Supplementary Table 1						
	P2-5 (n = 24)	**P10-15 (n = 21)**	**P20-25 (n = 21)**	**P50-56 (n = 19)**	**P > 150 (n = 20)**	**oneway ANOVA + *post-hoc test***
C_m (nF)	0.04 ± 0.02	0.10 ± 0.04	0.16 ± 0.05	0.11 ± 0.02	0.14 ± 0.07	Kruskal-Wallis test: p < 0.0001 Dunn's multiple comparisons test: P2-5 vs. P10-15: p =0.0005 P2-5 vs. P20-25: p < 0.0001 P2-5 vs. P50-56: p = 0.0001 P2-5 vs. P > 150: p < 0.0001 P10-15 vs. P 20-25: p = 0.0215 P10-15 vs. P 50-56: p > 0.9999 P10-15 vs. P > 150: p > 0.9999 P20-25 vs. P 50-56: p = 0.1059 P20-25 vs. P > 150: p > 0.9999 P50-56 vs. P 150: p > 0.9999
R_{In} (GΩ)	1.61 ± 0.88	0.74 ± 0.31	0.37 ± 0.28	0.25 ± 0.07	0.36 ± 0.24	Kruskal-Wallis test: p < 0.0001 Dunn's multiple comparisons test: P2-5 vs. P10-15: p > 0.9999 P2-5 vs. P20-25: p < 0.0001 P2-5 vs. P50-56: < 0.0001 P2-5 vs. P > 150: < 0.0001 P10-15 vs. P 20-25: p = 0.0098 P10-15 vs. P 50-56: p = 0.0001 P10-15 vs. P > 150: p = 0.0074 P20-25 vs. P 50-56: p > 0.9999 P20-25 vs. P > 150: p > 0.9999 P50-56 vs. P 150: p > 0.9999
E_{rest} (mV)	-58 ± 9	-68 ± 9	-70 ± 6	-72 ± 10	-72 ± 10	ANOVA: p < 0.0001 Bonferroni's multiple comparisons test P2-5 vs. P10-15: p =0.0007 P2-5 vs. P20-25: p < 0.0001 P2-5 vs. P50-56: < 0.0001 P2-5 vs. P > 150: < 0.0001 P10-15 vs. P 20-25: p = 0.9792 P10-15 vs. P 50-56: p = 0.7538 P10-15 vs. P > 150: p = 0.7725 P20-25 vs. P 50-56: p = 0.9664 P20-25 vs. P > 150: p = 0.9736

						P50-56 vs. P 150: p > 0.9999

Development of passive membrane properties in M1LV neurons. Capacitance (C_m), input resistance (R_{in}), and resting membrane potential (E_{rest}) are reported as average ± standard deviation. P values for multiple comparison and post-hoc test are reported for each paired comparison. The statistical tests used for normally distributed samples were one-way ANOVA and Bonferroni's multiple comparisons test (A. + Bonferroni). Non-normally distributed samples were compared with the Kruskal-Wallis test and Dunn's multiple comparisons test (K-W + Dunn's).

Supplementary Table 2

	P1	**P3**	**P5**	**P7**	**P10**	**P15**	**P28**	**P55**	**P150**
AIS length (µm)	(n = 4) 13.5 ± 0.8	(n = 6) 15.6 ± 0.4	(n = 6) 16.5 ± 0.4	(n = 6) 17.5 ± 0.8	(n = 6) 20.6 ± 1.4	(n = 6) 22.4 ± 2.1	(n = 6) 24.4 ± 1.7	(n = 6) 26.5 ± 1.2	(n = 6) 28.3 ± 0.5
AIS prox. diameter (µm)	(n = 3) 1.34 ± 0.09				(n = 3) 1.56 ± 0.15		(n = 3) 2.04 ± 0.15		
AIS dist. diameter (µm)	0.99 ± 0.05				1.07 ± 0.15		1.08 ± 0.04		
AIS distance from soma (µm)	1.79 ± 0.30				1.29 ± 0.21		1.07 ± 0.21		

Developmental AIS elongation in M1LV pyramidal neurons. AIS length, proximal and distal diameter, and distance from soma for M1LV neurons are reported as average ± standard deviation. Number of animals (n) used for the analysis of each age group are reported below headers, indicating each respective age group (at least 100 AIS/animal).

