

JULY 3rd, 2023



INTEGRATED/0918/0008

SOUNDPET NEWSLETTER

ISSUE 6

Providing with news on MRI guided Focused Ultrasound technology in the field of oncology, in the framework of the SOUNDPET project!

INDEX

***In-vivo* Focused Ultrasound ablation
in a rabbit thigh model &
canine and feline mammary cancer patients**

co-funded by



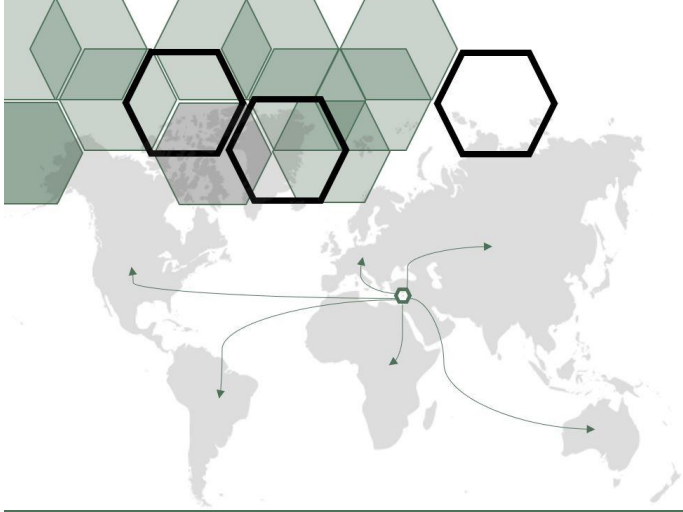
Ευρωπαϊκή Ένωση
Ευρωπαϊκό Ταμείο
Περιφερειακής Ανάπτυξης



