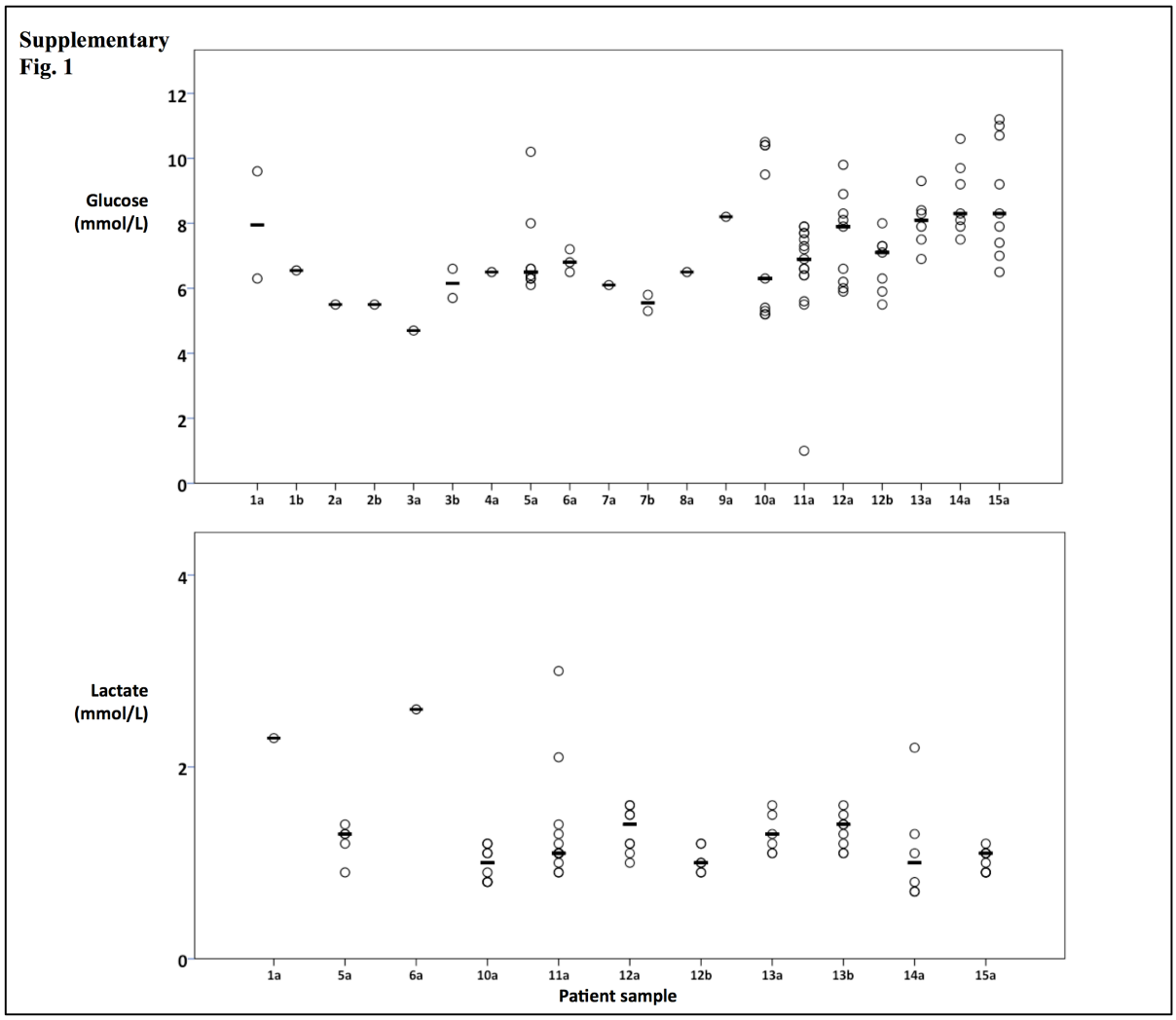
TBI Patient	Age	Sex	Injury mechanism	GCS at scene/15	Modified Marshall CT Grade (initial CT)	Pattern of injury	^{13}C microdialysis start time after injury (hours)	Sedative regime	GOS Outcome
1	26	F	RTC	6	2d	Diffuse	17	P, F	4
2	27	M	RTC	7	3	Diffuse	45	P, F	5
3	53	F	RTC	6	2c	Diffuse	41	P, F	NA
4	59	F	RTC	4	6b	ASDH, diffuse	60	Nil	NA
5	16	F	RTC	4	2d	Diffuse	47	F, M, T	5
6	37	M	RTC	8	2d	Contusions, diffuse	49	P, F	5
7	28	M	RTC	3	6b	ASDH, diffuse	104	P, F, M	5
8	20	M	RTC	4	2d	Diffuse	132	P, F	4
9	20	M	RTC	5	6c	Diffuse, ICH	51	P, F	NA
10	25	M	RTC	8	1	Diffuse	26	P, F	4
11	20	M	RTC	4	2d	Diffuse	88	P, F	5
12	27	M	Assault	5	3	ASDH, diffuse	17	P, F, M	3
13	26	M	RTC	5	2c	Diffuse	47	P, F, R	3
14	28	F	Fall	11	6b	ASDH, diffuse	104	P, F, R	3
15	51	M	Fall	8	6b	ASDH, contusions, diffuse	14	P, F	4

