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**Supplemental information**

**VIP interneuron activity during sleep  
conveys the cortical infraslow oscillation**

**Kilian Rolle, Louisa Weber, Jan Born, and Niels Niethard**

**Table S1. Cell and epoch contributions of animals, related to all Figures.**

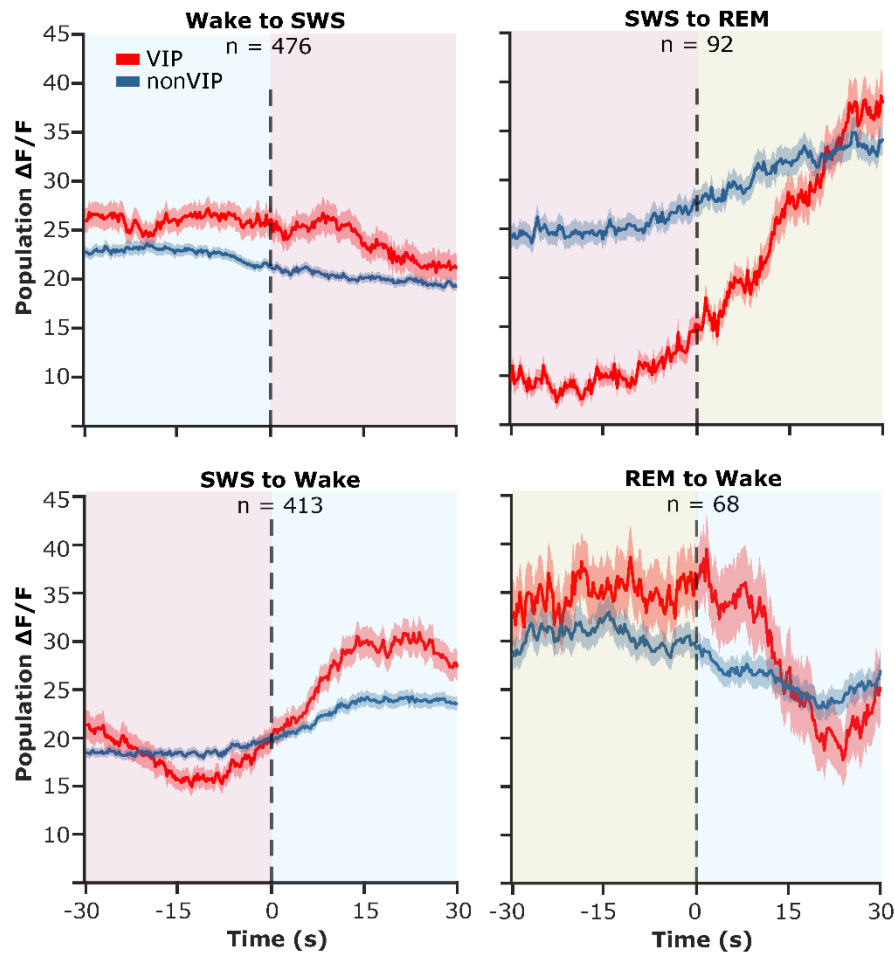
Animal	Sessions	# Cells		Duration (in min)		
		VIP	nonVIP	WAKE	SWS	REM
1	4	25	275	301.19	201.00	15.51
2	4	25	262	374.84	281.38	43.53
3	3	20	134	120.71	138.67	24.17
4	5	28	332	271.20	278.06	60.51
5	2	11	81	315.20	110.20	16.34
6	1	7	42	137.84	67.36	1.83
7	1	3	33	114.51	38.02	0.00
8	5	21	183	701.39	333.12	15.17
9	1	2	14	115.67	97.56	2.67
<b>Sum</b>	<b>26</b>	<b>142</b>	<b>1356</b>	<b>2452.55</b>	<b>1545.37</b>	<b>179.73</b>
<b>Mean</b>	<b>2.89</b>	<b>15.78</b>	<b>150.67</b>	<b>272.51</b>	<b>171.71</b>	<b>19.97</b>
<b>±SEM</b>	<b>0.56</b>	<b>3.37</b>	<b>39.31</b>	<b>63.22</b>	<b>35.23</b>	<b>6.77</b>

Contribution of the individual animals to the data set. From left to right: Animal: indicates subject #, number of recording Sessions for each animal, number of recorded VIP and nonVIP cells (# Cells) across all sessions, time (Duration) spent in Wake, SWS, and REM sleep across all sessions. Bottom lines indicate sums across all animals and means ( $\pm$ SEM) for the sample. This table is related to all analysis.

