Photoacoustic Probe for Detecting Breast Cancer

Background:

Breast cancer is among the most common cancers among women. Currently, the techniques for breast cancer diagnosis involve clinical breast exam, mammography, ultrasounds, molecular breast imaging, and magnetic resonance imaging (MRI), particularly for women that are in high-risk category for breast cancer. Mammography and ultrasonography are considered as the most effective screening techniques for breast cancer; however, they do have limitations e.g., mammography sometimes give false-negatives, especially in young subjects. It may also be painful or uncomfortable. Similarly, MRI may give false negative results, and it is expensive. Also, using dyes and fluorophores for tumour imaging may have its challenges and side-effects. Hence, a non-invasive, sensitive, non-fluorophore/dye-based technology to detect breast cancer at an early stage is required.

Technology:

This technology uses photo-acoustic (PA) spectroscopy to detect breast tumour development by analyzing the minor biochemical changes upon tumour development. PA imaging combines non-ionizing, deep penetrating excitation light with acoustic detection to reconstruct three-dimensional images for tumor detection. This technology is a suitable alternative to existing technologies since it provides non-invasive and early detection of breast cancer alongwith high sensitivity & specificity.

Applications:

Device for detection of breast cancer non-invasively without use of any extrinsic fluorophores

Advantages:

- Non-invasive
- Label-free
- High sensitivity & specificity

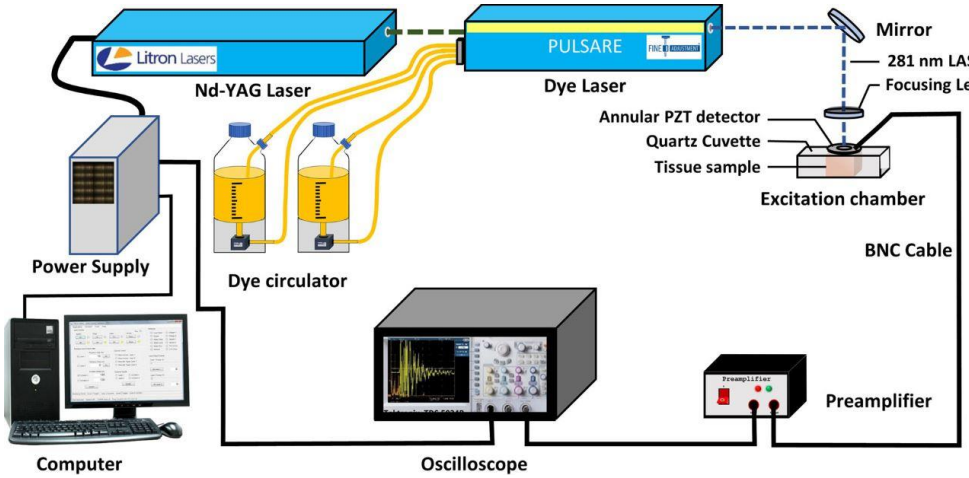

Figure. Photoacoustic instrumentation. Block diagram of the experimental setup used to record Photoacoustic spectra of tumor tissues (Ref. Rodrigues et al., 2021)

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