

Supplementary S2

Spike-wave discharges in the control non-epileptic group (NEW rat substrain)

Spike-wave discharges were common in WAG/Rij subjects, but they were almost completely absent in non-epileptic control subjects (NEW). The male subject M2 displayed 13 SWD per hour in average (Table S2.1) showing epileptic phenotype. This subject was moved from the control non-epileptic to the epileptic group.

Table S2.1. Results of automatic detection of spike-wave discharges in non-epileptic control subjects (NEW) during baseline

	Rats and recordings					SWDs				
	ID	Date of birth	Date of recording	AGE, months	Phase of cycle	Length of recogn., h	Total SWD's duration	SWD's density s/per hour	Mean SWD duration	Total number of SWDs
males	M1	19.12.2021	25.05.2022	5.2		19.56	2.3	0.12	2.3	1
	M2*	19.12.2021	18.07.2022	7		11.11	428.1	38.53	2.93	146
	M3	19.12.2021	11.08.2022	7.8		15.26	5.17	0.34	2.59	2
	M4	19.11.2021	11.08.2022	8.8		24.85	2.8	0.11	2.8	1
	M5	19.11.2021	31.08.2022	9.5		20.72	0	0	-	0
	M6	19.11.2021	31.10.2022	11.5		21.72	0	0	-	0
females	F1	19.11.2021	18.07.2022	8		11.11	3.6	0.32	3.6	1
	F2	19.11.2021	09.08.2022	8.8	proestrus	20.11	2.3	0.11	2.3	1
	F3	19.12.2021	17.08.2022	8		21.72	4.5	0.21	2.25	2
	F4	19.12.2021	31.08.2022	8.5	diestrus	20.72	13	0.63	2.6	5
	F5#	19.11.2021	15.08.2022	9	diestrus	21.72	0	0	-	0
	F6#	13.11.2021	09.08.2022	9	proestrus	20.11	0	0	-	0
	F7	13.11.2021	15.08.2022	9.2	proestrus	21.72	6.5	0.3	3.25	2
	F8	13.11.2021	17.08.2022	9.2		21.72	0	0	-	0
	F8	13.11.2021	31.10.2022	11.7		21.72	3.4	0.16	3.4	1

* - Subject M2 was excluded from analysis, because it has an epileptic phenotype

- Subjects F5 and F6 had non-epileptic phenotype in baseline and showed SWDs after i.p. injection of Dexmedetomidine

Dexmedetomidine (Dex) in doses ranging from 0.004 to 0.034 mg/kg was intraperitoneally injected in NEW rats (Figure S2.1).

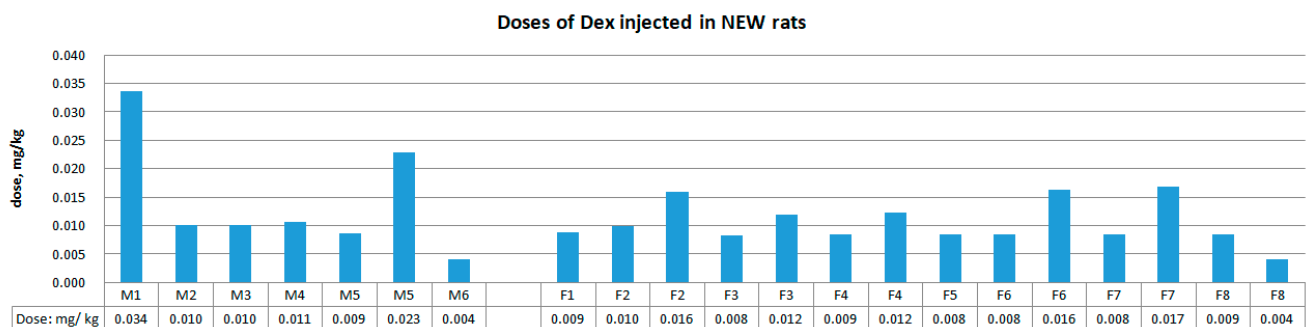


Figure S2.1. Doses of Dexmedetomidine (Dex) injected in the group of NEW rats.

Two female subjects (F5 and F6) with the non-epileptic phenotype determined in baseline (Table S1) showed SWDs after administration of Dexmedetomidine in dose 0.008 mg/kg (both subjects). In the rest 11 control NEW rats, Dexmedetomidine did not provoke genuine SWDs. The results of the automatic SWDs detection are shown in Table S2.2.