Supplementary Table 3 ANOVA p < 0.0001 Bonferroni's multiple comparisons test:							
P1 vs. P3: *p* = 0.2014 P1 vs. P5 *p* = 0.0143 P1 vs. P7: *p* = 0.0004 P1 vs. P10: *p* <0.0001 P1 vs. P15: *p* <0.0001 P1 vs. P28: *p* <0.0001 P1 vs. P55: *p* <0.0001 P1 vs. P150: *p* <0.0001	P3 vs. P5: *p* = 0.9415 P3 vs. P7: *p* = 0.2174 P3 vs. P10: *p* <0.0001 P3 vs. P15: *p* <0.0001 P3 vs. P28: *p* <0.0001 P3 vs. P55: *p* <0.0001 P3 vs. P150: *p* <0.0001	P5 vs. P7: *p* = 0.9067 P5 vs. P10: *p* <0.0001 P5 vs. P15: *p* <0.0001 P5 vs. P28: *p* <0.0001 P5 vs. P55: *p* <0.0001 P5 vs. P150: *p* <0.0001	P07 vs. P10: *p* = 0.0037 P07 vs. P15: *p* <0.0001 P07 vs. P28: *p* <0.0001 P07 vs. P55: *p* <0.0001 P07 vs. P150: *p* <0.0001	P10 vs. P15: *p* = 0.2318 P10 vs. P2: *p* = 0.0001 P10 vs. P55: *p* <0.0001 P10 vs. P150: *p* <0.0001	P15 vs. P28: *p* = 0.1485 P15 vs. P55: *p* <0.0001 P15 vs. P150: *p* <0.0001	P28 vs. P55: *p* = 0.1381 P28 vs. P150: *p* = 0.0008	P55 vs. P150: *p* = 0.4086
Developmental AIS elongation in M1LV pyramidal neurons: AIS length; oneway ANOVA + *post-hoc test.* Statistical comparison of AIS length between age groups, referring to data in Supplementary Table 2. P values for post-hoc test are reported for each paired comparison. The statistical tests used for comparing these (normally distributed) samples was one-way ANOVA and Bonferroni's multiple comparisons test (A. + Bonferroni).							

Supplementary Table 4						
	P2-5 (n = 24)	**P10-15 (n = 21)**	**P20-25 (n = 21)**	**P50-56 (n = 19)**	**P > 150 (n = 20)**	**oneway ANOVA + *post-hoc test***
rheobase (pA)	11.9 ± 9.5	24.5 ± 20.0	57.4 ± 46.5	75.8 ± 37.6	51.7 ± 29.0	Kruskal-Wallis test: p < 0.0001 (K-W + Dunn's multiple comparisons test:*P2-5 vs. P10-15: p = 0.8636* *P2-5 vs. P20-25: p < 0.0001* *P2-5 vs. P50-56: < 0.0001* *P2-5 vs. P > 150: < 0.0001* *P10-15 vs. P 20-25: p = 0.0560* *P10-15 vs. P 50-56: p = 0.0003* *P10-15 vs. P > 150: p = 0.0698* *P20-25 vs. P 50-56: p > 0.9999* *P20-25 vs. P > 150: p > 0.9999* *P50-56 vs. P 150: p > 0.9999*
Max gain *d*AP frequency/ dI_{input} (Hz/pA)	$14x10^{-3}$ ± $7x10^{-3}$	$7x10^{-3}$ ± $3x10^{-3}$	$5x10^{-3}$ ± $1x10^{-3}$	$7x10^{-3}$ ± $2x10^{-3}$	$6x10^{-3}$ ± $2x10^{-3}$	ANOVA: p < 0.0001 Bonferroni's multiple comparisons test: *P2-5 vs. P10-15: p < 0.0627* *P2-5 vs. P20-25: p = 0.0001* *P2-5 vs. P50-56: p = 0.0818* *P2-5 vs. P > 150: p = 0.001* *P10-15 vs. P 20-25: p > 0.5937* *P10-15 vs. P 50-56: p > 0.9999* *P10-15 vs. P > 150: p > 0.9999* *P20-25 vs. P 50-56: p = 0.7328* *P20-25 vs. P > 150: p > 0.9999* *P50-56 vs. P 150: p > 0.9999*
max AP freq. (Hz)	19 ± 14	19 ± 8	29 ± 12	30 ± 7	31 ± 8	Kruskal-Wallis test: p < 0.0001 (K-W + Dunn's multiple comparisons test:*P2-5 vs. P10-15: p > 0.9999* *P2-5 vs. P20-25: p = 0.1564* *P2-5 vs. P50-56: p = 0.0065* *P2-5 vs. P > 150: p = 0.0023* *P10-15 vs. P 20-25: p = 0.0555* *P10-15 vs. P 50-56: p = 0.0019* *P10-15 vs. P > 150: p = 0.0006*

