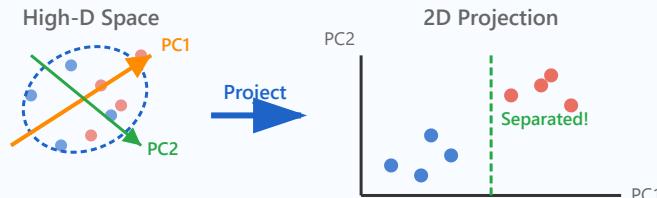


Dimensionality Reduction

PCA

Principal Component Analysis - linear transformation preserving maximum variance



Clinical Applications:

- Gene expression clustering
- Quality control visualization
- Batch effect detection

t-SNE

t-Distributed Stochastic Neighbor Embedding - nonlinear visualization method



Clinical Applications:

- Single-cell RNA-seq visualization
- Patient subtype discovery
- Exploratory data analysis

UMAP

Uniform Manifold Approximation - faster than t-SNE, preserves global structure

Autoencoders

Deep learning compression - learns nonlinear representations

