

## Supplementary information:

Supplementary Table 1. Demographic and clinical information for patients with disorders of consciousness

Patient number	Gender/Age	Cause	Time of fMRI (days after insult)	CRS-R	Diagnosis
UWS1	M/51	TBI	100	4	UWS
UWS2	F/35	TBI	21	5	UWS
UWS3	M/60	SIH	109	6	UWS
UWS4	M/44	TBI	21	3	UWS
UWS5	M/50	TBI	137	3	UWS
UWS6	M/46	SIH	18	2	UWS
UWS7	M/24	TBI	15	6	UWS
UWS8	M/38	TBI	81	3	UWS
UWS9	M/46	TBI	25	2	UWS
UWS10	F/67	TBI	10	3	UWS
UWS11	F/39	TBI	31	6	UWS
UWS12	F/52	SIH	51	4	UWS
UWS13	M/46	TBI	162	5	UWS
UWS14	M/17	TBI	16	3	UWS
UWS15	F/43	SIH	162	6	UWS
UWS16	M/24	Anoxic	5	3	UWS
UWS17	F/57	TBI	15	3	UWS
UWS18	F/24	TBI	1	3	UWS
UWS19	M/46	Anoxic	23	3	UWS
UWS20	M/62	TBI	24	4	UWS
UWS21	M/45	TBI	12	6	UWS
UWS22	M/39	SIH	221	4	UWS
UWS23	M/57	SIH	33	2	UWS
MCS1	M/18	TBI	30	6	MCS
MCS2	F/32	TBI	73	12	MCS
MCS3	M/49	TBI	24	9	MCS
MCS4	M/16	TBI	4	12	MCS
MCS5	M/17	TBI	44	12	MCS
MCS6	M/44	TBI	98	8	MCS
MCS7	M/56	TBI	18	8	MCS
MCS8	M/36	TBI	82	13	MCS
MCS9	M/48	TBI	19	10	MCS
BL1	M/46	TBI	43	23	BL
BL2	M/18	TBI	182	23	BL
BL3	M/70	TBI	11	23	BL
BL4	F/52	TBI	137	23	BL
BL5	M/24	TBI	165	23	BL
BL6	M/18	TBI	105	23	BL
BL7	F/29	TBI	6	23	BL
BL8	M/49	TBI	57	23	BL
BL9	F/33	TBI	86	19	BL

BL10	M/21	TBI	621	23	BL
BL11	F/50	SIH	9	23	BL
BL12	M/46	SIH	41	23	BL
BL13	M/64	SIH	30	23	BL
BL14	F/33	SIH	4	23	BL
BL15	F/24	TBI	139	23	BL
BL16	F/54	TBI	4	23	BL
BL17	F/28	TBI	4	23	BL
BL18	M/34	TBI	4	23	BL

