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Glycine - Tumor Growth Inhibition in Experimental Hepatocellular Carcinoma

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Glycine (Gly) is a simple non-essential amino acid, which has previously shown anti-tumorigenic effects in several experimental cancer models. Angiogenesis is one of the essential conditions for solid tumor's growth and progression, including hepatocellular carcinoma (HCC).

The aim of this study was to evaluate Gly as a potent human HCC tumor growth inhibitor in vitro, focusing on inhibition of vascular endothelial growth factor (VEGF-A), also confirming the presence of glycine receptor (GlyR) in HCC and evaluating GlyR's possible involvement in regulation of VEGF-A.

In this research project, Gly has not shown direct cytotoxic effects for human HCC cell lines. However, 1 mM and 10 mM concentrations of Gly have shown a significant inhibitory effect for VEGF-A mRNA expression up to 58.5% ± 6% as well as decreased VEGF-A protein expression up to 63% ± 7% in human HCC cell lines. Furthermore, the evidence of GlyR have been confirmed in HepG2 and Huh 7 cell lysates. It has been indirectly shown by using GlyR inhibitor strychnine, that this receptor is involved in Gly regulated VEGF-A inhibition in human HCC. The activator protein-1 transcriptional complex is affected by Gly and is most likely responsible at least in part for VEGF-A inhibition by this amino acid.

In conclusion, findings of this study reveal, that Gly exposes antiangiogenic properties in human HCC without cytotoxicity. Gly should be further considered as a potentially

antiangiogenic agent for HCC. Further research of GlyR and involved signaling pathways would be very preferred to assess potential clinical implications of Gly in HCC and other solid tumors.