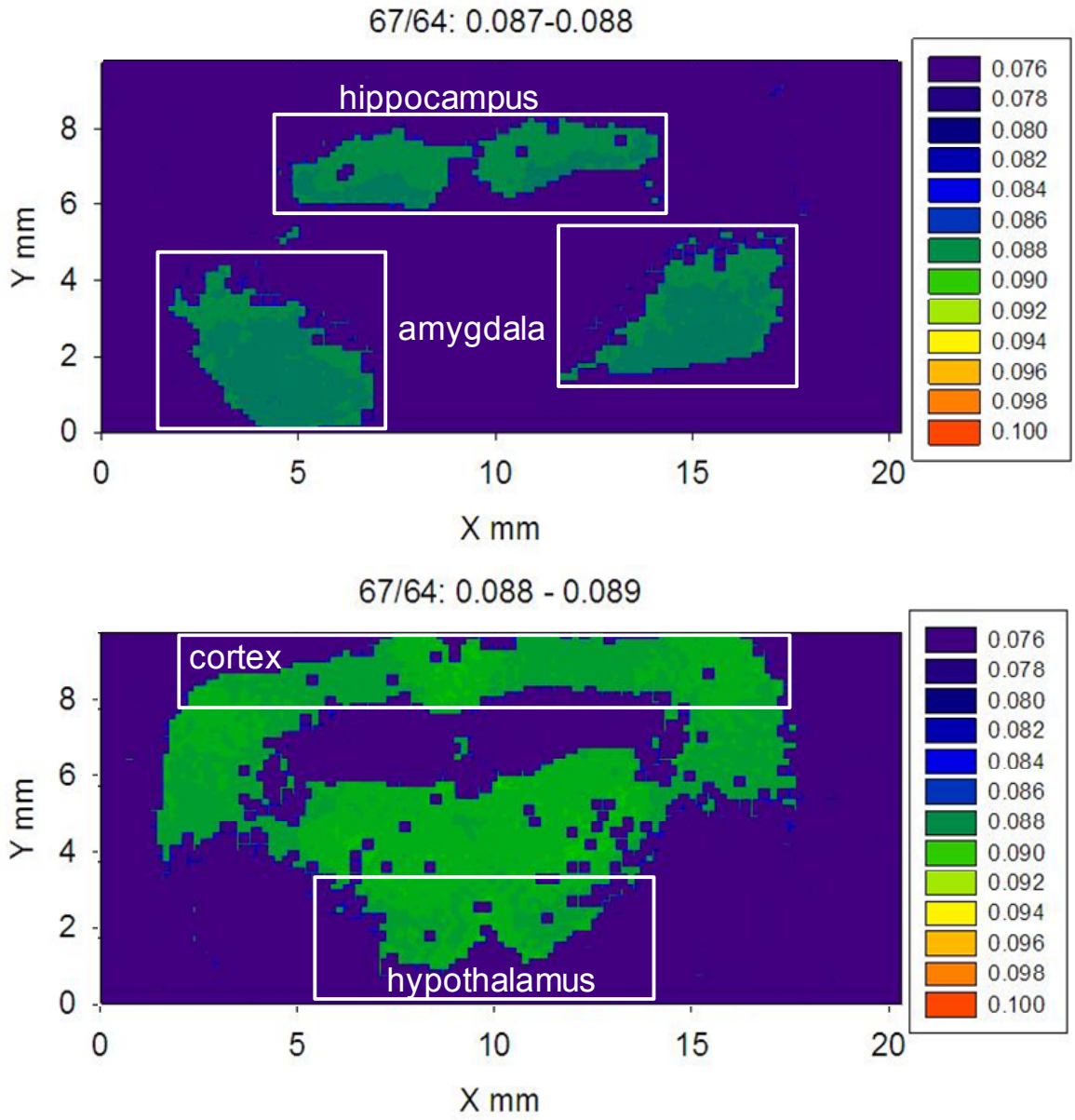

Figure ESM 3: Sampling areas for "full feature" analysis of 67/64, obtained by LA-MC-ICP-MS, are indicated by white rectangles. Only data in the IR range given in the graph title has been considered for average IR calculations.

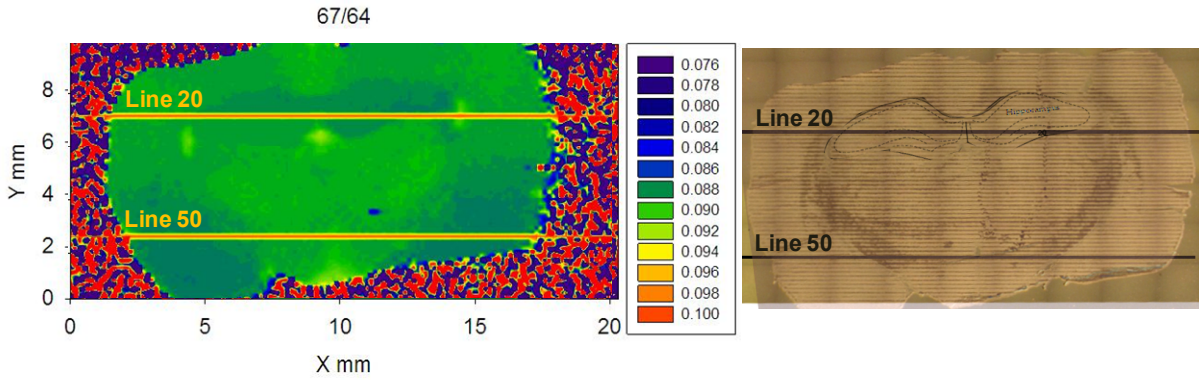

Figure ESM 4: Position of line scans through features of a rat brain thin section from a treated animal which have been chosen for representative analysis of LA-MC-ICP-MS data of the respective features.