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Ultrasound sensitive nanobubbles containing Paclitaxel, YM155, and siRNA as gene carriers for the therapy of lung cancer

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23% of the worldwide cancer-related death rate is due to lung cancer, more than the sum of breast, colon and prostate cancer. A great deal in common for almost each cancer type, including lung cancer, is an overexpression of the apoptosis inhibitor survivin. For improving the chemotherapy several strategies were performed. Previously, ultrasound sensitive nanobubbles containing paclitaxel, survivin-siRNA and survivin inhibitor sepantronium bromide (YM155), respectively, were developed against A549 lung cancer cells. The paclitaxel-loaded nanobubbles had a particle size of 309nm and a zeta potential of 34mV, the paclitaxel and YM155 loaded nanobubbles had a particle size of 57nm and a ZP of 47mV, while the PTX and siRNA loaded nanobubbles had a particle size of 252nm and a ZP of 27mV. The cytotoxicity studies revealed promising results and encouraged for further investigations. The aim of this study was to evaluate the siRNA complexation, serum stability, gene silencing efficiency, and Apoptosis. The developed nanobubbles were able to form a complex with survivin-siRNA and protected the siRNA from nucleases. The gene silencing efficiency and Apoptosis were evaluated, with and without ultrasound exposure, by qPCR and Apoptosis kits and showed that NB formulations were able to silence survivin expression and induce apoptosis in the A549 cell line.

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Biography

Yucel Baspinar studied Pharmacy at Free University Berlin, Germany and started as a research assistant at the same Institute in the Department of Pharmaceutical Biochemistry, Biopharmacy and Biotechnology with his Ph.D. thesis (2005- 2009) entitled as “nano and microemulsions for the topical application of poorly soluble immune suppressive. He worked as Head of Drug Development and Quality Control Laboratory and in Biosimilar Laboratory in the Center for Drug Research & Development and Pharmacokinetic Applications at the Ege University in Izmir, Turkey. 2013- now he is Assistant Professor in the Faculty of Pharmacy, Department of Pharmaceutical Biotechnology, Ege University. The major research areas are Pharmaceutical Formulations of protein drugs and monoclonal antibodies prepared by the recombinant DNA technology and biosimilars.

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