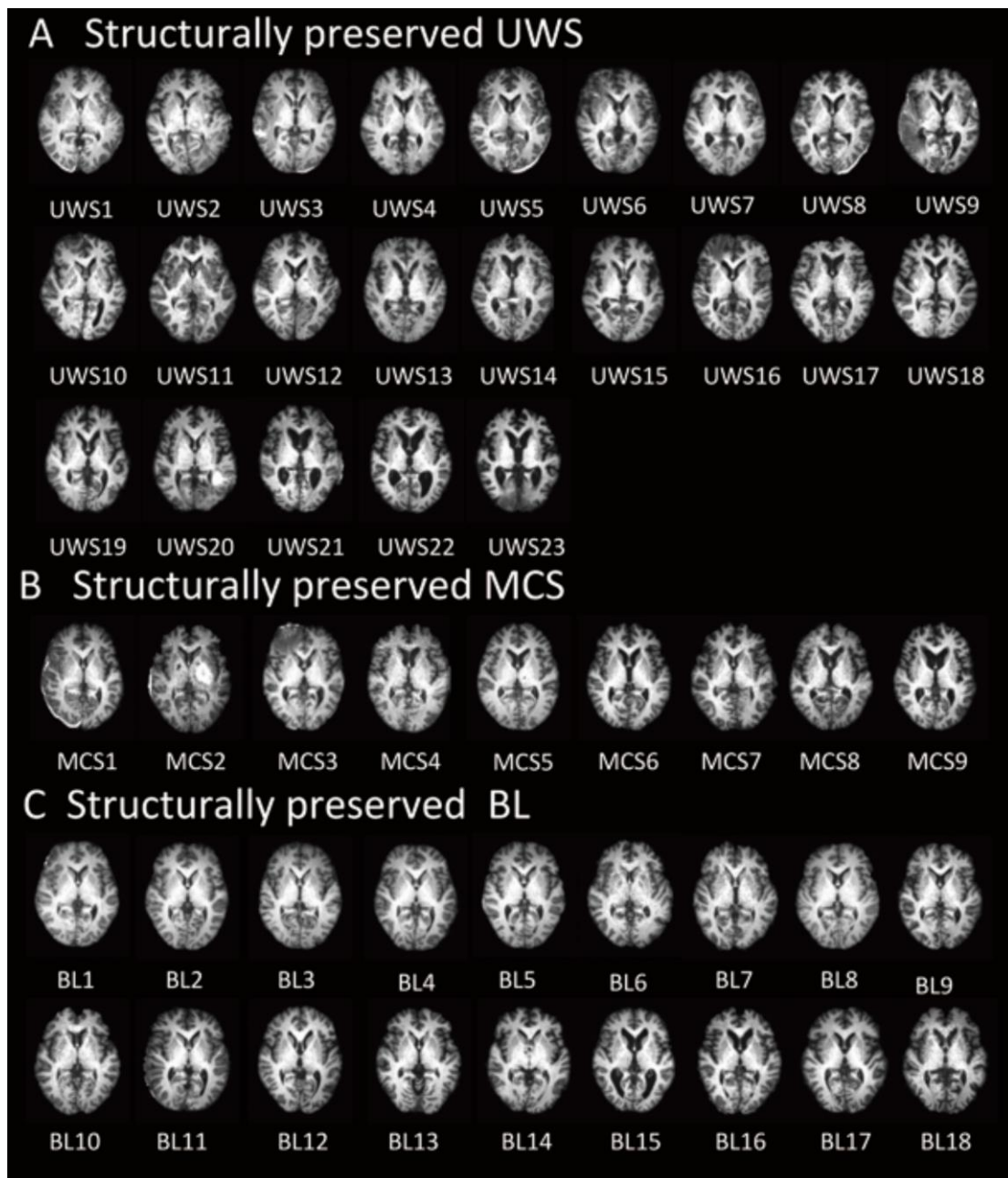
Note: UWS = unresponsive wakefulness syndrome, MCS = Minimally conscious state, BL = patients with brain lesions but full consciousness. CRS-R: Coma Recovery Scale-Revised; SIH: spontaneous intracerebral hemorrhage, TBI = traumatic brain injury.

Supplementary Table 2. Coordinates for global hubs with reduced degree centrality in unconsciousness

Brain regions	Lateral	Coordinates (MNI)		
		X	Y	Z
SACC	M	-2	6	41
SMA	M	-2	-14	52
SMG	L	-59	-24	21
	R	56	-26	24
MTG	L	-54	-68	7