						P20-25 vs. P 50-56: p > 0.9999 *P20-25 vs. P > 150: p > 0.9999* *P50-56 vs. P 150: p > 0.9999*
AP threshold (mV)	-30 ± 7	-42 ± 7	-43 ± 7	-42 ± 8	-44 ± 7	Kruskal-Wallis test: p < 0.0001 (K-W + Dunn's multiple comparisons test:*P2-5 vs. P10-15: p = 0.0005* *P2-5 vs. P20-25: p < 0.0001* *P2-5 vs. P50-56: p = 0.0027* *P2-5 vs. P > 150: p < 0.0001* *P10-15 vs. P 20-25: p > 0.9999* *P10-15 vs. P 50-56: > 0.9999* *P10-15 vs. P > 150: > 0.9999* *P20-25 vs. P 50-56: > 0.9999* *P20-25 vs. P > 150: > 0.9999* *P50-56 vs. P 150: > 0.9999*
max dV/dT (V/s)	95 ± 41	158 ± 27	254 ± 61	219 ± 44	218 ± 65	Kruskal-Wallis test: p < 0.0001 (K-W + Dunn's multiple comparisons test:P2-5 vs. P10-15: p = 0.0937 P2-5 vs. P20-25: p < 0.0001 P2-5 vs. P50-56: p < 0.0001 P2-5 vs. P > 150: p < 0.0001 P10-15 vs. P 20-25: p = 0.0002 P10-15 vs. P 50-56: p = 0.0184 P10-15 vs. P > 150: p = 0.0441 P20-25 vs. P 50-56: p > 0.9999 P20-25 vs. P > 150: p > 0.9999 P50-56 vs. P 150: p > 0.9999
min dV/dT (V/s)	-21 ± 11	-31 ± 7	-53 ± 20	-52 ± 7	-61 ± 14	Kruskal-Wallis test: p < 0. Dunn's multiple comparisons test:*P2-5 vs. P10-15: p = 0.0529* *P2-5 vs. P20-25: p < 0.0001* *P2-5 vs. P50-56: p < 0.0001* *P2-5 vs. P > 150: p < 0.0001* *P10-15 vs. P 20-25: p < 0.0001* *P10-15 vs. P 50-56: p < 0.0001* *P10-15 vs. P > 150: p < 0.0001* *P20-25 vs. P 50-56: p > 0.9999* *P20-25 vs. P > 150: p = 0.1867* *P50-56 vs. P 150: p = 0.1666*

AP half-width (ms)	3.5 ± 1.6	2.3 ± 0.4	1.7 ± 0.5	1.7 ± 0.2	1.4 ± 0.3	Kruskal-Wallis test: p < 0.0001 Dunn's multiple comparisons test:P2-5 vs. P10-15: p > 0.9999 P2-5 vs. P20-25: p < 0.0001 P2-5 vs. P50-56: p = 0.0001 P2-5 vs. P > 150: p < 0.0001 P10-15 vs. P 20-25: p = 0.0036 P10-15 vs. P 50-56: p = 0.0140 P10-15 vs. P > 150: p < 0.0001 P20-25 vs. P 50-56: p > 0.9999 P20-25 vs. P > 150: p = 0.8198 P50-56 vs. P 150: p = 0.3962

Developmental changes in intrinsic membrane properties and input – output gain. Intrinsic membrane properties, maximal input-output gain, rheobase, maximal AP frequency, AP threshold, max dV/dt, min dV/dt, and AP half-width of M1LV neuron are reported as average ± standard deviation. P values for multiple comparison and post-hoc test are reported for each paired comparison. The statistical tests used for normally distributed samples were one-way ANOVA and Bonferroni's multiple comparisons test (A. + Bonferroni). Non-normally distributed samples were compared with the Kruskal-Wallis test and Dunn's multiple comparisons test (K-W + Dunn's).

Supplementary Table 5.

