

Proteins Implicated in Liver Cancer (Hepatocellular Carcinoma)

Protein	Gene	Role	Mechanism
p53	TP53	Tumor suppressor (inactivated)	Loss-of-function mutations → impaired DNA repair & apoptosis, promotes HCC progression
β-catenin	CTNNB1	Oncogene (activated)	Mutations activate Wnt/β-catenin pathway → uncontrolled proliferation
TERT (telomerase)	TERT	Oncogene	Promoter mutations/reactivation → telomere maintenance, immortalization
Glypican-3 (GPC3)	GPC3	Oncofetal marker & oncogene	Cell surface proteoglycan promoting growth signaling
c-Met	MET	Oncogenic receptor tyrosine kinase	Overexpression/activation of HGF-MET signaling → invasion & growth
EGFR	EGFR	Oncogenic receptor tyrosine kinase	Activation of MAPK/PI3K pathways → proliferation
AKT/PI3K/mTOR	AKT1, PIK3CA, MTOR	Oncogenic pathway	Upregulation → survival & growth of cancer cells
PTEN	PTEN	Tumor suppressor (loss)	Loss removes inhibition of PI3K-AKT signaling
Alpha-fetoprotein (AFP)	AFP	Biomarker	Fetal protein elevated in HCC, diagnostic marker
YAP1	YAP1	Oncogene (Hippo pathway effector)	Overactivation → proliferation & survival