Κυπριακή Δημοκρατία

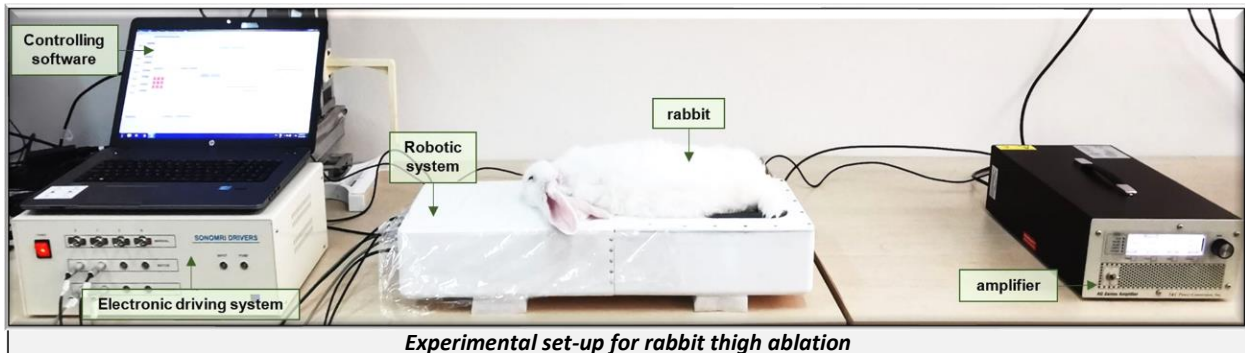


Διαρθρωτικά Ταμεία
της Ευρωπαϊκής Ένωσης στην Κύπρο

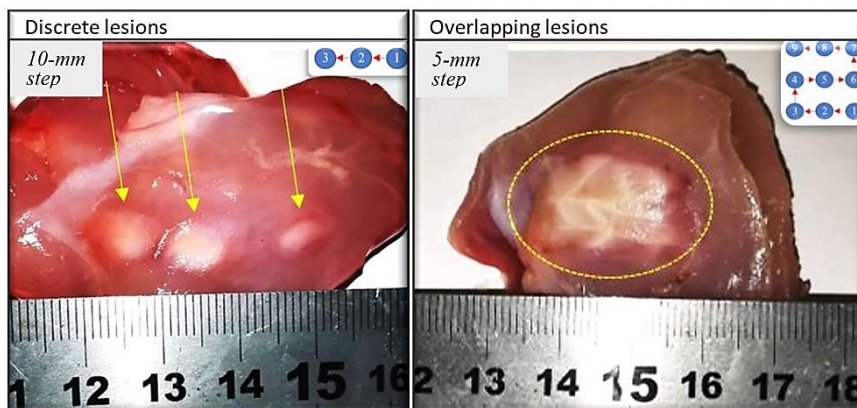


Focused ultrasound ablation in a rabbit thigh model

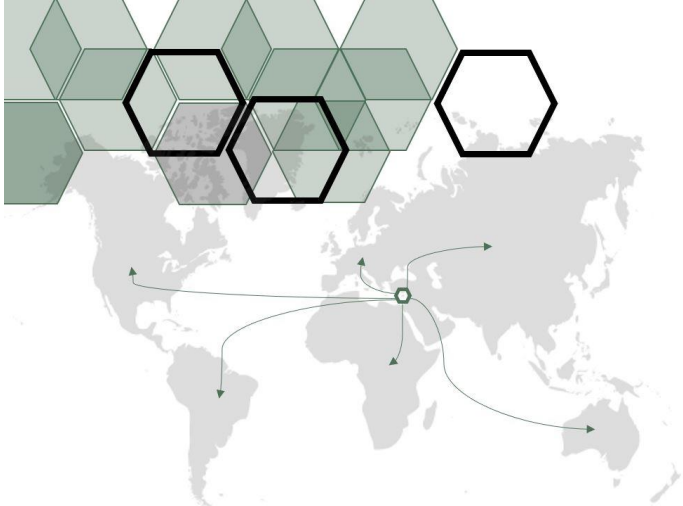
The *in-vivo* performance of the SOUNDPET robotic system was tested in a rabbit thigh model. The rabbit experiments were carried out at the premises of CUT by a qualified veterinarian. The rabbit thighs received multiple sonications in grid patterns. The spatial step between successive sonications and ultrasonic parameters were varied to assess their effect on lesion formation. After completion of the experiment, the animal was humanely euthanized.



Both discrete and overlapping lesions with variable diameter and length were inflicted in tissue, demonstrating that the **system is capable of creating reproducible and controllable lesions in live tissue**. No operational malfunctions that could compromise the animal's welfare were recorded. There were no indications of animal suffering or off-target burns.



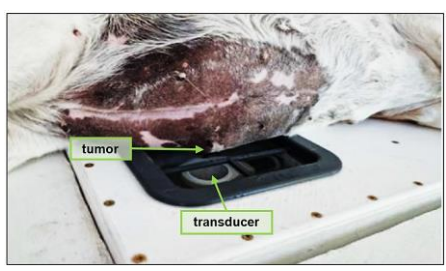
Sample photos (top view) of rabbit thigh after muscle exposure showing lesions inflicted using focal intensity of 2116 W/cm², 10 s sonication time, and 60 s delay between sonications, at focal depth = 1 cm.



Focused ultrasound treatment of canine & feline mammary cancer



Nine (9) pets with local superficial tumors of the mammary glands were involved in the trial and treated with FUS followed by surgical removal of the entire tumor. The pet trials took place at the premises of the referring veterinarians. A comprehensive treatment protocol was adopted where the pet was placed on the device in a way to ensure that thermal heating is fully applied to the tumor, thus avoiding accidental heating of healthy tissue. Partial tumor ablation was performed by single or multiple grid sonications depending on the tumor size.