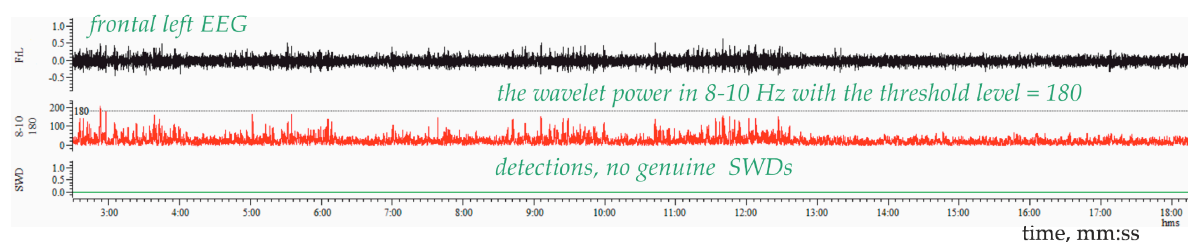
Table S2.2. Results of automatic detection of spike-wave discharges in non-epileptic control subjects (NEW) after i.p. administration of Dexmedetomidine.

	Rats and recordings				Dex. dose, mg/kg	SWDs				
	ID	Date of recording	AGE, months	Phase of cycle		Length of recogn., h	Length of recogn., h	SWD density s/per hour	Mean SWD duration	nSWD
males	M1	26.05.2022	5.3		0.034	10.66	0	0	-	0
	M2	19.07.2022	7.1		0.010	6.22	536	86.14	3.01	178
	M3	12.08.2022	7.9		0.010	20.72	2.8	0.1	2.08	1
	M4	12.08.2022	8.9		0.011	20.72	0	0	-	0
	M5	01.09.2022	9.5		0.009	23.56	2.2	0.09	2.2	1
	M5	14.09.2022	10		0.023	21.72	0	0	-	0
	M6	01.11.2022	11.5		0.004	23.56	4.9	0.21	2.45	2
females	F1	19.07.2022	8.1		0.009	6.22	0	0	-	0
	F2	10.08.2022	8.8	proestrus	0.010	22.22	15	0.68	2.5	6
	F2	12.09.2022	9.9	diestrus	0.016	22.78	0	0	-	0
	F3	18.08.2022	8.1		0.008	22.78	0	0	-	0
	F3	13.09.2022	8.9	proestrus	0.012	23.56	0	0	-	0
	F4	01.09.2022	8.5	proestrus	0.009	23.56	3.5	0.15	3.5	1
	F4	13.09.2022	8.9	diestrus	0.012	23.56	0	0	-	0
	F5	16.08.2022	9	proestrus	0.008	21.72	430	19.8	6.14	70
	F6	10.08.2022	9	diestrus	0.008	22.22	42.8	1.93	2.38	18
	F6	12.09.2022	9.9	diestrus	0.016					
	F7	16.08.2022	9.2	proestrus	0.008	22.39	0	0	-	0
	F7	14.09.2022	10.2	proestrus	0.017	21.72	9.0			3
	F8	18.08.2022	9.3		0.004	23.56	0	0	-	0
	F8	01.11.2022	11.7		0.009	22.78	12.5	0.55	2.5	5

In non-epileptic subjects, i.p. injections of Dex in low doses (0.004-0.034 mg/kg) did not provoke genuine SWDs. Figure S2.2a demonstrates that the power at the central frequency of 8-10 Hz was not high enough to reach the threshold level, therefore, no genuine SWDs were detected. However, injections of Dex elicited epileptiform activity in the form of irregular spikes, 4-8 Hz sharp waves and occasional spike-wave complexes (Figure S2.2b,c). This epileptiform activity did not meet the criteria for SWDs. Four-8 Hz oscillations were defined as the rudimentary SWDs in the frequency band of 4-8 Hz (rudSWDs, Figure S2.2c).