	P2-5 (n = 24)	P10-15 (n = 21)	P20-25 (n = 21)	P50-56 (n = 19)	P > 150 (n = 20)	oneway ANOVA + ***post-hoc test***
IS (V/s)	100 ± 40	150 ± 31	179 ± 60	180 ± 31	190 ± 47	Kruskal-Wallis test: p < 0.0001 Dunn’s multiple comparisons test:*P2-5 vs. P10-15: p =0.1341* *P2-5 vs. P20-25: p = 0.0002* *P2-5 vs. P50-56: p < 0.0001* *P2-5 vs. P > 150: p < 0.0001* *P10-15 vs. P 20-25: p = 0.5839* *P10-15 vs. P 50-56: p = 0.2295* *P10-15 vs. P > 150: p = 0.0797* *P20-25 vs. P 50-56: p > 0.9999* *P20-25 vs. P > 150: p > 0.9999* *P50-56 vs. P 150: p > 0.9999*
SD (V/s)	n.a.	130 ± 31	248 ± 66	250 ± 50	274 ± 52	Kruskal-Wallis test: p < 0.0001 Dunn’s multiple comparisons test:*P10-15 vs. P 20-25: p < 0.0001* *P10-15 vs. P 50-56: p < 0.0001* *P10-15 vs. P > 150: p < 0.0001* *P20-25 vs. P 50-56: p = 0.9998* *P20-25 vs. P > 150: p > 0.4143* *P50-56 vs. P 150: p > 0.4942*
Est I_{In-AIS} (pA)	126 ± 50	273 ± 58	451 ± 148	490.5 ± 84.98	550.6 ± 136.7	Kruskal-Wallis test: p < 0.0001 Dunn’s multiple comparisons test:*P2-5 vs. P10-15: p < 0.0001* *P2-5 vs. P20-25: p < 0.0001* *P2-5 vs. P50-56: p < 0.0001* *P2-5 vs. P > 150: p < 0.0001* *P10-15 vs. P 20-25: p = 0.0009* *P10-15 vs. P 50-56: p < 0.0001* *P10-15 vs. P > 150: p < 0.0001* *P20-25 vs. P 50-56: p = 0.9778* *P20-25 vs. P > 150: p > 0.3143*

						P50-56 vs. P 150: p > 0.6648

Developmental changes in IS and SD component. AP IS and SD component, and estimated inward current at the AIS (Est $I_{In\text{-}AIS}$) of M1LV neuron are reported as average ± standard deviation. P values for multiple comparison and post-hoc test are reported for each paired comparison. These (non-normally distributed) samples were compared with the Kruskal-Wallis test and Dunn’s multiple comparisons test (K-W + Dunn’s).

Supplementary Table 6.

	P2-5 (n_{mono}/n_{tri} = 21/0)	P10-15 (n_{mono}/n_{tri} = 19/0)	P20-25 (n_{mono}/n_{tri} = 20/7)	P50-56 (n_{mono}/n_{tri} = 18/6)	P > 150 (n_{mono}/n_{tri} = 16/14)	oneway ANOVA + *post-hoc test*
$AHP_{mono/slow}$ (mV)	19 ± 3	17 ± 3	13 ± 3	11 ± 3	14 ± 4	ANOVA: p < 0.0001 Bonferroni's multiple comparisons test:*P2-5 vs. P10-15: p =0.2449* *P2-5 vs. P20-25: p < 0.0001* *P2-5 vs. P50-56: p < 0.0001* *P2-5 vs. P > 150: p = 0.0002* *P10-15 vs. P 20-25: p = 0.0010* *P10-15 vs. P 50-56: p < 0.0001* *P10-15 vs. P > 150: p = 0.2480* *P20-25 vs. P 50-56: p > 0.9999* *P20-25 vs. P > 150: p > 0.9999* *P50-56 vs. P 150: p = 0.0817*
AHP_{fast} (mV)	n.a.	n.a.	6.1 ± 2.6	13.2 ± 2.9	9.1 ± 3.7	ANOVA: p < 0.0001 Bonferroni's multiple comparisons test: *P20-25 vs. P 50-56: p = 0.0025* *P20-25 vs. P > 150: p = 0.1773* *P50-56 vs. P 150: p = 0.0619*
ADP (mV)	n.a.	n.a.	2.2 ± 1.8	1.8 ± 1.0	3.9 ± 2.8	ANOVA: p < 0.0968 Bonferroni's multiple comparisons test:*P20-25 vs. P 50-56: p > 0.9999* *P20-25 vs. P > 150: p = 0.3324* *P50-56 vs. P 150: p = 0.1771*

