

1 **Supplementary Tables and Figures**

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Normal												
	Propofol			Ketamine			IPK			Sleep		
	Recording Sessions	Ctx sites	GPe sites	Recording Sessions	Ctx sites	GPe sites	Recording Sessions	Ctx sites	GPe sites	Recording Nights	Ctx sites	GPe sites
Monkey Ch	9	22	20	8	26	18	1	4	3	6	18	12
Monkey Cs	8	18	20	6	17	14	2	5	7	13	34	33
Total	17	40	40	14	43	32	3	9	10	19	52	45

MPTP treated												
	Propofol			Ketamine			IPK					
	Recording Sessions	Ctx sites	GPe sites	Recording Sessions	Ctx sites	GPe sites	Recording Sessions	Ctx sites	GPe sites			
Monkey Ch	3	11	11	3	12	8	2	7	6			
Monkey Cs	3	7	8	3	8	10	2	6	8			
Total	6	18	19	6	20	18	4	13	14			

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4 **Supplementary Table 1 | Recording database.**

5 For each sedative drug and sleep, recording sessions, nights and sites from both monkeys are given. Abbreviations as
6 in Fig.1.

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Propofol						
	Normal (N=17)			MPTP (N=6)		
	Sal-Ppf	Ppf-Wash	Sal-Wash	Sal-Ppf	Ppf-Wash	Sal-Wash
All	*** 0.0004	*** 0.0004	0.36	* 0.0312	* 0.0312	0.44
Long	*** 0.0004	*** 0.0004	0.33	* 0.0312	* 0.0312	0.44
Short	*** 0.0003	*** 0.0003	0.62	0.0625	* 0.0312	0.31

Ketamine						
	Normal (N=14)			MPTP (N=6)		
	Sal-Ktm	Ktm-Wash	Sal-Wash	Sal-Ktm	Ktm-Wash	Sal-Wash
All	*** 0.0001	*** 0.0001	** 0.0040	* 0.0312	* 0.0312	* 0.0312
Long	*** 0.0001	*** 0.0001	** 0.0067	* 0.0312	* 0.0312	* 0.0312
Short	0.95	** 0.0012	* 0.0245	0.44	0.56	0.22