Normal brain subject	Age	Sex	Benign tumour type	Perfusion fluid
1	60	F	Meningioma	1,2-13C glucose
2	59	M	Colloid cyst	1,2-13C glucose
3	59	M	Meningioma	1,2-13C glucose
4	73	M	Meningioma	1,2-13C glucose
5	50	F	Meningioma	1,2-13C glucose
6	67	F	Meningioma	1,2-13C glucose
7	42	F	Meningioma	Unsupplemented
8	68	F	Meningioma	Unsupplemented

Muscle subject	Age	Sex	Perfusion fluid
1	45	M	1,2-13C glucose
2	20	M	1,2-13C glucose
3	61	M	1,2-13C glucose
4	45	F	1,2-13C glucose
5	67	M	Unsupplemented
6	82	M	Unsupplemented
7	63	F	Unsupplemented
8	26	F	Unsupplemented
9	48	F	Unsupplemented

Supplementary Table 1. Fifteen TBI patients were recruited who underwent both a period of microdialysis with unsupplemented perfusion fluid and a period with perfusion fluid containing 4 mmol/L 1,2-$^{13}C_2$ glucose. All of the patients except TBI Patient 4 were sedated for the duration of their monitoring period; TBI Patient 4 underwent 1,2-$^{13}C_2$ glucose perfusion after sedative drugs had been stopped although she remained in coma. Eight patients undergoing craniotomies for benign tumours underwent microdialysis, with the catheter placed in radiographically normal brain, either with unsupplemented perfusion fluid (2 patients) or with 4 mmol/L 1,2-$^{13}C_2$ glucose (6 patients); microdialysates were collected postoperatively, during which time these patients were awake. Nine patients underwent microdialysis of their quadriceps muscle with either unsupplemented perfusion fluid (5 patients) or with 4 mmol/L 1,2-$^{13}C_2$ glucose (4 patients) whilst undergoing surgery for an acoustic neuroma; microdialysates were collected while these patients were anaesthetised. Abbreviations: RTC, road traffic collision; GCS, Glasgow Coma Scale; ASDH, acute subdural haematoma; ICH, intracerebral haematoma; P, propofol; F, fentanyl; M, midazolam; T, thiopentone; R, remifentanyl.

Supplementary Fig. 1. Systemic (serum) glucose and lactate concentrations measured during the 24 h microdialysis perfusion with 1,2-$^{13}C_2$ glucose in the TBI patients. Data for systemic glucose concentration (upper panel) is for all 15 TBI patients, five of whom had a second 24 h period of 1,2-$^{13}C_2$ glucose microdialysis perfusion. Data for systemic lactate concentration (lower panel) is for 9 TBI patients, two of whom had a second 24 h period of 1,2-$^{13}C_2$ glucose microdialysis perfusion. First and second perfusion periods are designated 'a' and 'b' respectively. Circles indicate individual data points; lines indicate median values.



Supplementary Fig. 2. Illustrative examples of ^{1}H-^{13}C HSQC spectra from normal brain showing glutamine labelling. In the one-dimensional ^{13}C spectra small peaks were detected at 28.9 and 33.7 ppm, which represent C3 and C4 glutamine signals respectively, in 4/6 of the normal brain subjects and in 2/15 of the TBI patients. (A) The identities of these peaks were confirmed using two-dimensional ^{1}H-^{13}C HSQC NMR experiments. The signals outlined within the inner rectangle are shown expanded in (B). Quantification of the glutamine singlets revealed no significant ^{13}C enrichment above natural abundance.