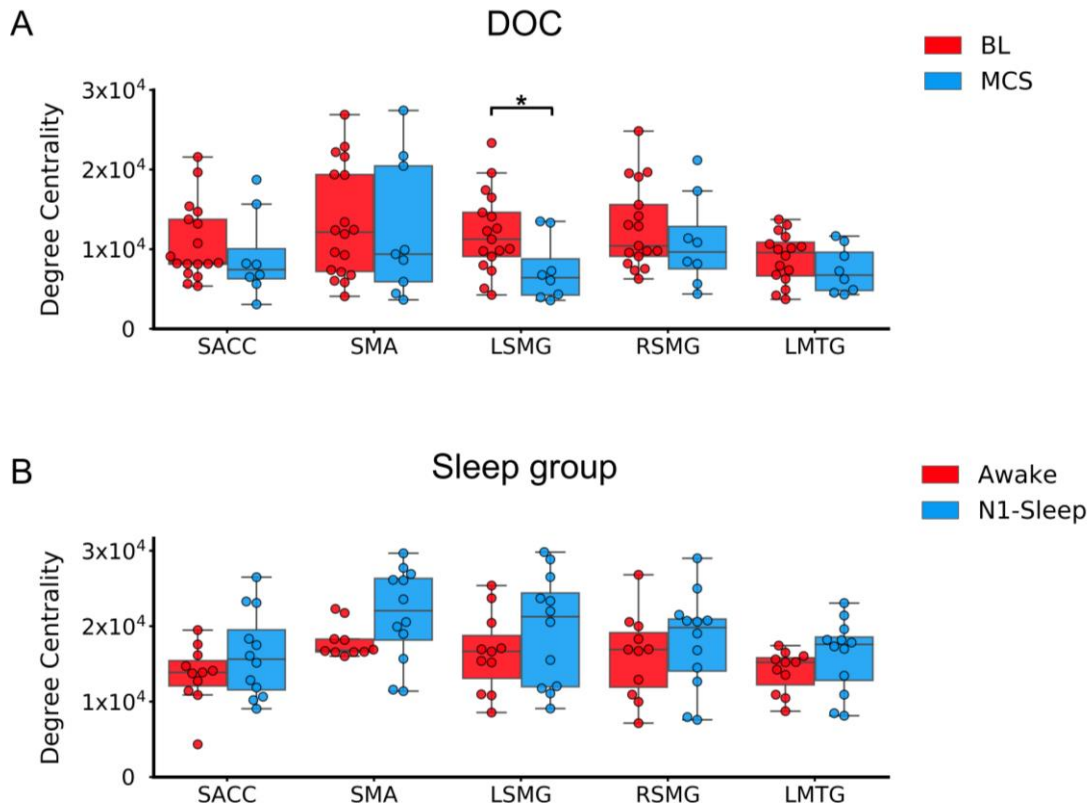
Note: The overlapped regions showing significantly reduced voxel-wise DC during all kinds of unconscious states (N3-sleep, anesthesia and unresponsive wakefulness syndrome). SACC = supragenual anterior cingulate cortex; SMA = supplementary motor area; SMG = supramarginal gyrus; LMTG = left middle temporal gyrus.

Supplementary fig. 1.



