

Table S2. Behaviors of *Phox2a*-induced nerves

Embryo	Number of axons that stop in mesenchyme	Number of axons joining trochlear nerve	Number of axons joining oculomotor nerve	Number of axons targeting a muscle directly	Total number of ectopic exits
1	1	1	0	0	2
2	2	0	0	0	2
3	1	1	1	1	4
4	1	2	0	0	3
5	2	1	2	1	6
6	0	0	2	1	3
7	1	2	1	0	4
8	2	2	2	0	6
9	0	0	0	0	0
10	1	0	0	0	1
11	3	0	1	0	4
12	0	3	0	0	3
13	1	2	0	0	3
14	1	0	3	1	5
15	0	1	0	0	1
16	0	0	2	0	2
17	0	0	0	0	0
18	0	0	0	0	0
19	0	0	0	0	0
Total	16	15	14	4	49

pEFX-*rPhox2a/Arix* was co-electroporated with pEFX-AP to label native and ectopic axons. Harvested embryos ($n=19$) were processed for alkaline phosphatase activity. An average of 2.6 ectopic axon exits (range 0-12) was observed.