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Diagnosis of Human oral Cancer by synchronous Luminescence Spectroscopy

D.K.Kendre

Gramin Mahavidyalaya,Vasantnagar (Kotgyal) Tq.Mukhed Dist.Nanded.(M.S.)

Key-words:
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Synchronous Luminescence fluorescence emission spectra.

Abstract: The twenty five (Malignant & Normal) samples are collected for the study of synchronous luminescence spectra. We recorded the synchronous luminescence spectra of cancer and normal tissues of oral cancer. The significant changes were observed in the fluorescence from cancer to normal oral tissue. The ratio of mean spectrally fluorescence intesnisty from cancer to normal is determined and recorded. We also determined the band structure of oral cancer tissue of SL spectroscopic technique

Introduction :

Cancer is the most dreadful disease in human being. It gives our contribution towards this dreadful disease to decrease the suffering of these patients. Oral cancer one of the ten most commonly Occurring cancers worldwide. In India 7% of all cancer deaths in males and 4 % in female have been reported to be due to oral cancer which can be attributed to tobacco habits, smoking and Chewing. Exposure to the tobacco related chemical carcinogen could provide direct damaging effect on the cellular DNA in human oral cavity. Diagnosis of oral cavity often delayed because the pain associated with ulceration occurs quite late in this stage. As early stages and oral lesions, can be treated completely.

The spectroscopic method have been shown to be more reliable and accurate. The synchronous luminescence spectroscopic are featureful and they give lot of information, synchronous luminescence spectroscopy technique potential depends on the various emission & excitation spectra. Which could changes the tissue morphology and the composition due to the repeated exposure during the spectral measurements. Also the over lapping spectral feature reprehensive of complex mixture of bimolecular is all but useless. These drawbacks can be over come to great extent by applying synchronous luminescence spectroscopy in which single spectral measurement might over the required details regarding the tissue pathology.

From the study is observed that there is an increase in the emission of NADH flavin and prophyrin and also increase in hemoglobin reabsorption as the tissues progresses from normal into malignant (1,2). We record the synchronous luminescence spectrum of normal sample of the oral tissues, In the neighborhood of the affected portion. We also record the Spectra of the malignant sample oral tissue. We obtain the ratio of intensity emitted by the malignant to the intensity emitted by normal simple. They compare each other as a function of wavelength of the spectra. In the present work we select the synchronous luminescence spectroscopy for the detection and diagnosis of the oral human cancer tissue.

Material and Method :

The samples of human body (breast, oral cavity, uterus, survical cancer, buccal mucosa etc.) were obtained from R.S.T. Cancer Hospital, Nagpur, N.S. Dhoot Cancer Hospital,

Aurangabad, Akola, Nanded region in Maharashtra state in India. The Normal tissues were also collected from the adjacent normal sites of the abnormality. The measurement were taken commercial spectra Physics fluorometer (SPEX, USA and Luorolog II) in RRCAT, Indore was used to record the SL spectra. The spectra were recorded by scanning both the excitation and emission monochromators simultaneously separation between them.

The light form Xenon lamp was incidence perpendicular to the sample surface to a spot of size approximately 2 mm x 4 mm and emitted light was collected at approximately 20^0 angle with respect to the direction of excitation light.

A bundle of seven optical fibers is used as light transporting system. A single central fiber carries light from the source to the sample and six fibers surround the central fiber collect the fluorescence signal given by the sample.

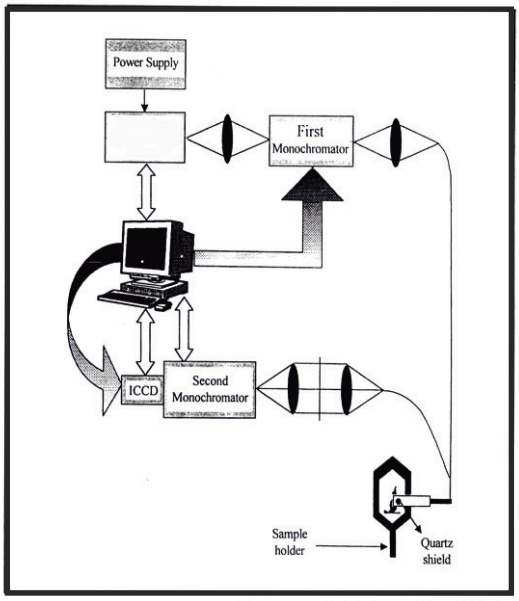

Fig 1. Experimental arrangement for recording SL spectra for recording cancer tissue.