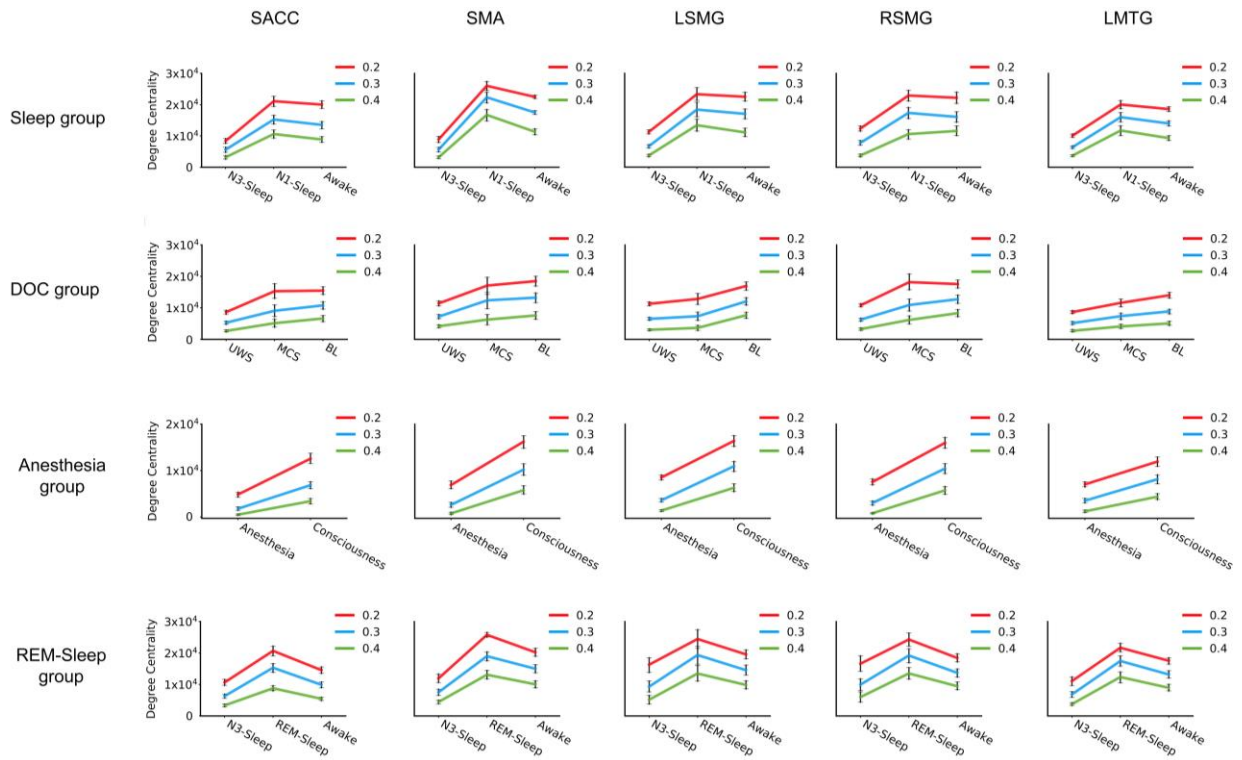
Supplementary fig. 1: Structure Image patients with disorders of consciousness. (A) UWS = unresponsive wakefulness syndrome, (B) MCS = minimally conscious state, (C) BL = patients with brain lesions but full consciousness.

Supplementary fig. 2.



Supplementary fig. 2. The degree centrality in DOC and sleep group. (A) The degree centrality in BL and MCS in DOC group. (B) The degree centrality in Awake and N1-sleep. SACC = supragenual anterior cingulate cortex; SMA = supplementary motor area; LSMG = left supramarginal gyrus; RSMG = right supramarginal gyrus; LMTG = left middle temporal gyrus. \* means  $p < 0.05$  FDR corrected.

