

Four-Dimensional Integrative Pipeline

(1) DATA ACQUISITION

TCGA: 1,635 samples, 3 cancer types

41,497 genes • ComBat correction

(2) IMMUNE DECONVOLUTION

TIMER2.0: 6 immune cell types

B, CD4+T, CD8+T, Neutrophils, Macrophages, DC

(3) STATISTICAL ANALYSIS

Correlation

Spearman

$$\rho = 0.42$$

CD274-CMTM6

Partial

6 covariates

$$\rho = 0.31$$

74% retained

Survival

Cox Model

0.72

C-index

(4) SENSITIVITY VALIDATION

Bootstrap (1,000 iter) • Outlier tests • Stratification

LUAD (n=601) — LUSC (n=562) — SKCM (n=472)

Consistency >95% across all tests

ROBUST, VALIDATED FINDINGS