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LIGHT SCATTERING OF HUMAN CEREBELLUM AT ELLIPSOIDAL PHOTOMETRY

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The use of laser technology for diagnosing a human brain requires an understanding of the effects of light scattered by its tissues. In this paper, based on the *in vitro* optical properties of the human cerebellum [1] for different wavelengths (405 nm, 532 nm and 650 nm.) done the Monte Carlo simulation of light propagation in tissue for photometer with ellipsoidal reflectors [2].

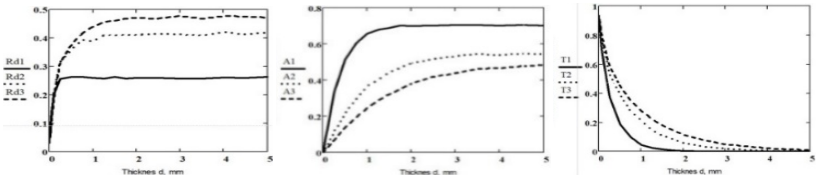

Figure 1. Optical coefficients of diffuse reflection *Rd* (*a*), total transmission *T* (*b*) and absorption *A* (*c*) for the human cerebellum

From the graphs in Fig. 1 we can conclude that diffuse reflection (*Rd*) for a wavelength of 405 nm, is rapidly increasing to d=0,25cm. For 532 nm, *Rd* its value increases to d=1 cm, and for 650 nm – to about d=1.5 cm. A further increase the sample thickness does not affect the character of the change in diffuse reflection coefficient. The coefficients *T* and *A* (Fig. 1b-1c) show the typical dynamics of changes for photometry by ellipsoidal reflectors [2]. Optical properties obtained as a result of simulation, may be useful when used *in vivo* [1]. In particular, they can be used for the quantitative assessment of the relationship between changes in blood circulation in the brain and the main activity of neurons, as pathological circulation and oxygenation of various parts of the brain can be the cause of neurological diseases, such as Alzheimer's disease, multiple sclerosis, epilepsy and stroke. Therefore, the development of diagnostic methods and tools based on [2, 3] will allow the identification of cognitive and perceptual responses and development changes.

References

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