Supplementary fig. 3



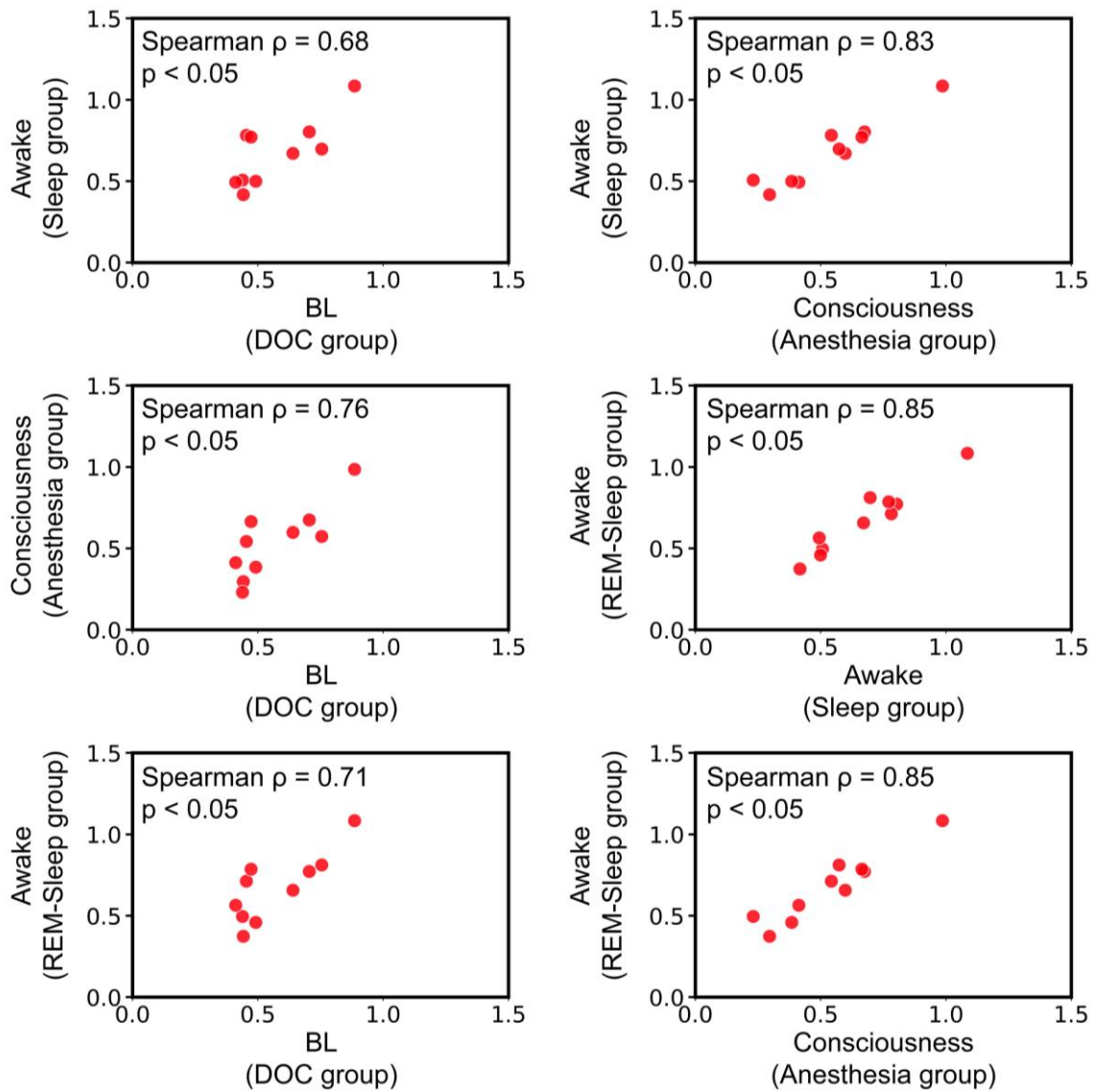
Supplementary fig. 3. The degree centrality values (with different thresholds) in global hubs.

0.3 means  $r > 0.3$ ; 0.2 means  $r > 0.2$ ; 0.4 means  $r > 0.4$ . SACC = supragenual anterior

cingulate cortex; SMA = supplementary motor area; LSMG = left supramarginal gyrus;

