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TO THE NON-INVASIVE OPTICAL CONTROL OF GLUCOUSE LEVEL

Student (magister) Kuprii A. I.
National Technical University of Ukraine
«Igor Sikorsky Kyiv Polytechnic Institute»

Diabetes problem is very acute in modern society, and therefore there is a need for a device to control of glucose level. Most of mass devices are using the invasive diagnostic principle. However, to preserve the organism integrity is possible and necessary to create devices, which functioning is based on non-invasive determining of sugar concentration in blood.

The most used optical methods in non-invasive diagnosis of blood glucose are: near infrared spectroscopy (NIRS), mid-infrared spectroscopy (Mid-IRS), Raman spectroscopy, photoacoustic spectroscopy (PA), polarization changes, optical coherence tomography (OCT), photonic crystal and fluorescence technology. In this diversity the most approach to the certified device are Raman and near infrared spectroscopy.

The basis of Raman spectroscopy (combination scattering light) is the inelastic scattering of optical radiation on the molecules of biological media... This method requires the use of constructive elements such as [1]: a bandpass filter that passes the desired waveband for research, as well as a band-stop filter that extracts the desired wavelength at which is possible to reveal the presence of glucose in the blood.

The most difficult to study and use in biophotonics are the near infrared spectrum. In this diapason, the passbands intensity of light penetration in tissue decreases as compared with the mid-infrared spectroscopy. Application of these methods for non-invasive diagnostic of blood glucose could increase the accuracy of result.

Based on methods discussed above, particularly on Raman spectroscopy, worked out technical solution of device for determining the concentration of blood glucose using the principles of photometry by ellipsoidal reflectors [2]. According to the developers, such combination of biophotonic methods will qualitatively improve the diabetes diagnostic procedure.

References

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