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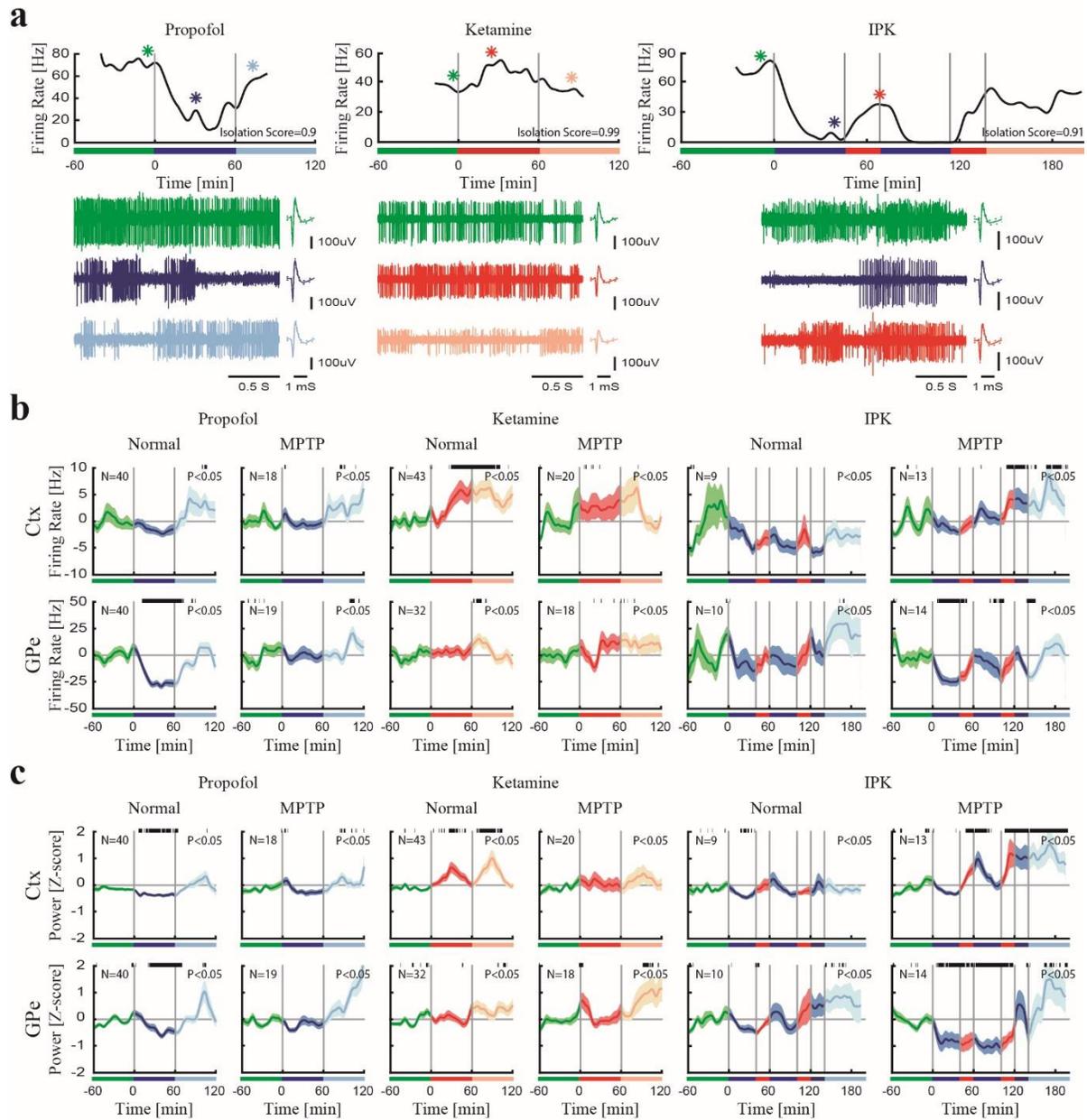
10 **Supplementary Table 2 | Eye closure proportion changed during propofol and ketamine sedation.**

11 Statistics of Fig.1e raster and bar plots. Two propofol sedations before MPTP with no air puff applied were excluded
 12 from rate plot in Fig.1e. P-value is given, two-sided Wilcoxon signed-rank test. Abbreviations as in Fig.1.

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17 **Supplementary Figure 1: Firing rate properties change during ketamine and propofol in cortex and the basal**
 18 **ganglia. a.** Examples of firing rate of GPe during propofol (left), ketamine (center) and IPK (right) sedation sessions.
 19 The spiking from time locations marked with asterisks is shown (lower). **b.** Averaged firing rate difference of multi-
 20 units of Ctx (upper) and GPe (lower) during propofol (left), ketamine (center) and IPK (right) before and after MPTP-
 21 treatment. Top black bar shows significant difference in firing rate compared to saline ($p < 0.05$, two-sided Wilcoxon
 22 rank sum test). **c.** Normalized total power (0.5-100 Hz) of SPK of Ctx (upper) and GPe (lower) during propofol (left),
 23 ketamine (center) and IPK (right) before and after MPTP-treatment. Top black bar shows significant difference

24 compared to saline ($p < 0.05$, two-sided Wilcoxon rank sum test). Color represents session epochs: saline baseline
25 (green), propofol sedation (blue), ketamine sedation (red) and saline washout (propofol, cyan; ketamine orange).
26 Abbreviations as in Fig.1.

