Volcano Plot: Tumor vs Normal

## Top GO Terms (Biological Process):

GO Term	Description	Genes	Fold Enrichment	p-value	q-value
GO:0051261	Protein depolymerization	SPTBN1, NCKAP5, SH3GL3	**27.5x**	0.00016	0.058
GO:0032984	Complex disassembly	Same as above	13x	0.0014	0.12
GO:0030837	Negative regulation of actin filament polymerization	SPTBN1, KANK3	34x	0.0015	0.12

GO:1901224	Non-canonical NF-kB signaling ↑	AGER, RTKN2	34x	0.0015	0.12
GO:0048708	Astrocyte differentiation	AGER, QKI	25x	0.0028	0.12

What does this suggest?

- Genes are strongly involved in **cytoskeleton regulation** (actin, depolymerization),

- Some roles in **immune signaling** (NF-κB),

- Also glial differentiation hints (astrocytes → nervous system relevance?).

Top GO BP Terms (Unfiltered)

GO Enrichment Dotplot
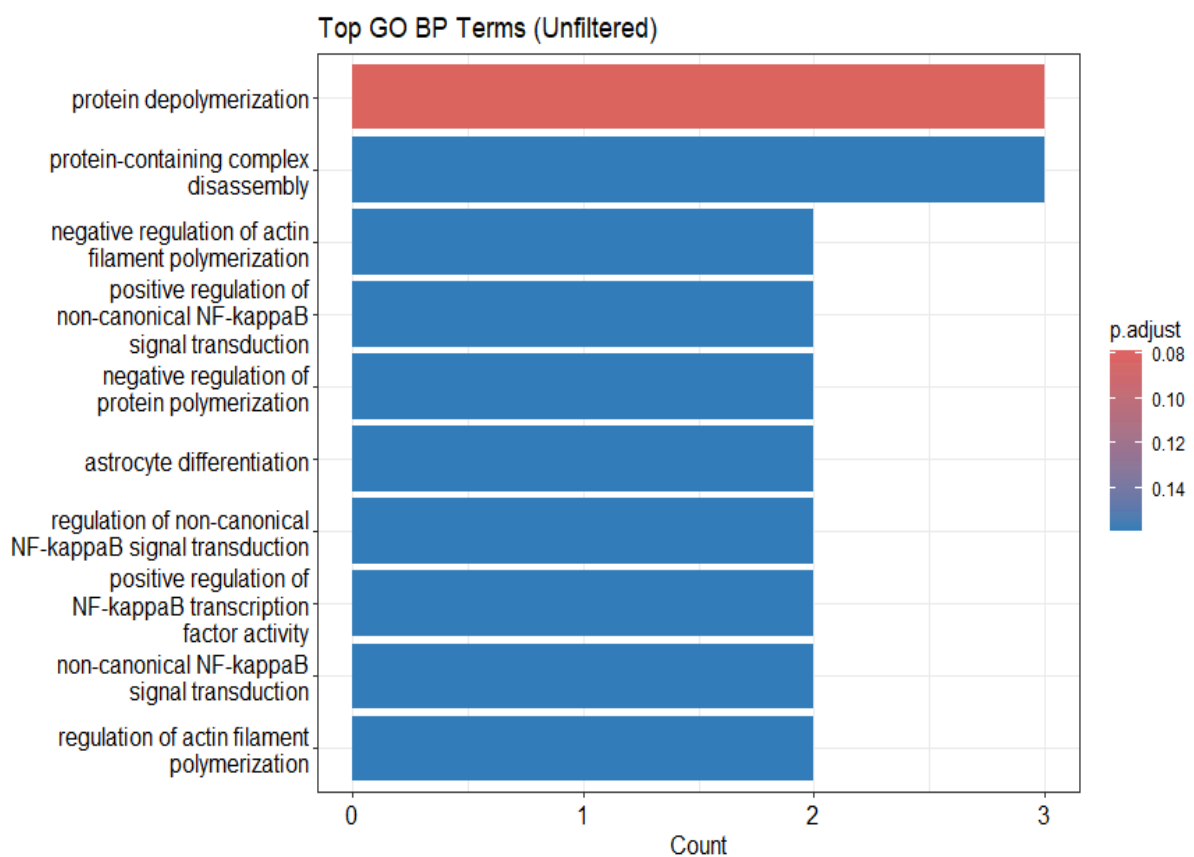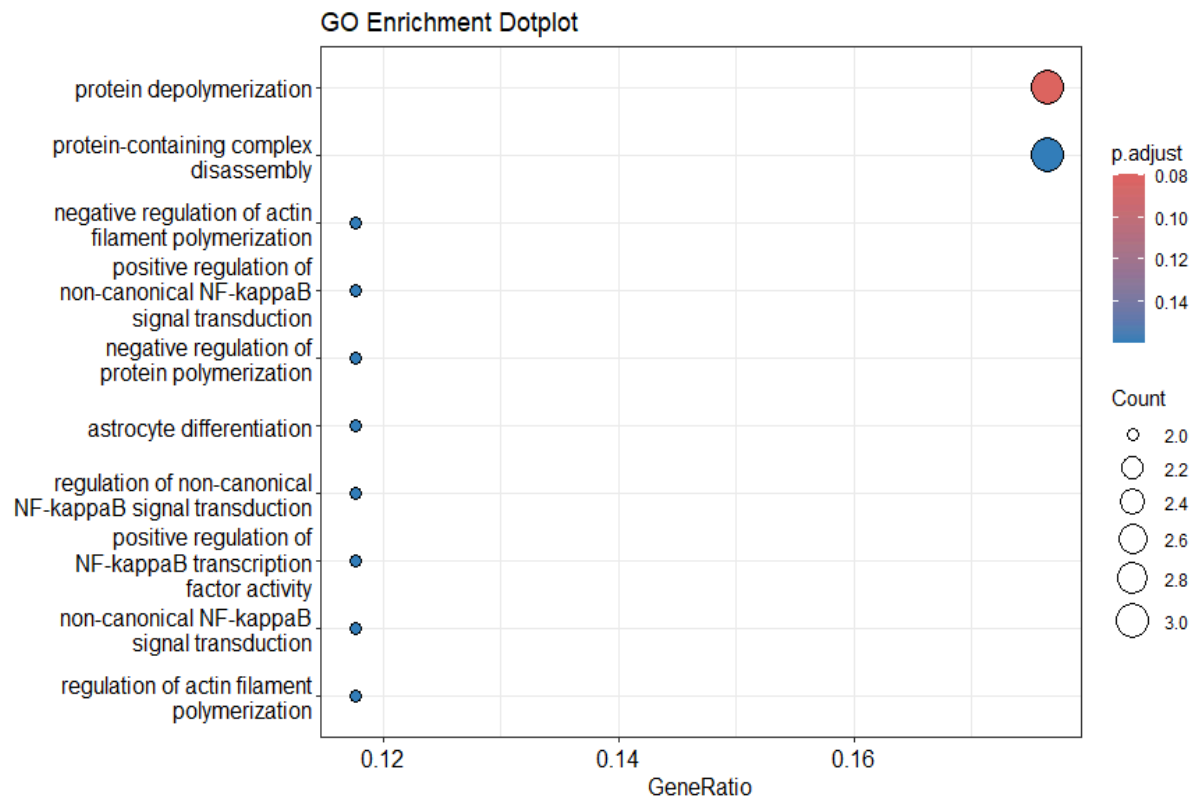
Gene	logFC	Pathway/Function	Role in Cancer	Literature Support	Therapy Status
AGER	-3.46	Inflammation, RAGE receptor	Overexpressed in various cancers; associated with inflammation and tumor progression	PMC10514562	Not currently targeted
COL10A1	+3.80	Extracellular matrix remodeling	Overexpressed in multiple cancers; linked to tumor progression and poor prognosis	PubMed ID: 37592784	Investigational biomarker
GRK5	-2.52	GPCR signaling regulation	Downregulation hampers cancer cell migration; potential role in metastasis	Nature Article	Not currently targeted

