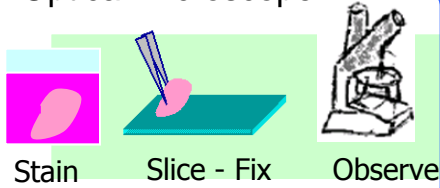


Cross-sectional Observation of Rat Brain Tumor Model and Its Quantitative Analysis by Newly Proposed Acoustic Microscope

Background & purpose

Optical Microscope



Takes time for staining and slicing

Acoustic Impedance Microscope



Non-staining
In-vivo
Non-contact

Acoustic Impedance Microprobe

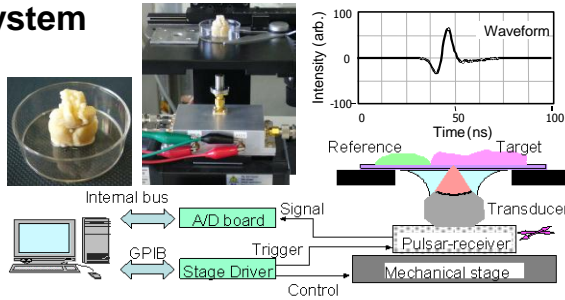


On-site
Real-time

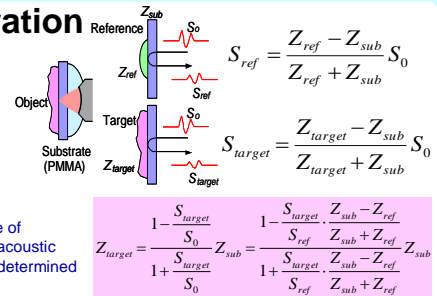
Specimen & system



Rat brain tumor model, 14 days after injection with 1×10^5 C6 glioma cells. Coronal cross section.

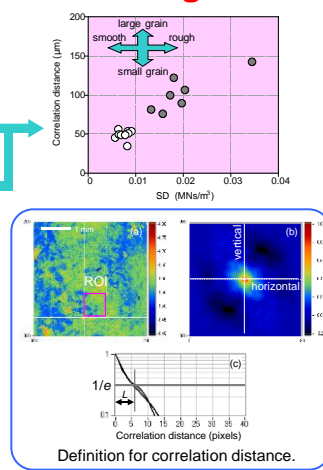
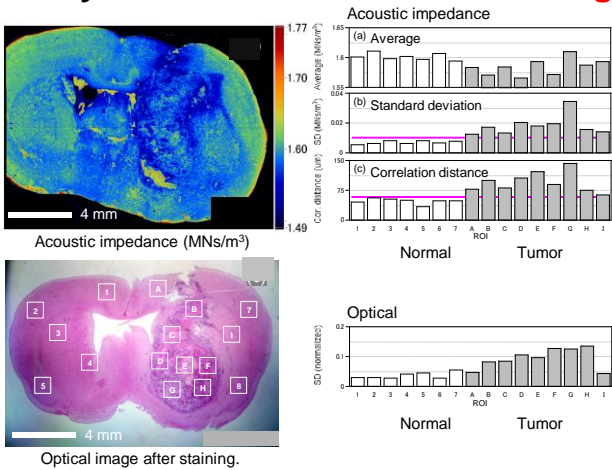


Calibration

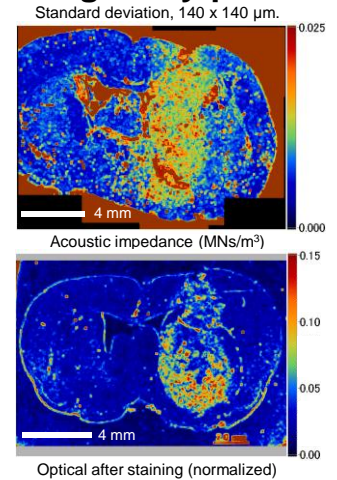


Analysis for ROIs

Tumor region is heterogeneous



Heterogeneity profiles



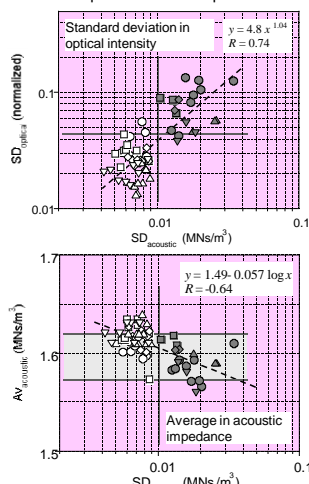
Reproducibility check

No.	CAI (MN/m ²)	SD in CAI	Stained Slice
1	1.50 - 1.78	0 - 0.022	
2	1.50 - 1.78	0 - 0.022	
3	1.50 - 1.78	0 - 0.025	
4	1.50 - 1.78	0 - 0.025	

min max 6 mm

Correlation analysis

Correlation between standard deviation in acoustic impedance & other parameters



Summary

Our imaging method for cross sectional **characteristic acoustic impedance** will become a powerful tool for **detection of brain tumor** during surgery operation.

The tumor region can be determined by **morphological inspection**, and highlighted by means of **local heterogeneity in characteristic acoustic impedance**.

A probe type system is needed for **in situ observation** during surgery operation; however, the present system can also be applied to **pathological inspection** of enucleated tissues.