

Table 1. Specifications for single-cell perturbation datasets used in this study.

Alias ID	Sample type	Perturbation type	Perturbation count	Control cell count	Gene count	Total cells	Publication
Replogle22_a	RPE1 cells	CRISPRi	784	11485	3463	164815	Replogle et al., <i>Cell</i> , 2022
Replogle22_b	K562 cells	CRISPRi	1300	10691	3192	262998	Replogle et al., <i>Cell</i> , 2023
Nadig25_a	Jurkat cells	CRISPRi	906	12013	3375	178366	Nadig et al., <i>Nature genetics</i> , 2025
Nadig25_b	HepG2 cells	CRISPRi	256	4976	4066	49394	Nadig et al., <i>Nature genetics</i> , 2025
Norman19	lymphoblasts	CRISPRa	225	11855	1823	110554	Norman et al., <i>Science</i> , 2019
Frangieh21	melanocytes	CRISPRi	232	57605	2171	217418	Frangieh et al., <i>Nature genetics</i> , 2021
Tian19_a	iPSC-induced neuron	CRISPRi	104	15580	320	111316	Tian et al., <i>Neuron</i> , 2019
Tian19_b	iPSC cells	CRISPRi	154	10687	319	195402	Tian et al., <i>Neuron</i> , 2019
Tian21_a	iPSC-induced neurons	CRISPRi	178	437	2956	31752	Tian et al., <i>Nature neuroscience</i> , 2021
Tian21_b	iPSC-induced neurons	CRISPRa	95	434	2014	20837	Tian et al., <i>Nature neuroscience</i> , 2021
Binan25	astrocytes	CRISPRi	54	9633	211	4926	Binan et al., <i>Cell</i> , 2025