Genuine SWDs

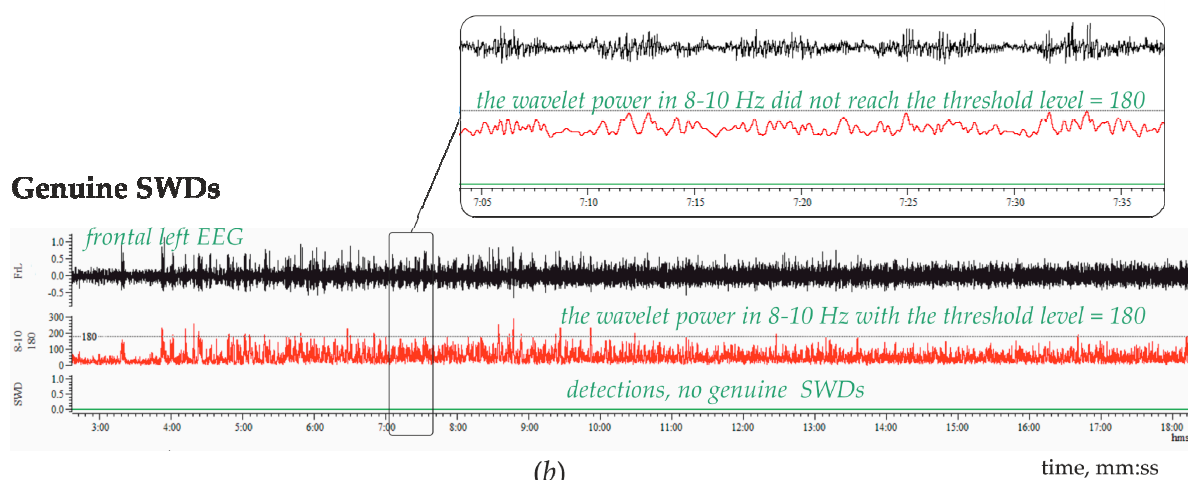
Baseline



(a)

Dexmedetomidine (i.p. 0.010 mg/kg)

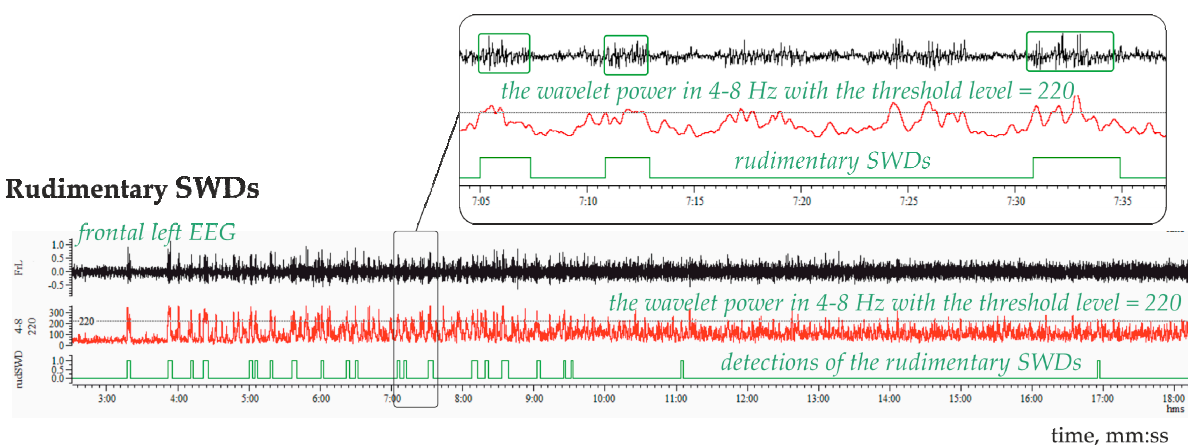
Genuine SWDs



(b)

Dexmedetomidine (i.p. 0.010 mg/kg)

Rudimentary SWDs



(c)

Figure S2.2. Results of SWDs detection in non-epileptic rat. Raw EEGs are shown in black; wavelet power in red; SWD detections (binary responses) as green lines. (a) In baseline, wavelet power at 8-10 Hz did not reach the threshold level, therefore no genuine SWDs. (b) After injection of Dex, wavelet power at 8-10 Hz did not reach the threshold level, and genuine SWDs were not detected. (c) After the injection of Dex, the rudimentary SWDs were detected based on the elevation of the wavelet power at 4-8 Hz, which is a lower frequency than in genuine SWDs.