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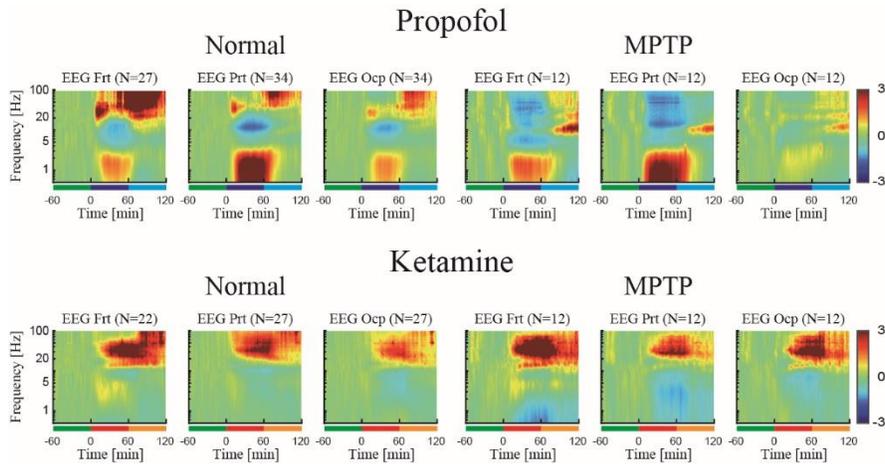
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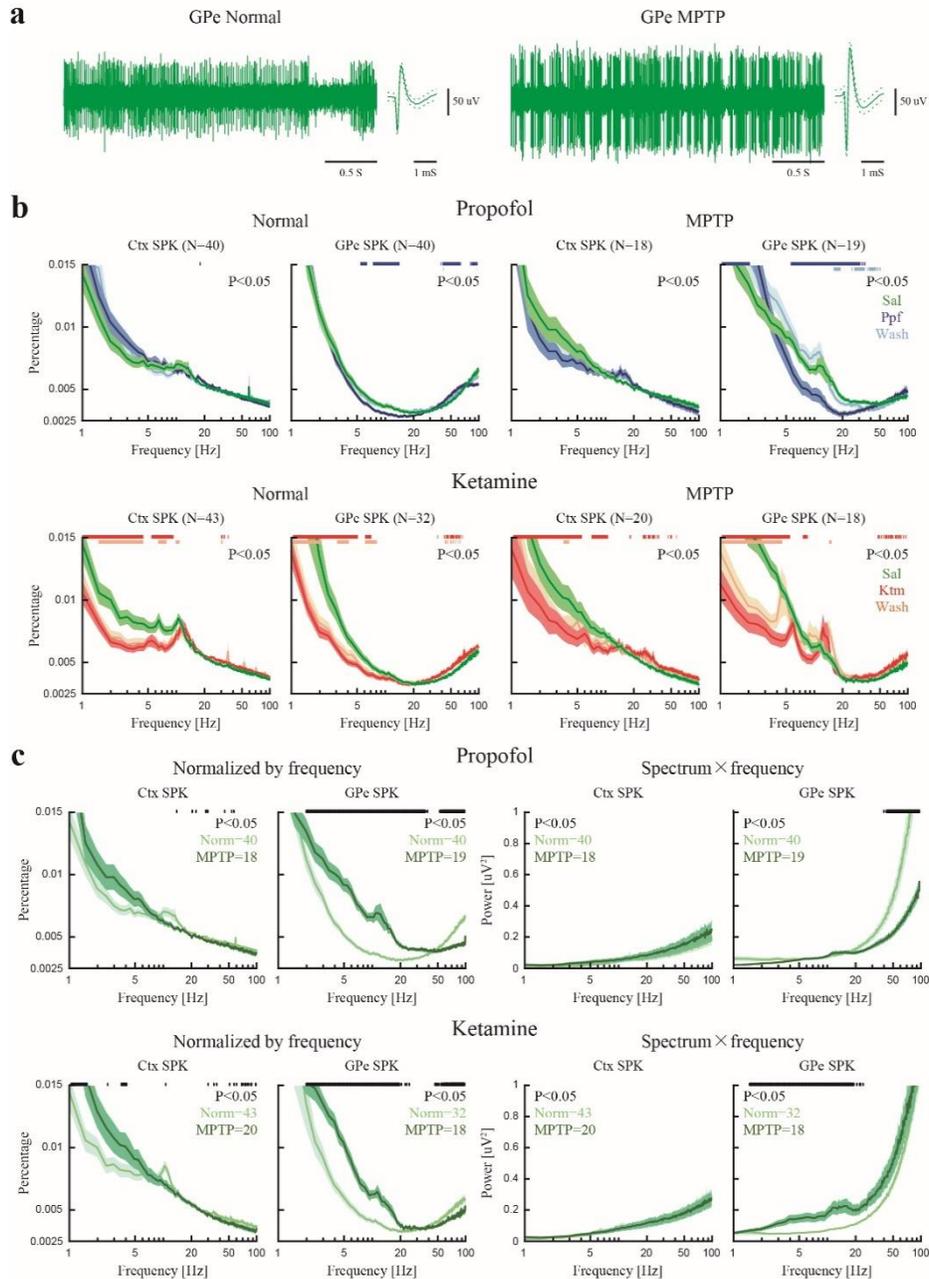
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40 **Supplementary Figure 2: Propofol and ketamine increase low and high frequency power, respectively, in frontal,**
 41 **parietal and occipital EEG.** The normalized power spectrograms of Frt, Prt and Ocp EEG during propofol (upper)
 42 and ketamine (lower) before (left) and after MPTP-treatment (right). Lower bar represents 1-hour time periods of
 43 saline baseline (green), propofol sedation (blue), ketamine sedation (red) and saline washout (propofol, cyan;
 44 ketamine, orange). Number of sites is given for both monkeys in each subplot. Abbreviations as in Fig.1.