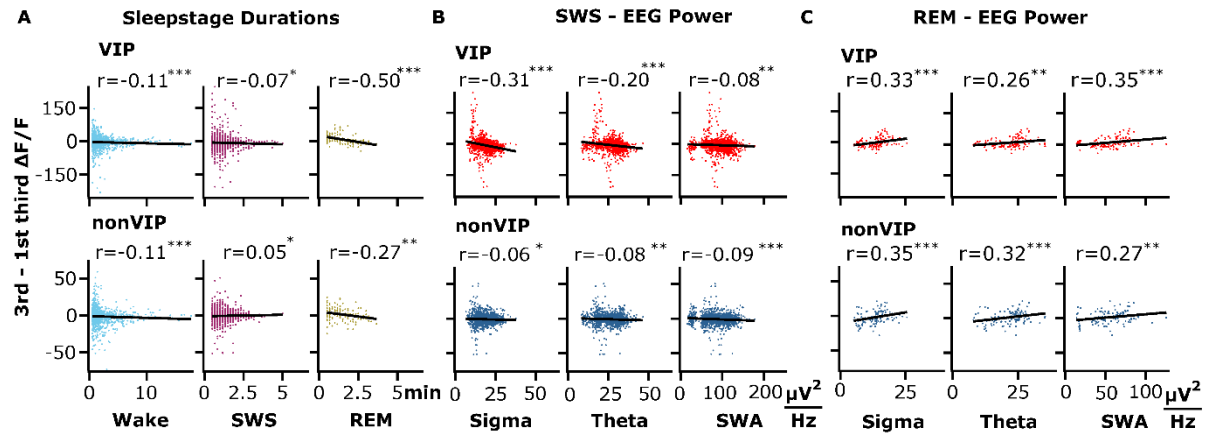
**Table S2. Slow wave sleep related events, contribution of animals related to the analysis of slow wave sleep specific events, related to Figures 3 and 7.**

Animal	Events		
	SO-spindle	SO	Spindle
1	242	2125	359
2	431	3150	583
3	237	1365	315
4	386	2757	477
5	123	1173	150
6	74	578	95
7	37	410	22
8	614	3324	393
9	144	1010	118
<b>Sum</b>	2288	15892	2512
<b>Mean</b>	254.22	1765.78	279.11
<b>±SEM</b>	63.19	368.70	63.99

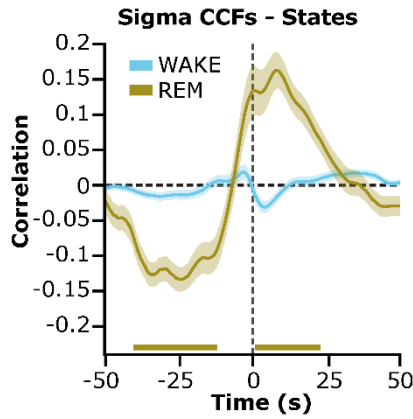
Number of solitary SOs, solitary spindles, and SO-spindle events identified in each animal.



**Figure S1,  $\Delta F/F$  signal of VIP and nonVIP cells at sleep stage transitions, related to Figure 1.** Mean  $\pm$  SEM  $\Delta F/F$  signals of VIP (red) and nonVIP (blue) cells time-locked to the sleep stage transitions (indicated above). The dashed line indicates the time of the stage transition.



**Figure S2. Relationship of within-epoch change in VIP and nonVIP cell activity with the duration and EEG characteristics of the epoch, related to Figure 2.** Scatterplots illustrating for VIP cells (top) and nonVIP cells (bottom) correlations between the within-epoch change in  $Ca^{2+}$  activity (3rd - 1st third of respective epoch) and **A)** the duration of the respective (from left to right) Wake, SWS, and REM sleep epochs, **B)** the mean power in the 0.5-4 Hz SWA, 4-9 Hz theta, and 11-16 Hz sigma EEG frequency bands during SWS epochs, as well as **C)** during REM sleep epochs. Percentage bend coefficients and their significance are indicated. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .



**Figure S3, the coupling between the ~0.02 Hz infraslow oscillation in VIP cell activity and EEG sigma is most distinct during slow wave sleep, related to Figures 4 and 6.** Mean ( $\pm$ SEM) cross-correlation functions (CCFs) between 11-16 Hz EEG sigma and VIP cell  $\text{Ca}^{2+}$  activity during  $n = 886$  Wake epochs (blue) and during  $n = 81$  REM sleep epochs (gold, all epochs  $\geq 50$  s duration). Coloured horizontal bars at the bottom indicate the significance of respective correlation coefficients ( $p < 0.05$ , after Bonferroni-Holm correction). Note that only the CCF for REM sleep reveals significant minima and maxima, which, however, extend over broad time ranges, speaking against a specifically timed relationship between the respective parameters.