

Photon Migration in the Skin for Optical Measurement of Blood Glucose Level

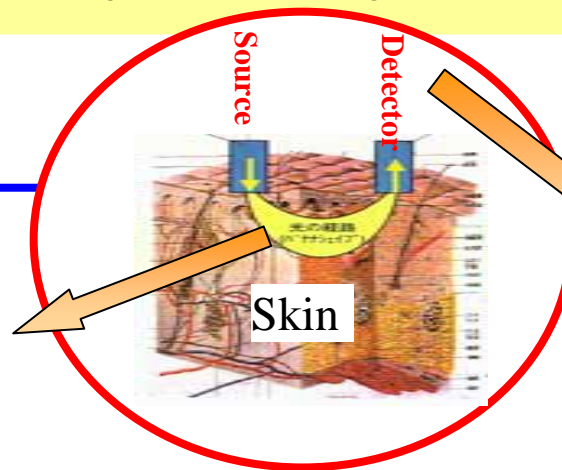
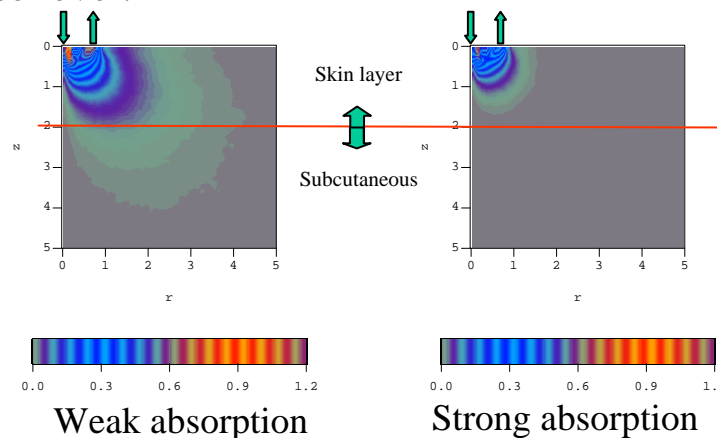
Near infrared light, the wavelength of which is a little bit longer than red light, can penetrate into biological tissue deeper than light in the other wavelength ranges and can be applied to various biomedical measurements. It is known that the change in the reflection spectra from skin tissue is related to the change in the blood glucose level, and many people have tried to measure the blood glucose level by optical methods. However, no one has succeeded in optical measurement of blood glucose level with clinical acceptable accuracy and stability mainly due to difficulty to understand the photon migration in biological tissues which strongly scatter light.

Our approach:

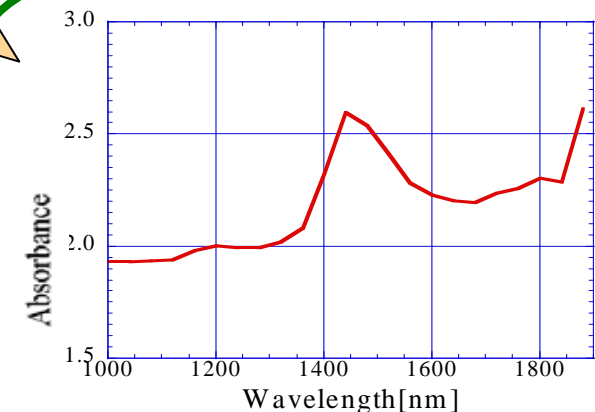
Study of photon migration in the skin

Photon migration in the skin is simulated computationally to estimate the light path and the causes of errors in the prediction of blood glucose level toward the optical measurement of blood glucose level.

The figures demonstrate the simulation results to show the difference in the light path between the cases with strong (right) and weak (left) absorption of near infrared light.



Process of optical measurement of blood glucose level



The shape of the absorption spectrum varies with the variation of blood glucose level. Statistical process such as multivariate analysis will be applied to the measured data to predict the blood glucose level.