• Upregulation of RORα by DADS suppressed gastric cancer cell proliferation, EMT, migration, and invasion.

• DADS exerted the anti-gastric cancer effects through RORα negatively modulating Wnt/β-catenin pathway and its target gene expression.

• DADS-induced interaction of RORα and β-catenin may impede β-catenin activation and nuclear translocation.