

2010 Master Thesis

Development of *in situ* analytical technique of lipid composition based on Raman spectroscopy

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Evidence to connect dietary factor and incidence of cancer is conflicting. However, several epidemiologic studies suggest that consumption of dietary fat have a correlation with incidence of several kinds of cancer. In the previous reports, authors generally use Gas Chromatography (GC) and Liquid Chromatography (LC) to analyze the lipid composition. Since these methods require extraction and modification of lipids, it is necessary to use relatively large size of adipose tissues. At the recent study, Raman spectroscopy in the real time *in vivo* diagnosis has successfully applied in colorectal cancer mouse. Raman spectroscopy combined with endoscope and BHRP can be used to monitor the lipid changes inside colorectal cancer mouse model and control mouse. The results suggest that there were site dependency and age dependency in *in vivo/ex vivo* measurement of adipose tissue. These results also demonstrate the ability of Raman system for providing rapid, *non invasive* and *non destructive* analysis of adipose tissue *in vivo* and *ex vivo*. These techniques make lipid monitoring in other diseases possible. The standardized intensity of Raman spectra of seven kinds fatty acids have successfully obtained. These standardized spectra were used to analyze adipose tissue in colorectal cancer mouse model and control mice. However, there were some error in the program, thus the adipose tissue could not be apportioned. Future plan for this research is to look for a new program to make the mixture analysis. The present result will be applied to estimate increase and decrease of each fatty acid. These results will contribute to unveil the mechanism of the dietary habit-cancer relation.