Inventory of Supplemental Information

1. Supplemental Table 1 shows intrinsic excitability measurements and relates to Figure 2.

2. Supplemental Figure 1 shows bar graphs of spontaneous firing rate and is supplemental to Figure 2.

3. Supplemental Figure 2 shows eye movement performance in BK null mice and littermates and is relevant for Figure 7.

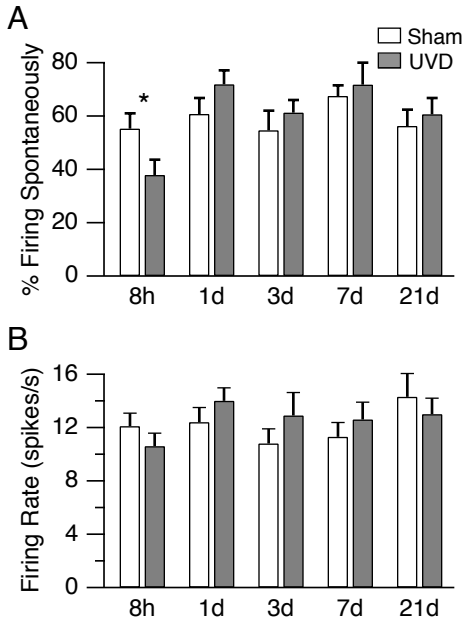
| | Excitability measure | | N | | *P* value |
|---|---|---|---|---|---|
| | **UVD** | **Sham** | **UVD** | **Sham** | |
| **AP width (ms)** | 0.82 ± .02 | 0.81 ± 0.02 | 135 | 142 | 0.59 |
| **AP half-width (ms)** | 0.35 ± 0.01 | 0.35 ± 0.01 | 135 | 142 | 0.65 |
| **AHP (mV)** | 20.5 ± 0.4 | 20.3 ± 0.4 | 135 | 142 | 0.90 |
| **Threshold (mV)** | -49.1 ± 0.6 | -48.8 ± 0.5 | 135 | 142 | 0.53 |
| **Input res. (MΩ)** | 270 ± 18 | 245 ± 18 | 132 | 142 | 0.39 |
| **Max. firing rate (Hz)** | 255 ± 11 | 256 ± 11 | 135 | 146 | 0.90 |
| **Adapt. ratio @ 40 Hz** | 0.88 ± 0.01 | 0.87 ± 0.01 | 123 | 132 | 0.09 |
| **PRF (spikes/s)** | 18 ± 4 | 18 ± 4 | 71 | 64 | 0.87 |