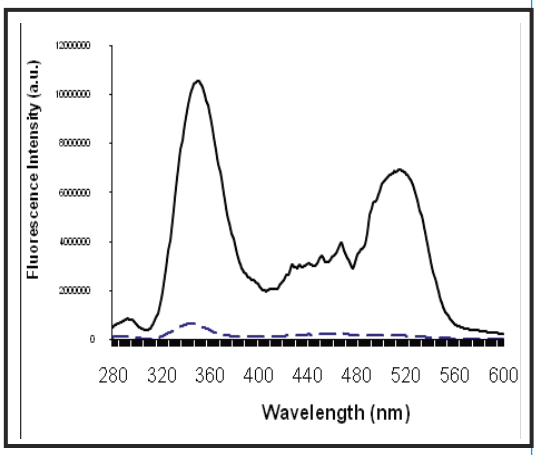

Figure (a): The SL spectra of oral cancer.

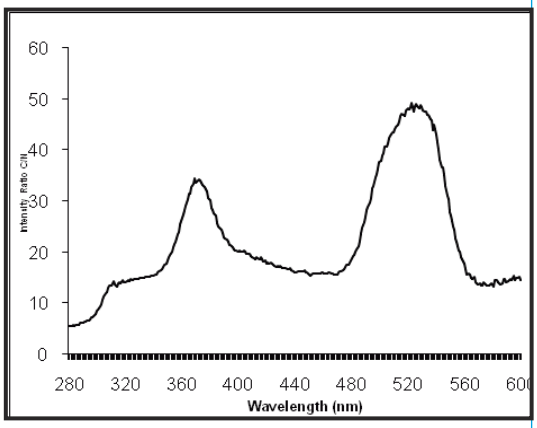

Figure (b): Intensity ratio C/N of Oral$_1$ cancer of SL spectra

Result and Discussion :

Fig.(a) shows the spectra the peak around 295 nm is due to amino acid mainly the tyrosine emission. The peak around 350 mm is due to tryptophan and structural proteins. The broadband arouns 460 nm may be due to the presence of pyrodixal phosphate, carotenes the and lipopigments, which is observed in some samples. Few samples show the fine structure in the wavelength range 450-500 nm which is due to stray xenon light reaching the exit slit of the excitation monochromator [23]. They can be