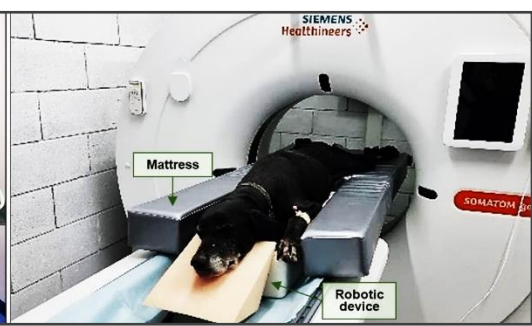
Animal placement on the device



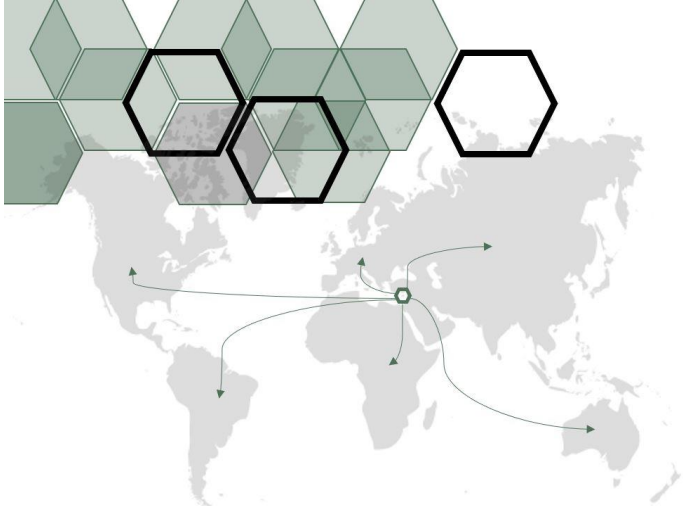
As part of these trials, the SOUNDPET system was integrated with a veterinary MRI system and a CT scanner. CT imaging was useful to visualize the animal placement and tumor location relative to the transducer. In the MRI, only anatomical imaging was possible because the specific MRI system uses ring-shaped coils that are placed around the pet, thus making ultrasonic penetration unfeasible. Since the device fits within the scanner, if in the future the vendor redesigns the coils, thermal ablation under MRI guidance will be feasible.



SOUNDPET device placed within the Vet-MR Grande veterinary MRI system (Esaote) at V3ts Veterinary Clinic (Larnaca, Cyprus).



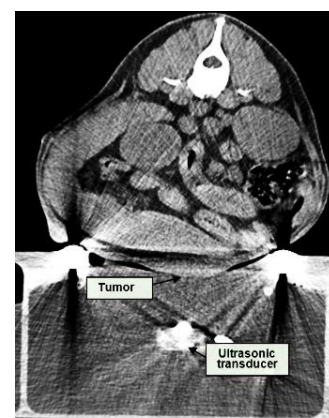
The SOUNDPET device integrated with the SOMATOM CT scanner (Siemens) at V3ts Veterinary Clinic.



Focused ultrasound treatment of canine & feline mammary cancer (cont.)



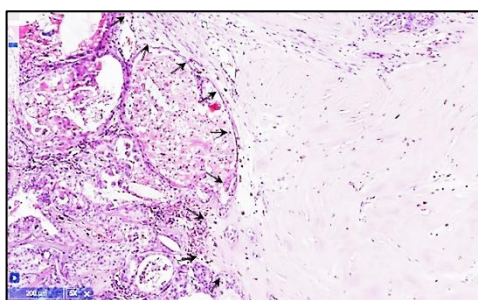
All pets were successfully treated with the SOUNDPET system with no recorded adverse events. Well-defined areas of coagulative necrosis were created in the treated canine and feline mammary tumors. The selected frequency (~2.5 MHz) offered good focusing and sufficient penetration of ultrasound in tissue. Hematoxylin and Eosin (H&E) staining demonstrated thermal necrosis in all treated tumors (9/9) without off-target effects, except from minor hemorrhage at the lesion borderline (1/9).



CT axial image of the dog placed on the device.



Example photo of mammary tumor in cat after FUS (45 W acoustic power, 20 s duration).



Indicative histological slide demonstrating thermal necrosis (indicated by the black arrows) at 5X magnification.

The findings are very promising and provide a good starting point for further research on FUS ablation of mammary neoplasia in pets. More trials with a larger patient population should be performed to confirm these findings and investigate the feasibility of safely ablating the entire malignancy, as well as deep-seated tumors.

CONNECT WITH US



<https://www.facebook.com/soundpet>



cy.linkedin.com/in/medsonic-ltd-cyprus-288286153



www.soundpet.eu

JULY 2023

co-funded by



Ευρωπαϊκή Ένωση
Ευρωπαϊκό Ταμείο
Περιφερειακής Ανάπτυξης



Κυπριακή Δημοκρατία



Διαρθρωτικά Ταμεία
της Ευρωπαϊκής Ένωσης στην Κύπρο