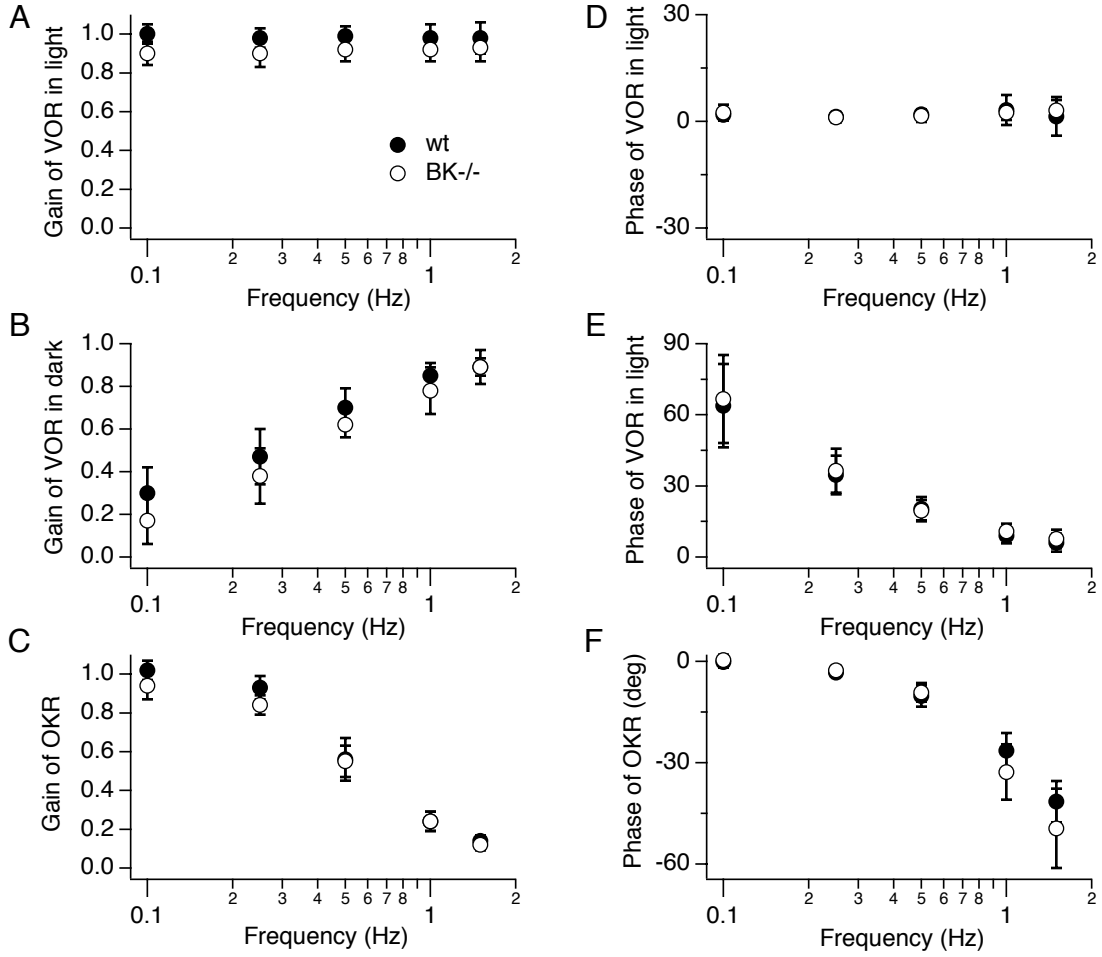
Supplemental Table 1. Measures of excitability did not differ between neurons recorded 24 h after manipulation in UVD and sham operated animals (related to Figure 2). Abbreviations: AP: action potential; AHP: afterhyperpolarization; Input res:input resistance; Max: maximum; Adapt ratio: adaptation ratio; PRF: postinhibitory rebound firing. Values are mean ± S.E. Statistics analyses used the nonparametric Wilcoxin sign rank test.

**SUPPLEMENTAL FIGURE LEGENDS**

1. Unilateral vestibular deafferentation results in transient changes in the proportion of spontaneously firing vestibular nucleus neurons (related to Figure 2). A. The proportion of neurons recorded with whole cell patch electrodes that fired spontaneous action potentials is plotted for each of five time points after unilateral vestibular deafferentation (filled bars) or sham operations (open bars). The number of neurons recorded at successive time points (8h, 1d, 3d, 7d, 21d) from UVD mice, respectively, were 161, 135, 116, 103 and 66 and for sham mice were 145, 150, 97, 114, and 64. B. Average spontaneous firing rates (+/-SEM) of firing rates of neurons in A that did fire spontaneously. Asterisk indicates statistical signficance (p , 0.05).

2. Similar oculomotor performance in BK null mice and wildtype littermate controls (related to Figure 7). A-C. Gain of the VOR in the light, VOR in the dark, and OKR, respectively, vs stimulus frequency in BK null mice and wiltype littermates. D-F. Corresponding phase values. In all plots, symbols represent mean ± SD, n=5.


A
Sham
UVD
% Firing Spontaneously
80
60
40
20
0
*
8h
1d
3d
7d
21d
B
Firing Rate (spikes/s)
16
12
8
4
0
8h
1d
3d
7d
21d


A
Gain of VOR in light
1.0
0.8
0.6
0.4
0.2
0.0
wt
BK-/-
0.1
2
3
4
5
6
7
8
1
2
Frequency (Hz)
D
Phase of VOR in light
30
0
-30
0.1
1
2
Frequency (Hz)
B
Gain of VOR in dark
Frequency (Hz)
E
Phase of VOR in light
90
60
30
0
Frequency (Hz)
C
Gain of OKR
Frequency (Hz)
F
Phase of OKR (deg)
0
-30
-60
Frequency (Hz)