| Gene	Value	Pathway	Function	Reference	Classification
GPM6A	-4.20	PI3K/AKT pathway inhibition	Suppresses lung adenocarcinoma progression; potential tumor suppressor	[PMC9674424](#)	Potential therapeutic target
RTKN2	-3.41	Rho GTPase signaling	Associated with unfavorable prognosis in NSCLC; promotes tumor progression	[PMC7591235](#)	Potential therapeutic target
QKI	-1.22	RNA binding, alternative splicing	Frequently downregulated in lung cancer; associated with poor prognosis	[PMC3983035](#)	Potential prognostic marker
KANK3	-2.01	p38 MAPK pathway regulation	Downregulated in lung adenocarcinoma; exerts antitumor effects	[ScienceDirect Article](#)	Potential therapeutic target

🔍 Interpretation & Recommendations

- **COL10A1**: Its significant upregulation and involvement in extracellular matrix remodeling make it a promising biomarker for tumor progression and a potential target for immunotherapy.

- **GPM6A**: The strong downregulation suggests a tumor suppressor role, particularly in lung adenocarcinoma, indicating its potential as a therapeutic target.

- **RTKN2** and **QKI**: Both genes are downregulated and associated with poor prognosis in lung cancer, highlighting their relevance as prognostic markers and potential therapeutic targets.

- **KANK3**: Its downregulation and role in inhibiting tumor progression via the p38 MAPK pathway suggest it could be a valuable target in lung adenocarcinoma

therapy.