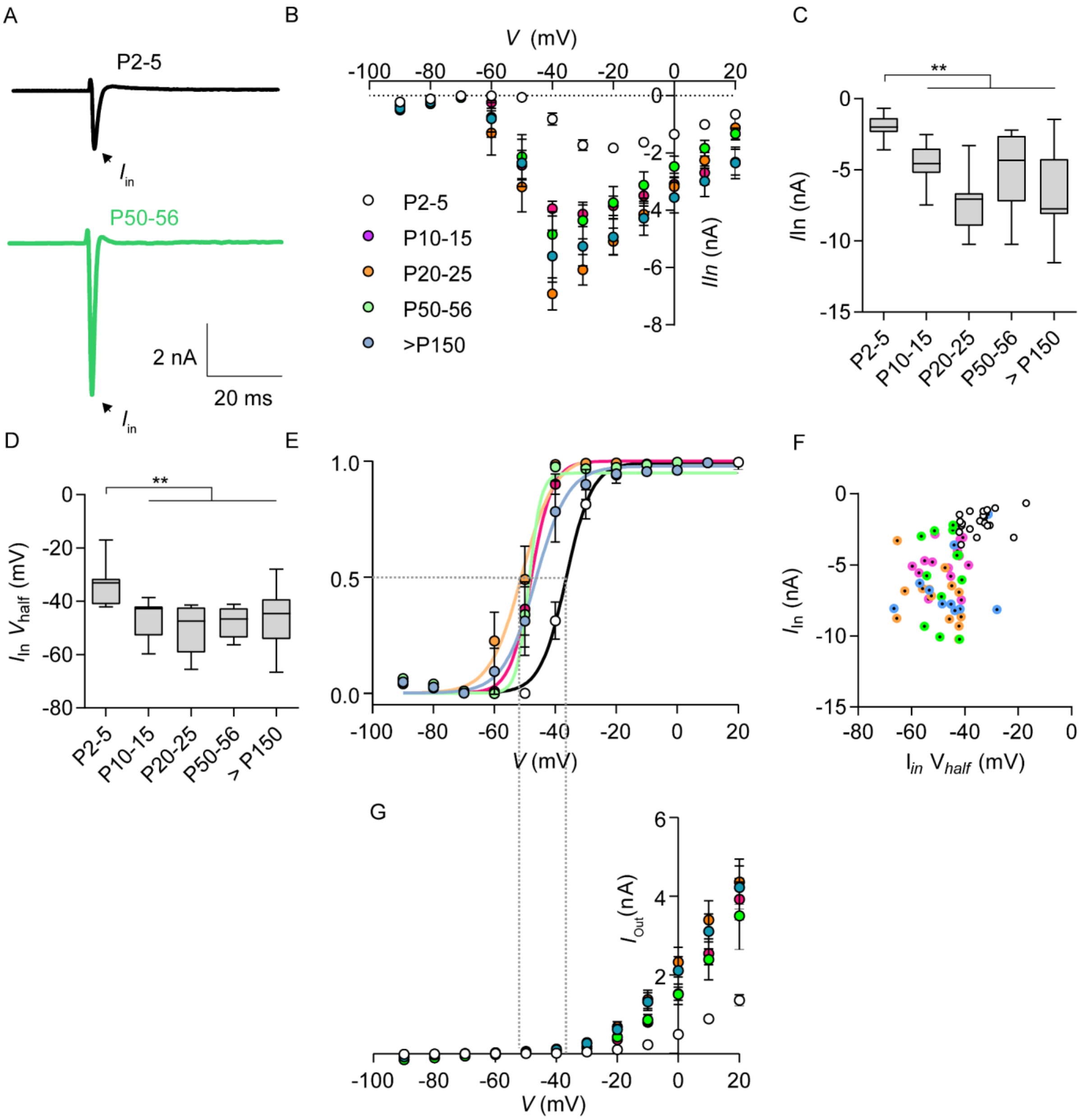
Developmental changes of AHP and ADP. Average amplitude of $AHP_{mono/slow}$, $AHP_{fast\ and}$ ADP of M1LV neurons are reported as average ± standard deviation. P values for multiple comparison and post-hoc test are reported for each paired comparison. Below the table headers indicating age groups, the number of neurons showing mono-phasic events (n_{mono}) and tri-phasic events (n_{tri}) are reported side by side (n_{mono}/n_{tri}). The statistical tests used for comparing these (normally distributed) samples was one-way ANOVA and Bonferroni's multiple comparisons test (A. + Bonferroni).

Supplementary Table 7.