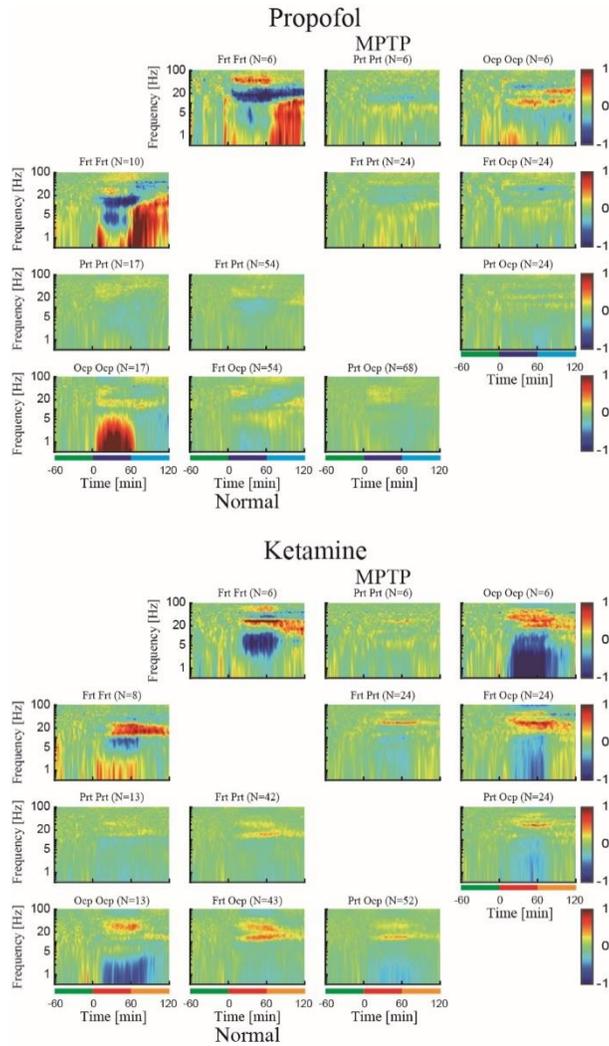


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46 **Supplementary Figure 3: Spiking activity in the basal ganglia shows increased power in beta band after MPTP-**
 47 **treatment. a.** Examples of GPe SPK before (left) and after (right) MPTP-treatment. **b.** Average power spectrum
 48 densities of Ctx/GPe SPK during propofol (upper) and ketamine (lower) before (left) and after (right) MPTP-
 49 treatment. First 15min of each sedation stage is not included in averaging. Power is given as fraction of total power in
 50 the range of 0.5-100 Hz. Top color bar shows significant difference between sedation, washout and saline ($p < 0.05$,
 51 two-sided Wilcoxon rank sum test). **c.** Averaged power spectrum densities of Ctx/GPe SPK during saline before and