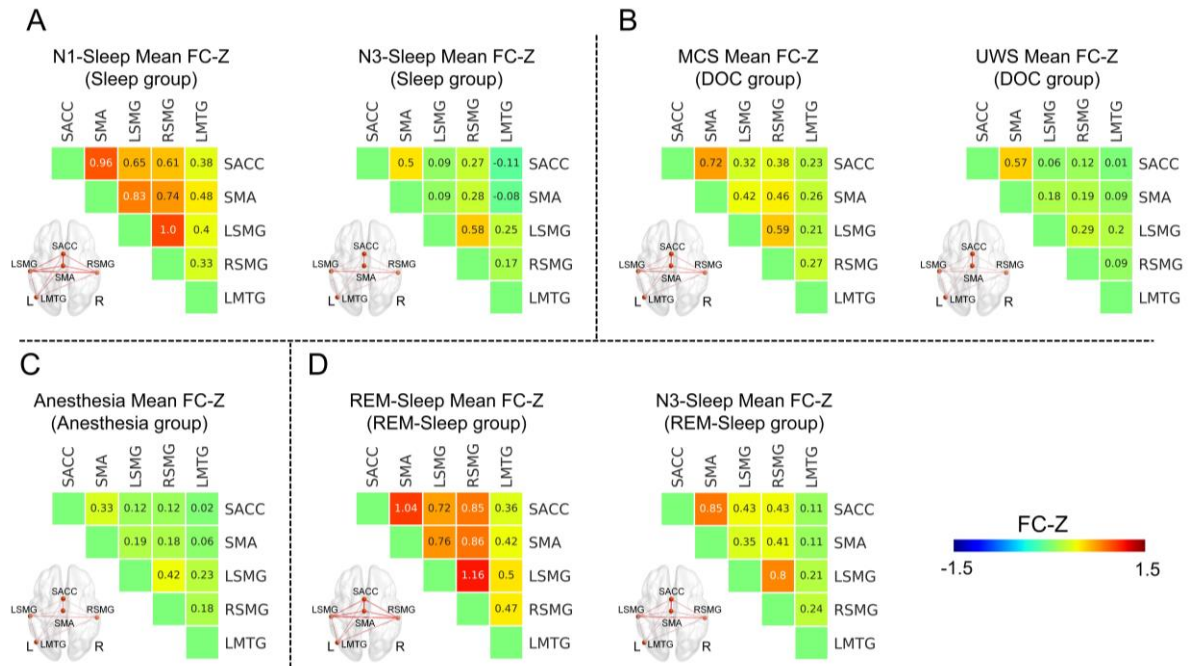
RSMG = right supramarginal gyrus; LMTG = left middle temporal gyrus.

Supplementary fig. 4.



Supplementary fig. 4. The relationship of functional connectivity (FC) between each of pair of groups during conscious states.

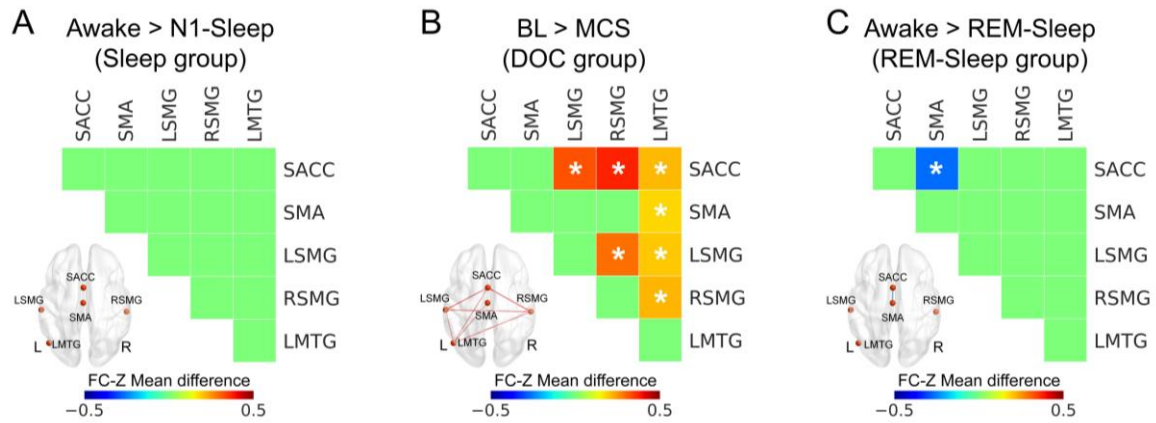
Supplementary fig. 5.



