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Novel nutraceuticals GZ17-06.02 suppresses pancreatic cancer tumorigenesis and metastasis by inhibiting cancer stem cells

Purpose: Current therapeutic regimens have limited effectiveness in pancreatic adenocarcinoma (PDAC). Novel therapeutic targets are needed to treat this disease. GZ17-06.02, novel nutraceutical, showed its anti-cancer properties in several cancers. We hypothesize that GZ17-06.02 will inhibit tumor progression and metastasis in PDAC.

Experimental Procedure: In this study, we have determined cell proliferation, pancosphere formation and apoptosis following treatment of different doses GZ17-06.02 in human pancreatic cancer cells. Cell cycle distribution and apoptosis were measured using flow cytometric analysis. Orthotopic pancreatic cancer model in athymic mice was developed and GZ17-06.02 was given orally for 20 days to those mice. Proliferative markers, pEGFR/pAkt and apoptotic markers, Bax/Bcl-2, were monitored following treatment with GZ17-06.02 in both in vivo and in vitro models. Metastatic markers, MMP-2 and MMP-9 were measured in metastatic tissues in orthotopic models.

Results: GZ17-06.02 inhibited proliferation of pancreatic cancer cell lines in a dose- and time-dependent manner. GZ17-06.02 induced apoptosis in both in vitro and in vivo pancreatic cancer. Moreover, the compound significantly inhibited epidermal growth factor receptor and Akt phosphorylation. Furthermore, GZ17-06.02 decreased the number and size of the pancospheres in S2-007 cells with concomitant inhibition of pancreatic cancer stem cell markers, DCLK1, Lgr5 and EpCam. The effect of GZ17-06.02 suppressed tumor growth and metastatic potential as indicative of MMP-2 and MMP-9 activity in primary and metastatic tumors.

Conclusions: GZ17-06.02 significantly inhibits pancreatic cancer stem cells, thereby suppressing tumorigenesis and metastasis in both in vitro and in vivo pancreatic cancer models.

Biography

Animesh Dhar has completed his PhD from University of Calcutta in Physiology and did his Post-doctoral training from University of Puerto Rico in Biochemistry and University of Missouri-Columbia in Pharmacology. He became a Research Track Assistant Professor in Pharmacology, University of Columbia and then moved at University of Missouri-Kansas City School of Medicine as an Associate Professor. He joined in the Department of Cancer Biology as an Associate Professor in University of Kansas Medical Center. He has published more than 60 publications in the journals of international repute and more than 10 reviews in the area of his research.

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Notes:

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