(A) Consistency: 10X gene subset 1 vs. gene subset 2 Hemato. Cells (10X) (#PCs=50) JM149PT Cells (10X) (#PCs=5 ung Epithelium (10X) (#PCs=5(aryn. Mesoderm (10X) (#PCs=! Veural Progen. (10X) (#PCs=50) $\begin{array}{c} \log(y/s+1)\\ \operatorname{acosh}(2\alpha y/s+1)\\ \log(y/s+1/(4\alpha))\\ \log(\operatorname{CPM}+1)\\ \log(y/s+1)/u\\ \log(y/s+1)\to \operatorname{HVG}\\ \log(y/s+1)\to \operatorname{AVG}\to \operatorname{Z} \end{array}$ Pearson **GLM Residuals** sctransform
Analytic Pearson
Random Quantile
Pearson (no clip)
Pearson→HVG
Pearson→HVG
Pearson→HVG→Z Sanity MAP Sanity Distance Dino Normalisr GLM PCA NewWave y/s30 ouse Mammary (10X) (#PCs=5 Mouse Aorta (10X) (#PCs=50) Bovine IVDs (10X) (#PCs=50) T Helper Cells (10X) (#PCs=50] T Cells (10X) (#PCs=50) $\begin{array}{c} \log(y/s+1)\\ \operatorname{acosh}(2\alpha y/s+1)\\ \log(y/s+1/(4\alpha))\\ \log(\operatorname{CPM}+1)\\ \log(y/s+1)/u\\ \log(y/s+1)\to \operatorname{HVG}\\ \log(y/s+1)\to \operatorname{DG}(y/s+1)\to \operatorname{DG}(y/s$ sctransform
Analytic Pearson
Random Quantile
Pearson (no clip)
Pearson→HVG
Pearson→HVG→Z Sanity MAP Sanity Distance Dino Normalisr GLM PCA NewWave y/sk-NN Overlap (B) Simulation: Ground truth vs. simulated counts Dyngen (#PCs=5) Linear Walk (#PCs=10) muscat (#PCs=10) Random Walk (#PCs=200) scDesign2 (#PCs=50) $\begin{array}{c} \log(y/s+1) \\ \operatorname{acosh}(2\alpha y/s+1) - 1 \\ \log(y/s+1)/(4\alpha)) \\ \log(\operatorname{CPM}+1) \\ \log(y/s+1)/u \\ \log(y/s+1) \to \operatorname{HVG} \\ \log(y/s+1) \to \operatorname{TG} \\ (y/s+1) \to \operatorname{HVG} \to \operatorname{TG} \end{array}$ $\log(y/s+1) \rightarrow HVG \rightarrow Z$ Pearson sctransform Analytic Pearson Random Quantile Pearson (no clip) Pearson→HVG Pearson→Z Pearson→HVG→Z Sanity MAP Sanity Distance Dino Normalisi GLM PCA NewWave y/sk-NN Overlap (C) Downsampling: Original vs. downsampled deeply sequenced data mcSCRB (#PCs=10) Fibroblasts (ss3) (#PCs=10) Fibroblasts 2 (ss3) (#PCs=10) siRNA KD (ss3) (#PCs=50) $\log(y/s + 1)$ $\operatorname{acosh}(2\alpha y/s + 1)$ $\log(y/s + 1)/(4\alpha)$ $\log(\operatorname{CPM} + 1)$ $\log(y/s + 1) \to \operatorname{HVG}$ $\log(y/s + 1) \to \operatorname{HVG} \to 7$ $(y/s + 1) \to \operatorname{HVG} \to 7$ $\begin{array}{c} \log(y/s+1) \to \mathsf{Z} \\ \log(y/s+1) \to \mathsf{HVG} \to \mathsf{Z} \end{array}$ sctransform Analytic Pearson Random Quantile Pearson (no clip) Pearson→HVG Pearson→Z Pearson→HVG→Z Sanity MAP Sanity Distance Dino Normalisr

k-NN Overlap

GLM PCA NewWave