52 after MPTP-treatment. Left, normalized by total power. Right, normalized by frequency multiplication (whitening,
53 1/f normalization). Top black bar shows significant difference ($p < 0.05$, two-sided Wilcoxon rank sum test). Color
54 represents before (light green) and after (dark green) MPTP-treatment. Number of sites is given. Color codes are the
55 same as Supplementary Figure 1. Abbreviations as in Fig.1.

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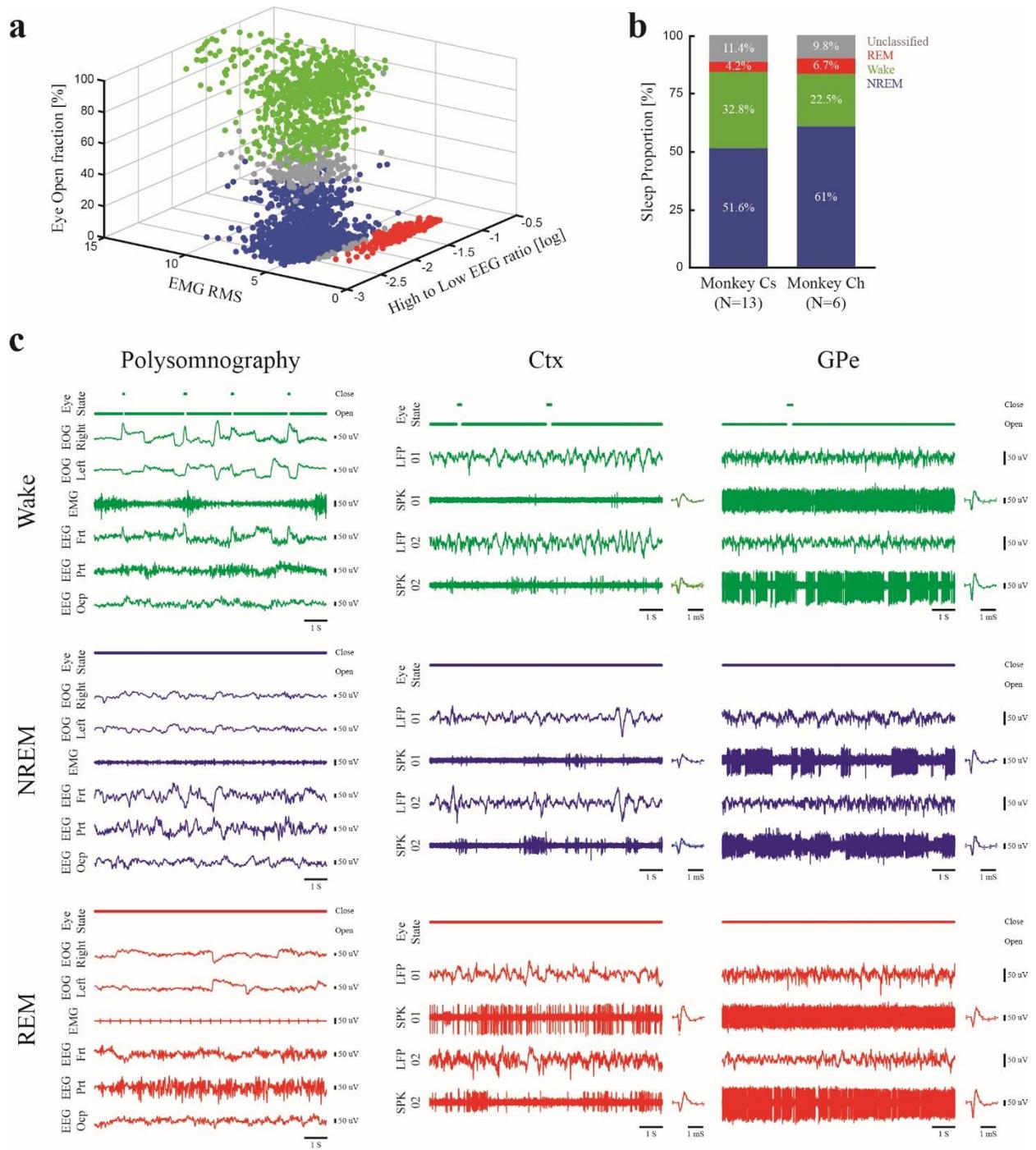


