(a)

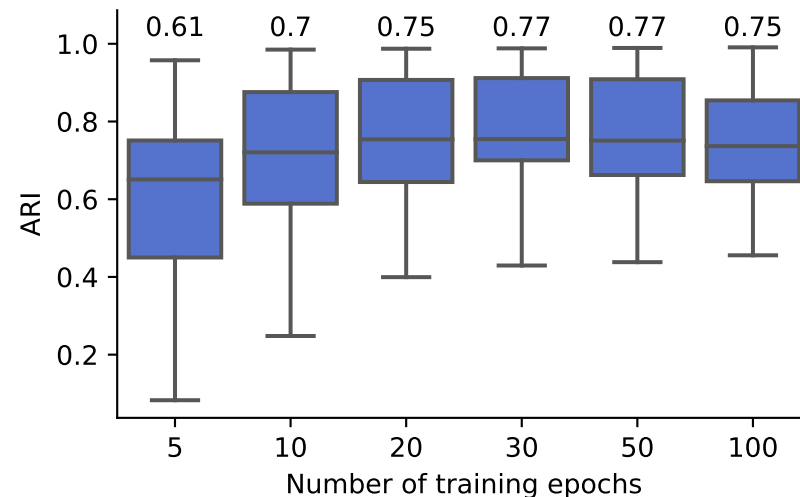|	Avg time(sec)	Factor
pca_kmeans	1.25	0.23
constrastive + KM	5.38	1.0
scrna	9.65	1.79
cidr	10.01	1.86
scanpy-seurat	10.62	1.97
constrastive + KM (CPU)	12.23	2.27
soup	12.9	2.4
raceid	12.98	2.41
constrastive + LD	13.4	2.49
constrastive + LD (CPU)	20.05	3.73
scedar	37.2	6.91
desc	43.08	8.0
scvi	98.41	18.28
scziDesk	152.11	28.26
scDeepCluster	6121.42	1137.38
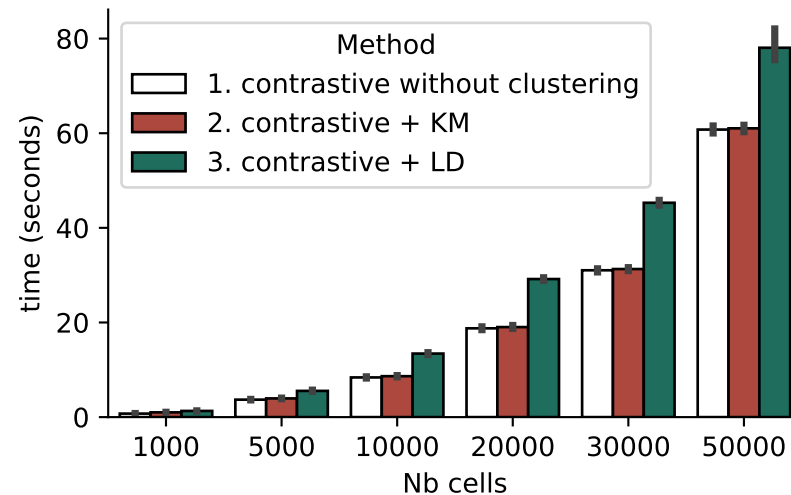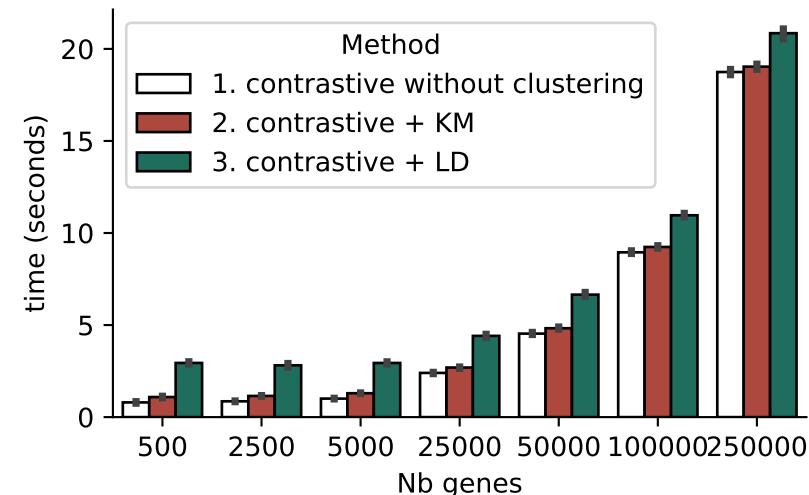
(b) **(c)** **(c) ARI score** **(d) Silhouette score**