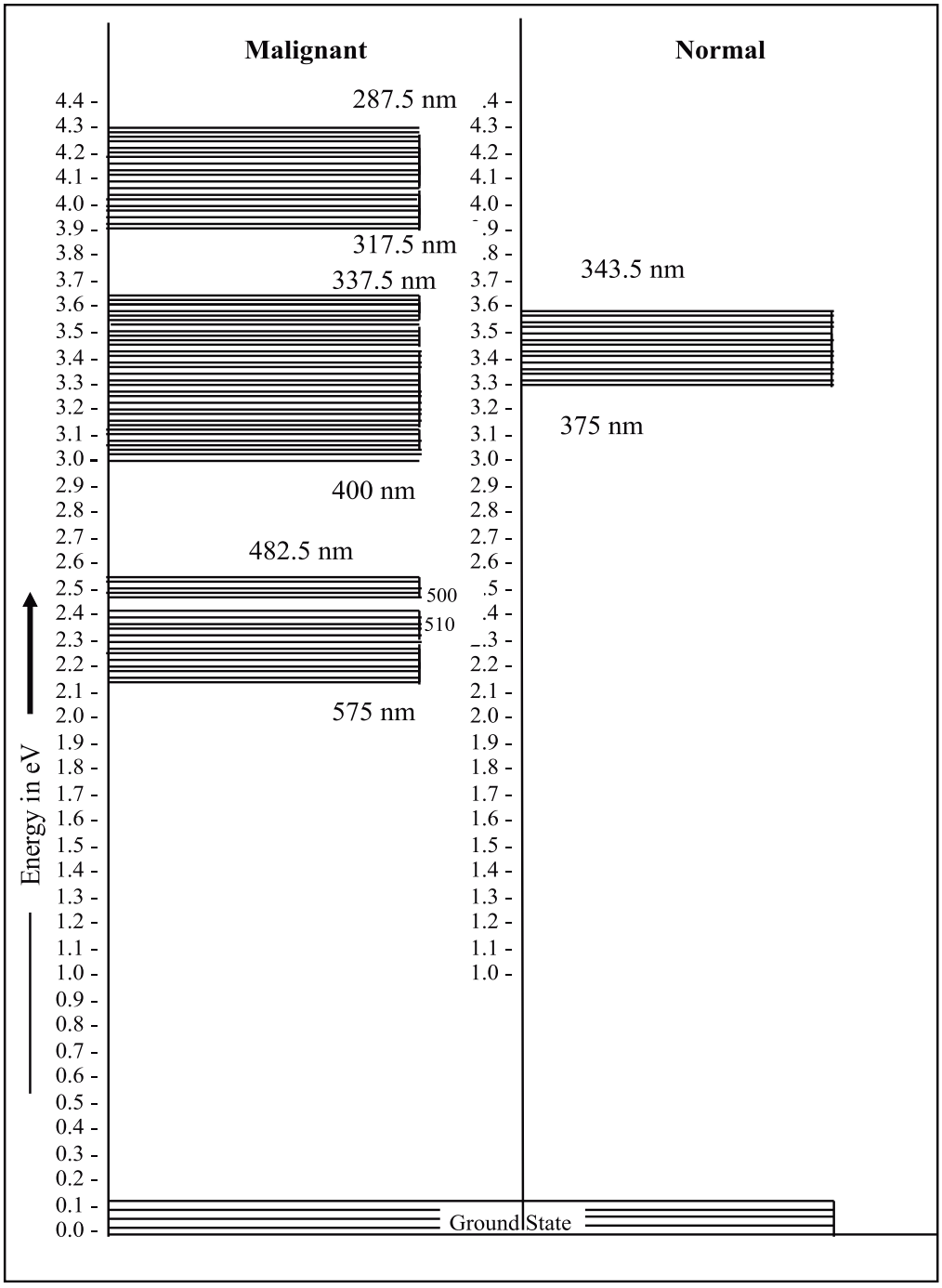

Figure (c): Energy band structure of Oral$_i$ Cancer of SL Spectra

contribution from NADH to the total intensity around 430 nm. The peak around 510 nm is due to FAD or flavin.

The peaks show the different widths and heights. By comparing the height and width of the peaks in the spectra of normal and cancerous tissues, they can be distinguished from each other. The oral cancer shows on peak for normal and five peaks for cancer tissues. Oral and exhibit four peaks for normal

Fig. (b) The observed ratio of integrated Fluorescence vice intensity of cancerous to adjoining normal tissue was 50 and at their corresponding peak wavelength 525 nm.and corresponding ratio cancerous to normal at nitrogen laser wavelength was 18 We have included the column containing the intensity ratio at nitrogen laser wavelength to study the potential of nitrogen laser as a excitation source.

Fig. c The energy band structure of oral cancer and normal tissue of SLS as shown in figure c.The Cancer tissue in different stages might show different features and we are sure that the different stages of cancer may be detected by the band structure. The energy band structure also shows that the two photons spectroscopy may be highly useful for the diagnosis of the oral cancer of human tissue.

Conclusions :

All the SL spectra show that the fluorescence intensity is more for cancerous tissues than that for the normal tissues. Form the statistical analysis of the data obtained form the SL spectra it is observed that SLS technique give better classification accuracy than that of conventional laser induced spectroscopy.

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References :

1) Alexey s Ladokhin `` Fluorescence spectroscopy in peptide & protein analysis, Encylopedia of anal. Chem. R.A. Meyers (Ed) PP.5762-5779 (2000)
2) Yang Y, Celmar E.J. Szczepaniak M.Z. & Alffano R.R. `` Excitation spectrum of malignant and benign breast tissues. A potential optical biopsy approach`` `` Laser in life science 7, PP 249-265 (1997)
3) Kindade K. `` Laser focus world`` PP. 71-91 (1996)
4) P.K.Gupta and S.K. Mujumdar ,`` laser in surgery & medicine `` Vol.21, PP.411-422 (1997)
5) S.K. Mujumdar et.al ,`` Laser in life sciences 9, PP.143-152 (2000) T.K. Anisha , R. Pravitha I.S. Smitha and R.S. Jayasree, `` Characterization of human breast and oral tissue by S.L.S., proc. Of N.L.S.PP.605-606 (2003)