

**Purpose:** To investigate the effect of pulsed focused ultrasound (pFUS) on the uptake of doxorubicin (DOX) in prostate tumor in vivo.

**Methods:** A mouse prostate tumor model was used in this study by implanting and growing LNCaP tumor cells in male nude mice prostate. An InSightec ExAblate 2000 system with a 1.5T GE MR scanner was used for MRI-guided pFUS treatment. Non-thermal sonications were delivered by keeping the local body temperature below 42°C as measured in real-time by MR thermometry. Tumor-bearing mice were exposed to pFUS (1MHz; 25W acoustic power; 10% duty cycle with 0.1 sec on and 0.9 sec off) for 60 sec in each sonication. A total of 4-8 sonication spots, depending on the tumor size, were used to cover the whole tumor. Immediately after pFUS exposure, DOX (10mg/kg) was injected via tail vein. Mice were euthanized after two hours and the DOX concentration in tumor (microgram of DOX per gram of tumor weight) was measured using the fluorescence technique. Mice were randomly assigned to two groups (n=8 for each group). One group received DOX injection only (group: DOX). The other received both pFUS exposure and DOX injection (group: FUS+DOX).

**Results:** The DOX concentration in the FUS+DOX group was 14.9±2.5 ug/g compared to 9.5±1.6 ug/g of the DOX group (p=0.051). There was an about 60% increase of the DOX uptake in the prostate tumor exposed to pFUS.

**Conclusion:** Results show that pFUS exposures significantly enhanced the uptake of DOX in prostate tumors. This result is consistent with our previous study of enhanced [3H]-docetaxel uptake in prostate tumors. Further studies are being conducted to investigate the optimal pFUS parameters to maximize the uptake enhancement and its clinical benefits for cancer therapy (Study supported by a grant from Focused Ultrasound Surgery Foundation and partially by DOD PC073127).