57 **Supplementary Figure 4: Propofol and ketamine increase and decrease low frequency EEG pairwise**
 58 **synchronization, respectively.** The normalized magnitude-square coherograms of all pairs of EEG during propofol
 59 (upper) and ketamine (lower) before (left) and after (right) MPTP-treatment. Lower bar represents 1-hour time
 60 periods of saline baseline (green), propofol sedation (blue), ketamine sedation (red) and saline washout (propofol,
 61 cyan; ketamine, orange). Number of pairs is given in each subplot. Color scale represents z-score. Abbreviations as in
 62 Fig.1.

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67 **Supplementary Figure 5: Example of sleep stage and sleep statistics.** **a.** One-night example of the output of the
 68 semiautomatic sleep staging algorithm (monkey Cs). The different sleep stages (wake, NREM, and REM) are staged
 69 by high/low EEG power ratio, EMG RMS, and eye-open fraction. **b.** The average proportion of sleep stages out of the
 70 all nights' duration for the two monkeys. N is number of nights. **c.** Examples of polysomnography (left), LFP/SPK of

71 Ctx (center) and GPe (right) during wake (upper, green), NREM (center, blue) and REM (lower, red) sleep.

72 Abbreviations as in Fig.4.

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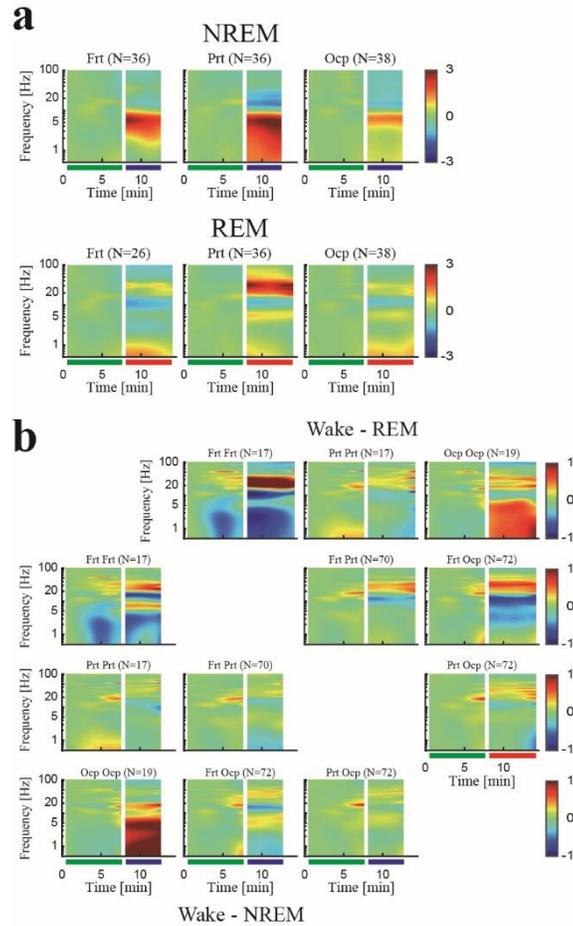
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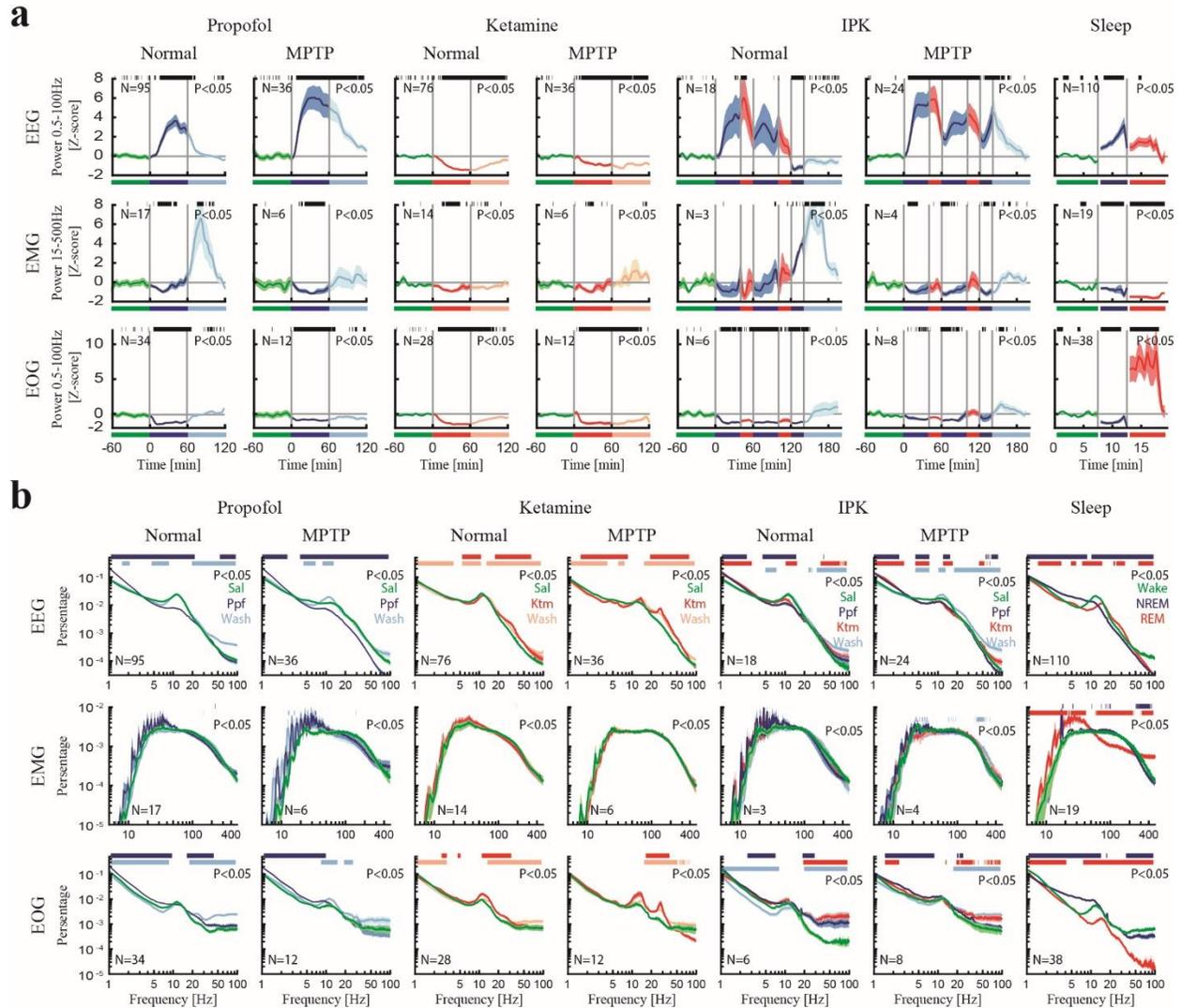


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81 **Supplementary Figure 6: Frontal, parietal and occipital EEG during natural NREM and REM sleep show increased**
 82 **low frequency power/synchronization and increased high frequency power/synchronization, respectively. a.** The
 83 normalized power spectrograms of Frt, Prt and Ocp EEG during NREM (upper) and REM (lower) sleep. Lower bar
 84 represents time periods of wake (green), NREM (blue) and REM (red). **b.** The normalized coherograms of all pairs of
 85 EEG during NREM (lower left) and REM (upper right). Lower bar represents time periods of wake (green), NREM
 86 (blue) and REM (red). Number of sites (A) and pairs (B) is given for both monkeys for each subplot. Abbreviations as
 87 in Fig.4.

