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FT-IR spectroscopy is ideal for studies of nucleic acids because it is fast, non-destructive, and requires small amounts of sample. Only few studies have been reported on the structural differences between the DNA extracted from tumor and normal tissues. In this study 23 breast samples from rats, constituting of 10 normal samples and 13 breast tumors samples, were analyzed by FT-IR. The main goal of this study was to classify the different histological types of the breast tissue. DNeasy Mini Kit (Qiagen) was utilized as the DNA extraction protocol. The total DNA was stored in distilled water, quantified by optical spectroscopy (Nanodrop. ND-1000, Labtrade), and then dried under moderate vacuum in CaF_2 windows for FT-IR measurements. The absorption spectrum enabled the differentiation of the two tissue classes using eight first principal components by discriminant analysis with cross-validation. The results showed differences of vibrational modes between DNA of normal and tumor tissues. Discriminant analysis correctly identified 89% of the samples.
Keywords: DNA, FT-IR, breast cancer, spectroscopy

[12/05/10 - P113]
Thyroid lesions diagnosis by Fourier transformed infrared absorption spectroscopy (FTIR), Felipe Guimarães Albero, Denise Maria Zezell, *Centro de Lasers e Aplicações, IPEN - CNEN/ SP, São Paulo, Brasil*, Etelvino José Henriques Bechara, *Instituto de Química, USP and UNIFESP/Diadema, São Paulo, Brasil*, Orlando Parise Júnior, *Hospital Sírio Libanês, São Paulo , Brasil* ■ Thyroid nodules are a common disorder, with 4-7% of incidence in the Brazilian population. Although the fine needle aspiration (FNA) is an accurate method for thyroid tumors diagnosis, the discrimination between benign and malignant neoplasm is currently not possible in some cases with high incidence of false negative diagnosis, leading to a surgical intervention due to the risk of carcinomas. The aim of this study was to verify if the Fourier Transform infrared spectroscopy (FTIR) can contribute to the diagnosis of thyroid carcinomas and goiters, using samples of tissue, aspirates and homogenates. Samples of thyroid nodules with histopathological diagnosis were obtained and prepared for FTIR spectroscopy analysis.
Samples were suspended in 2 mL of saline solution at 0.9%, were surgically collected and frozen in liquid nitrogen. A drop of 5 μL of the cell suspension dried was placed on one infrared transparent ZnSe window. The FNA and homogenate samples were measured by Nicolet 6700 FTIR spectrometer, with accessory of μ-FTIR (between 950-1750 cm^{-1},), at a nominal resolution of 4 cm^{-1} and 120 scans. Tissue samples were analyzed directly by ATR-FTIR technique, at a resolution 2 cm^{-1}, with 60 scans in the same region, in a diamond window of range 900 - 1800 cm^{-1}.All spectra were corrected by the baseline and normalized by amides area (1550-1640 cm^{-1}) in order to minimize variations of sample homogeneity. Then, spectra were converted into second derivatives using the Savitzk-Golay algorithm with a 13 points window. The Ward's minimum variance algorithm and Euclidean distances among the points were used for cluster analysis.
All samples showed some cell pellets and large amount of hormone, represented by the bands of 1545 and 1655 cm^{-1}. Bands in 1409, 1412, 1414, 1578 and 1579 cm^{-1} were also found, indicating possible presence of sugar, DNA, citric acid or metabolic products. In this study, it was obtained an excellent separation between goiter and malign lesion for the samples of tissues, with 100% of specificity in specific cluster and 67% sensibility and 50% of specificity. In homogenate and FNA samples this sensibility and specificity were lower presence of due to the many types of thyroid lesions into goiters group. To obtain a more precise diagnosis for FNA of follicular thyroid the sample size should be increased. The results of this study suggest that FTIR spectroscopy may be useful for discriminate thyroid carcinomas from goiters in tissue samples. Aknowlegments: FAPESP and CNPq.

[12/05/10 - P114]
A Method for Minimizing Speckle Noise in Images Obtained Through Near Infrared Laser Transillumination for Optical Diagnosis of Dental Caries, Marília Wellichan Mancini, Luciana Almeida-Lopes, Hermes Pretel. *DMC Equipamentos*, Emerson Cristiano Barbano, *Instituto de Física de São Carlos-Universidade de São Paulo*, Luis Carlos Trevelin, Jander Moreira, Denis Henrique Pinheiro Salvadeo, Paulo Eduardo Papotti, Rafael Loosli Dias, *Departamento de Computação-Universidade Federal de São Carlos* ■ Several optical-based diagnostic methods have been investigated in order to allow for enhanced diagnosis of dental caries through non-ionizing electromagnetic sources and allowing for more precise diagnostic outcomes. These methods are based on light induced fluorescence (LIF), optical coherence tomography (OCT) and transillumination (TI). In the last few years, TI imaging based methods have re-gained a great attention due to the relatively hardware simplicity in comparison to OCT technique and the potential of the method to allow for precise qualitative and quantitative information through imaging processing techniques. Furthermore, the TI method has shown great potential to overcome the limitations of X-Rays based diagnostic of occlusal early caries lesions with the great advantage of using non-ionizing radiation. Most of TI methods for caries diagnosis are based on the use of non-coherent light sources. We show in this work the viability of using laser transillumination in the near infrared region of the eletromagnetic spectrum for caries diagnosis, examination of restorative material boundaries and detailed morfological assessment of dental elements. One of main sources of noise in near infrared laser transillumination imaging (NIR LTI) investigated here is the speckle noise inherent to coherent imaging. Speckle is a random interference pattern in an image obtained of an object containing multiple scatterers through coherent radiation illumination