Supplementary fig. 5. ROI-based functional connectivity in altered conscious states. (A) The mean of functional connectivity z-values of N1-sleep and N3-sleep states in sleep group. (B) The mean of functional connectivity z-values of MCS and UWS in DOC group. (C) The mean of functional connectivity z-values of anesthesia state. (D) The mean of functional connectivity z-values of REM-sleep and N3-sleep states in REM-sleep group. SACC = supragenual anterior cingulate cortex; SMA = supplementary motor area; LSMG = left supramarginal gyrus; RSMG = right supramarginal gyrus; LMTG = left middle temporal gyrus.

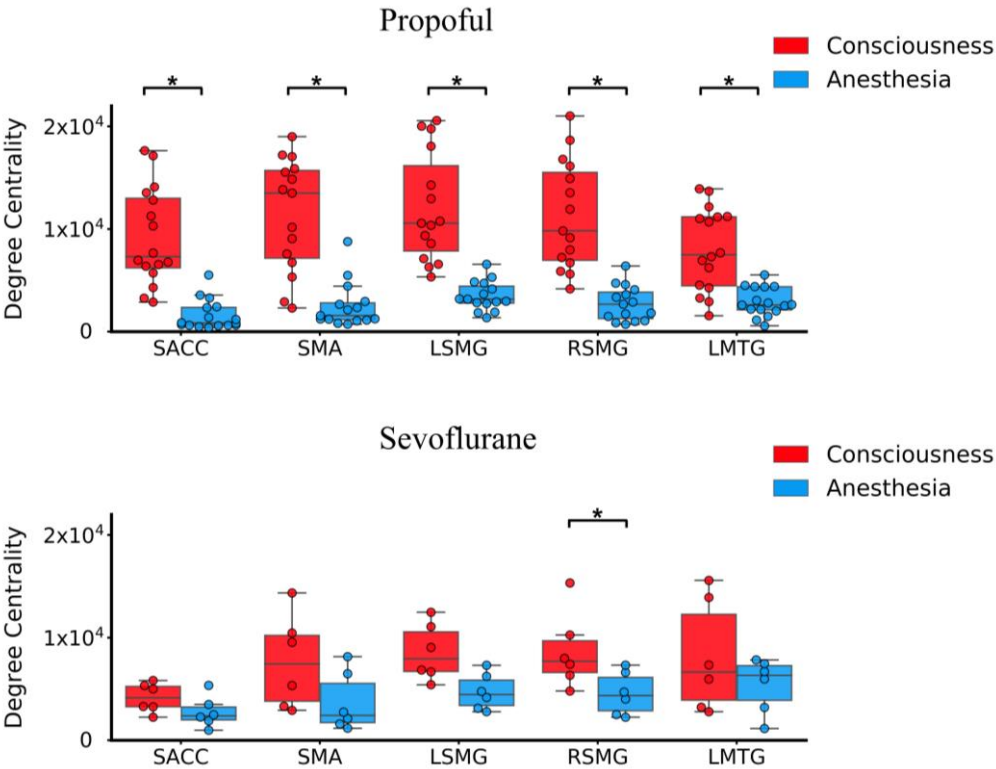


Supplementary fig. 6



Supplementary fig. 6. The functional connectivity difference between different conscious states. (A) No difference between awake and N1-sleep in sleep group. (B) The difference between BL and MCS in DOC group. (C) The difference between awake and REM-sleep in REM-sleep group. \* means  $p < 0.05$  FDR corrected. SACC = supragenual anterior cingulate cortex; SMA = supplementary motor area; LSMG = left supramarginal gyrus; RSMG = right supramarginal gyrus; LMTG = left middle temporal gyrus.

Supplementary fig. 7



Supplementary fig. 7. The degree centrality for participants adopting Propofol and Sevoflurane. SACC = supragenual anterior cingulate cortex; SMA = supplementary motor area; LSMG = left supramarginal gyrus; RSMG = right supramarginal gyrus; LMTG = left middle temporal gyrus. \* means  $p < 0.05$  FDR corrected.

All data needed to evaluate the conclusions in the paper are present in the paper and the Supplementary Materials. Additional data related to this paper may be requested from the corresponding author.