	P2-5 (n = 21)	P10-15 (n = 19)	P20-25 (n = 14)	P50-56 (n = 15)	P > 150 (n = 13)	oneway ANOVA + *post-hoc test*
I_{In} (nA)	-2.0 ± 0.7	-4.6 ± 1.4	-7.5 ± 1.9	-5.4 ± 2.8	-6.6 ± 2.6	ANOVA: p < 0.0001 Bonferroni's multiple comparisons test:*P2-5 vs. P10-15: p =0.0005* *P2-5 vs. P20-25: p < 0.0001* *P2-5 vs. P50-56: p < 0.0001* *P2-5 vs. P > 150: p < 0.0001* *P10-15 vs. P 20-25: p = 0.0005* *P10-15 vs. P 50-56: p = 0.7067* *P10-15 vs. P > 150: p = 0.0303* *P20-25 vs. P 50-56: p = 0.0412* *P20-25 vs. P > 150: p = 0.7935* *P50-56 vs. P 150: p = 0.4575*
$I_{In}V_{Half}$ (mV)	-34 ± 7	-47 ± 7	-51 ± 9	-48 ± 6	-46 ± 11	Kruskal-Wallis test: p < 0.0001 Dunn's multiple comparisons test:*P2-5 vs. P10-15: p =0.0002* *P2-5 vs. P20-25: p < 0.0001* *P2-5 vs. P50-56: p = 0.0001* *P2-5 vs. P > 150: p = 0.0062* *P10-15 vs. P 20-25: p > 0.9999* *P10-15 vs. P 50-56: p > 0.9999* *P10-15 vs. P > 150: p > 0.9999* *P20-25 vs. P 50-56: p > 0.9999* *P20-25 vs. P > 150: p > 0.9999* *P50-56 vs. P 150: p > 0.9999*
I_{Out} (nA)	1.3 ± 0.6	3.9 ± 2.3	4.4 ± 2.0	3.6 ± 3.1	4.0 ± 1.9	Kruskal-Wallis test: p < 0.0001 Dunn's multiple comparisons test:*P2-5 vs. P10-15: p < 0.0001* *P2-5 vs. P20-25: p < 0.0001* *P2-5 vs. P50-56: p = 0.0378* *P2-5 vs. P > 150: p < 0.0001* *P10-15 vs. P 20-25: p > 0.9999*

						P10-15 vs. P 50-56: p > 0.9999 *P10-15 vs. P > 150: p > 0.9999* *P20-25 vs. P 50-56: p = 0.4134* *P20-25 vs. P > 150: p > 0.9999* *P50-56 vs. P 150: p > 0.9999*

Developmental changes in inward and outward voltage-activated currents. Voltage sensitive inward current (I_{In}), voltage of I_{In} half-maximal activation ($I_{In}V_{Half}$), steady state outward current (I_{Out}), fast outward current ($I_{Out\ fast}$), and $I_{Out\ fast}$ decay constant (τ) of M1LV neuron are reported as average ± standard deviation. P values for multiple comparison and post-hoc test are reported for each paired comparison. The statistical tests used for normally distributed samples were one-way ANOVA and Bonferroni's multiple comparisons test (A. + Bonferroni). Non-normally distributed samples were compared with the Kruskal-Wallis test and Dunn's multiple comparisons test (K-W + Dunn's).



Supplementary Fig. 1 Development of voltage-activated currents. A. Typical inward current (I_{In}) of P2-5 neurons (black) and P50-56 neurons (green) upon depolarization (-70 mV to -40 mV). Peak I_{in} is highlighted by arrowheads. **B.** Current – voltage relation of peak I_{In} elicited by depolarizing steps (500 ms) of increasing voltage (from -90 mV to +20 mV, holding potential: -70 mV). **C.** Maximal amplitude of I_{In}. **D.** Inward current half-maximal activation ($I_{In}V_{half}$). **E.** Fractional activation of I_{In} for different age groups. Note the smaller voltage sensitivity at P2-5. **F.** Relation between amplitude of peak I_{In} and $I_{In}V_{half}$, samples are color coded as in panel B. **G.**

Current – voltage relation of outward currents elicited by depolarizing voltage steps (500 ms) of increasing amplitude (from -90 mV to +20 mV, holding potential: -70 mV). Note reduced amplitude and voltage dependence at P2-5. ** $p < 0.01$; P2-5: n = 21; P10-15: n = 19; P20-25: n = 14; P50-56: n = 15; P > 150: n = 13.