

Table S1 Benchmarking of cell deconvolution accuracy on pseudo-bulk data constructed by combining reference scRNA-seq examples

a. Benchmarking of cell deconvolution accuracy on pseudo-bulk data constructed by combining reference scRNA-seq examples with root mean square errors(RMSE)

	Cortex	Adipose SAT	Adipose VAT	Pancreas
Scaden	0.07474473	0.0418323	0.04669483	0.05232536
C-XGBoost	0.04495449	0.03507694	0.04218134	0.04327391
XGBoost	0.04344115	0.0369141	0.04265618	0.05006292
I-XGBoost	0.04380389	0.03269347	0.0411704	0.04721296
MuSic	0.05334602	0.04869855	0.04931888	0.06004699
CibersortX	0.114221	0.04792287	0.05258879	0.08158549
DWLS	0.04828551	0.04062974	0.04676445	0.04215957

b.Benchmarking of cell deconvolution accuracy on pseudo-bulk data constructed by combining reference scRNA-seq examples with mean absolute errors(MAE)

	Cortex	Adipose SAT	Adipose VAT	Pancreas
Scaden	0.05523456	0.02996179	0.03091787	0.03631532
C-XGBoost	0.0346267	0.0244116	0.02881767	0.03074721
XGBoost	0.03337231	0.02507159	0.02873974	0.03449428
I-XGBoost	0.03407456	0.02306463	0.02783756	0.0329499
MuSic	0.04006588	0.03540459	0.0355931	0.03886928
CibersortX	0.07743558	0.03262749	0.03681934	0.05315746
DWLS	0.03661265	0.02641852	0.03017064	0.02827276

c.Benchmarking of cell deconvolution accuracy on pseudo-bulk data
constructed by combining reference scRNA-seq examples with
Lin's Concordance Correlation Coefficient (CCC)

	Cortex	Adipose SAT	Adipose VAT	Pancreas
Scaden	0.8632376	0.8796104	0.8009276	0.883012
C-XGBoost	0.965445	0.9245607	0.845244	0.927449
XGBoost	0.9645204	0.9194504	0.8404321	0.908383
I-XGBoost	0.9673321	0.9324575	0.8461624	0.910903
MuSic	0.9493826	0.8155326	0.7640733	0.873175
CibersortX	0.7558594	0.8372572	0.7467354	0.766789
DWLS	0.9617633	0.8928219	0.8081832	0.930284