Summary of Key Differentially Expressed Genes (DEGs)

logFC	Pathway/Function	Role in Cancer	Literature Support	Therapy Status
	AGER	• Inflammation • RAGE receptor	• Overexpressed in various cancers, actiated with inflammation and tumor progression	Not currently targeted
C7OP	COL10A1	• Extracellular matrix remodeling	• Overexpressed in multiple cancers, linked to tumor progression prognosis	Investigational biomarker
GRKS	GRK5	• GPCR signaling Regulates GPCR signaling	• Downregulation hampers cancer cell migration, potential tumor suppressor	Nature Article
GPM6A	GPM6A	• PI3K/AKT pathway inhibition	• Suppressing lung adenocarcino progsession Potential tumor suppresso	PMC9574424
RYKNZ	RTKN2	• Rho GTPase signaling	• Associated with unfavorable prognosis in NSCLC. promotes tumor	Potential therapeutic target
QKI	QKI	• RNA binding, alternative splicing	• Frequently downregulated in lung cancer, essociated with poor prognosis	Potential prognostic mar-ker
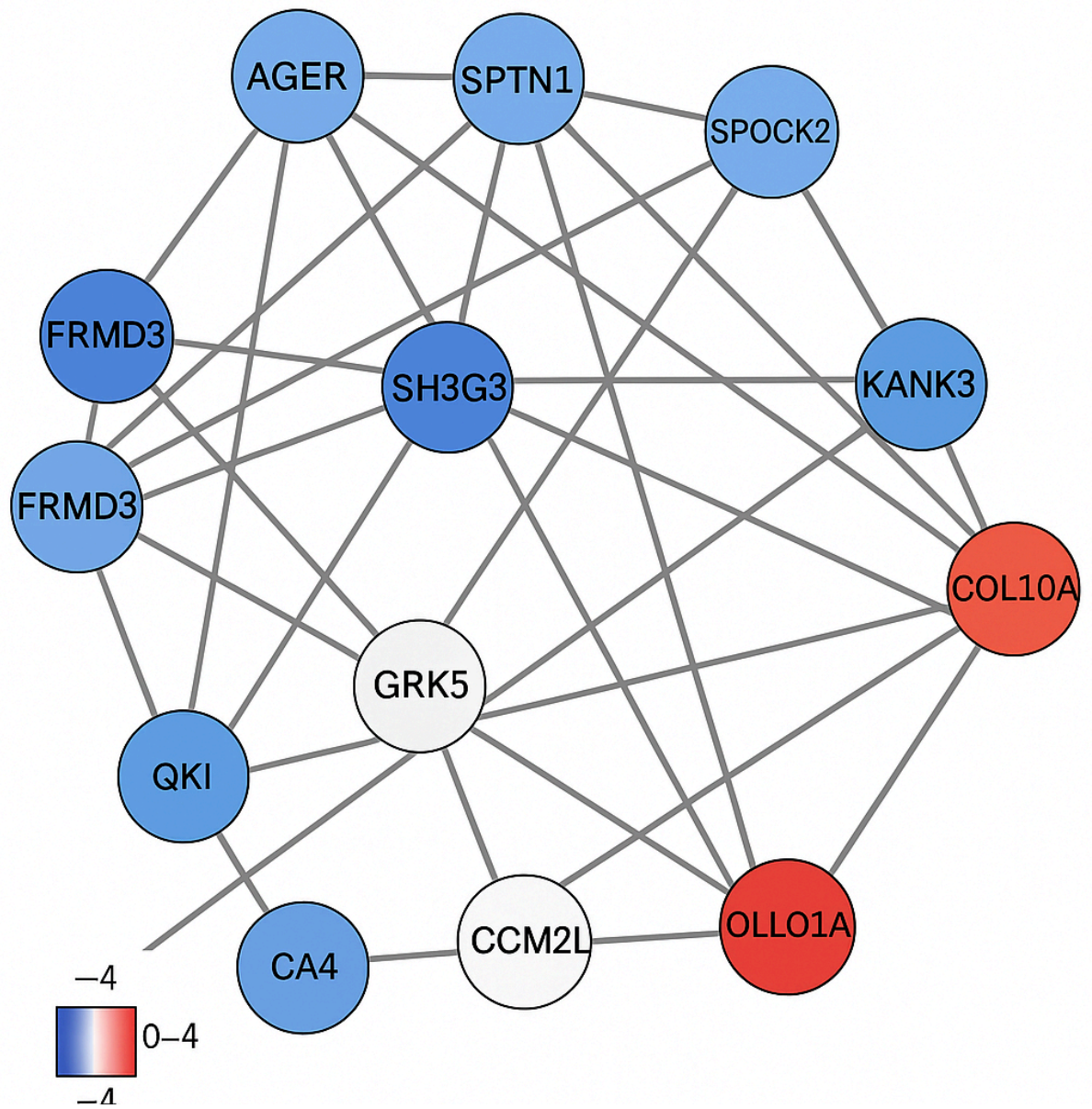
- 🔵 **Blue = downregulated**

- 🔴 **Red = upregulated**

- Lighter shades represent intermediate values.