
Supplementary information

**Topographic structure and function of locus
coeruleus noradrenaline neurons**

In the format provided by the
authors and unedited

Injection target (mice, cells)	Injection type	Injection volume	Coordinates from bregma (AP, ML, DV) (mm)
MOB (4, 928)	Pressure	150 nL per insertion	(4.28, 0.50, -2.30); (4.28, 1.20, -0.70)
CTX: PL, MO (5, 2,714)	Pressure	300 nL per insertion	(2.10, 0.33, -1.50); (1.70, 0.90, {-0.80, -0.40})
TH: VAL, VPM (7, 327)	Iontophoresis	5–7 min, 3 μ A per insertion	(-0.82, 1.13, -3.28); (-1.82, 1.60, -3.30)
PAG (6, 1,546)	Pressure	200 nL	(-4.45, 0.40, -1.40)
CB: culmen, anisoform, paramedian (6, 3,829)	Pressure	200 nL, 300 nL	(-5.75, 0.00, -0.50); (-7.50, 2.00, {-1.75, -0.90})
SP: C4–C5 (7, 4,321)	Pressure	100 nL per insertion	(N.A., 0.35, -0.90); (N.A., -0.35, -0.90))

Supplementary Table 1: Virus injections for retrograde tracing experiments. Summary of animal and cell counts by projection target and labelled soma location. Spinal cord injections were made bilaterally. All other injections were in the right hemisphere. Injection coordinates are relative to bregma (anterior-posterior, AP; medial-lateral, ML; dorsal-ventral, DV).

Injection target	Injection type	Injection volume	Coordinates from bregma (AP, ML, DV) (mm)
CTX: PL, MO	Pressure	300 nL per insertion	(2.10, 0.33, -1.50); (1.70, 0.90, {-0.80, -0.40})
TH: VAL, VPM	Pressure	300 nL per insertion	(-0.82, 1.13, -3.28); (-1.82, 1.60, -3.30)
CB: culmen, anisoform, paramedian	Pressure	200 nL, 300 nL	(-5.75, 0.00, -0.50); (-7.50, 2.00, {-1.75, -0.90})
SP: C4–C5	Pressure	100 nL per insertion	(N.A., 0.35, -0.90); (N.A., -0.35, -0.90))

Supplementary Table 2: Virus injections for retro-seq experiments. Summary of animal and cell counts by projection target and labelled soma location. Spinal cord injections were made bilaterally. All other injections were in the right hemisphere. Injection coordinates are relative to bregma (anterior-posterior, AP; medial-lateral, ML; dorsal-ventral, DV).

Parameter	Prior distribution
$\alpha_{(-)}$	[0, 1]
$\alpha_{(+)}$	[0, 1]
α	[0, 1]
ζ	[0, 1]
β	[0, 10]
bias	$\mathcal{N}(0, 1)$

Supplementary Table 3: Reinforcement-learning model parameters.