

Visa-BikDD and visa-miRNA nanoparticles targeting to breast cancer and breast cancer stem cells

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Development of cancer gene therapy has been hampered by the fact that there are no effective cancer-specific expression vectors available, which is critical for improving therapeutic efficacy and reducing toxicity in clinics. To overcome this problem, we recently developed a safe and effective strategy for targeting a potent pro-apoptotic gene (BikDD) to the pancreatic tumors (Xie et al. Cancer Cell, 2007). A VISA system (VP16-Gal4-WPRE integrated systemic amplifier) was engineered by using the two-step transcriptional amplification (TSTA) system and the posttranscriptional regulatory element of the woodchuck hepatitis virus (WPRE). The VISA system can boost the activity of cancer-specific promoters by an average of 600 folds compared to their basal levels. C-VISA (CCKAR-VISA) nanoparticles transcriptionally which targets transgene expression effectively to pancreatic tumors *in vivo* is moving into clinical trials at University of Texas M.D. Anderson Cancer Center, USA. In the current study, we identified hTERT, β -catenin, claudin-4, and FASN, CD44, ALDH1 promoters as breast cancer-and breast cancer stem cell-selective promoters, and amplified their activity to hundreds of folds greater by the "VISA" system without loss of their specificity. We further demonstrated significant antitumor activity of targeted BikDD (a mutant Bik) or an antioncogenic miRNA expression driven by nanoparticles of the hTERT-VISA-BikDD vectors or hTERT-VISA-miRNA vectors in breast cancer and breast cancer stem cells in multiple breast cancer models of living imaging by the Xenogen IVIS imaging system with limited toxicity. Thus, our newly developed hTERT-VISA-BikDD and hTERT-VISA-miRNA vectors nanoparticles are an innovative strategy for potentially eradicating breast cancer

Biography

Xiaoming Xie has completed his Ph.D from Central South University and postdoctoral studies from Baylor College of Medicine, USA. Then He became a faculty member of University of Texas M.D. Anderson Cancer Center. Now He is the Chairman of Department of Breast Cancer and director of Cancer Biotechnology, SunYat-Sen University Cancer Center, China. He has published more than 50 papers in reputed journals and serving as an editorial board member of several journals

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