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91 **Supplementary Figure 7: Polysomnography behaves differently during ketamine, propofol sedation and sleep**

92 **stages. a.** Normalized total power of EEG (upper), EMG (center) and EOG (lower) during propofol, ketamine, IPK

93 sedation and sleep. Top black bar shows significant difference compared to saline (wake) ($p < 0.05$, two-sided

94 Wilcoxon rank sum test). **b.** Average power spectrum densities of EEG (upper), EMG (center) and EOG (lower)

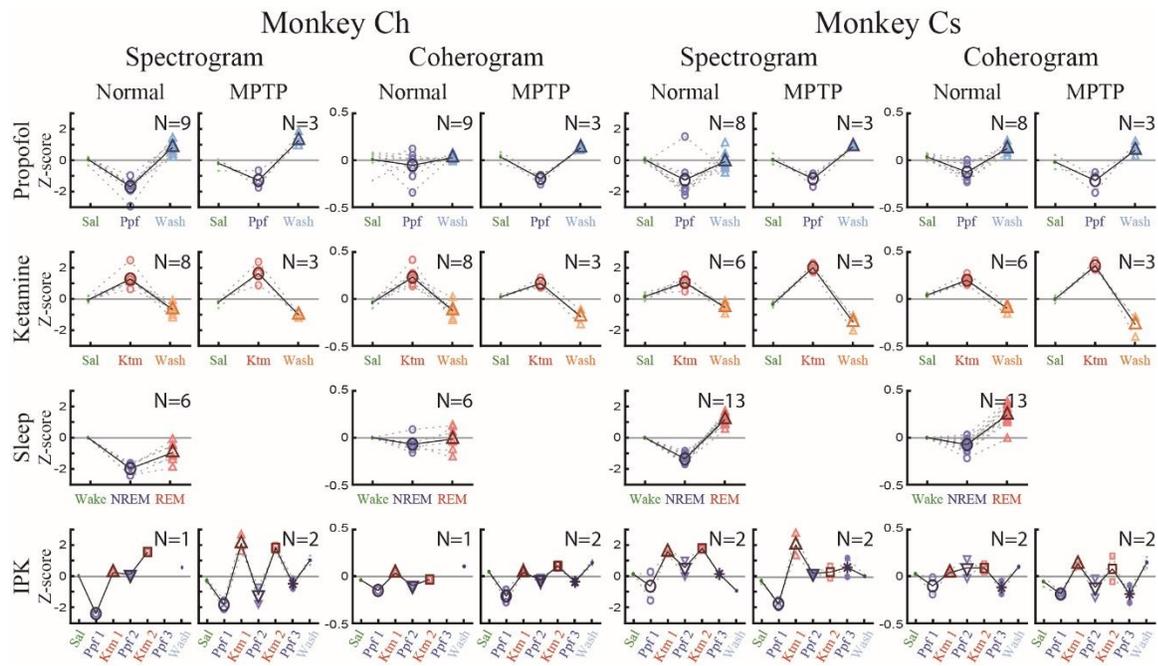
95 during propofol, ketamine, IPK sedation and sleep. First 15 min (10 min for IPK) of each sedation stage is not

96 included in the average. Power is given as fraction of total power. Top color bar shows significant difference between

97 sedation, washout and saline or NREM, REM and wake ($p < 0.05$, two-sided Wilcoxon rank sum test). EMG is filtered

98 15-1000 Hz. Color codes and abbreviations are as Fig.1 and Fig.4.

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Supplementary Figure 8: Propofol/NREM and ketamine/REM show decreased and increased high/low

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power/synchronization difference, respectively, in both monkeys. Color represents saline baseline (green), propofol

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sedation (blue), ketamine sedation (red), saline washout (propofol, cyan; ketamine, orange), wake (green), NREM

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(blue) and REM (red). Number of sedation sessions or nights is given for each monkey for each subplot.

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