KIRP - Kidney renal papillary cell carcinoma

Subtype	Biology & Expression	Genomic Alterations	Clinical Features
C1 (Type 1-like)	• Enriched for oxidative phosphorylation, metabolism, and immune pathways • Low proliferation signature	• Frequent **MET** alterations (mutations, amplifications) • Lower overall mutation and CNA burden	• Best prognosis • Typically low-grade tumors • More indolent clinical course
C2 (Type 2-like)	• Enriched EMT, TGF-β, and proliferation signatures • Dedifferentiated transcriptome profile	• Frequent **CDKN2A/B** loss • Higher frequency of **SETD2**, **FH**, **NFE2L2** mutations • High CNA burden	• Poor prognosis • High-grade tumors, aggressive behavior • Often presents at advanced stage
C3 (CpG Island Methylator Phenotype - CIMP)	• Hypermethylated profile • Low immune infiltration and differentiation • Suppressed immune signaling	• Enriched for **FH** mutations and loss • Distinct CIMP-like methylation • Mitochondrial gene silencing	• Intermediate to poor prognosis • Associated with metabolic dysregulation • May respond to epigenetic therapy