
BY SPECTROPHOTOMETRY METHOD TO IDENTIFY NEOPLASIA

A.D. Lesnichaya

lesnichaya.anastasiya@mail.ru

V.G. Orlova

ovg.10@mail.ru

Bauman Moscow State Technical University, Moscow, Russian Federation

The research done shows that wide functional possibilities of spectrophotometry method are not used in medical diagnostics invivo and insitu in full measure. To describe backscatter radiation, we analyzed morphological features of cells and tissues and selected a suitable simplified mathematical solution to the problem of scattering on the basis of refractive index, shape and size of cells and their organelles. Moreover, we examined the sensitivity of formulas to each parameter. Finally, we defined the function from the anatomical characteristics of tissue structure at the cellular level to transport scattering coefficient.

Keywords

Spectrophotometry, transport scattering coefficient, optical properties of biological tissues, neoplasia

© Bauman Moscow State Technical University, 2017

References

- [1] World health organization. Available at: <http://www.who.int/> (accessed 10.10.2017).
- [2] Tuchin V.V., ed. Handbook of optical biomedical diagnostics. SPIE, 2002, 1110 p. (Russ. ed.: Opticheskaya biomeditsinskaya diagnostika. V 2 t. Moscow, Fizmatlit publ., 2007.)
- [3] Strukov A.I., Serov V.V. Patologicheskaya anatomiya [Pathoanatomy]. Moscow, GEOTAR-Media publ., 2015, 875 p.
- [4] Gurr M.I., Jung R.T., Robinson M.P., James W.P.T. Adipose tissue cellularity in man: the relationship between fat cell size and number, the mass and distribution of body fat and the history of weight gain and loss. *Int. J. Obesity*, 1982, vol. 6, no. 5, pp. 419–436.
- [5] Tuchin V.V. Lazery i volokonnaya optika v biomeditsinskikh issledovaniyakh [Lasers and fiber-optics in biomedical research]. Saratov, Saratov university publ., 1998, 384 p.
- [6] Bashkatov A.N., Genina E.A., Kochubey V.I., Tuchin V.V. Optical properties of the subcutaneous adipose tissue in the spectral range 400–2500 nm. *Optika i spektroskopiya*, 2005, vol. 99, no. 5, pp. 868–874. (Eng. version: *Optics and Spectroscopy*, 2005, vol. 99, no. 5, pp. 836–842.)
- [7] Beck G., Akgun N., Ruck A., Stainer R. Design and characterization of a tissue phantom system for optical diagnosis. *Lasers Med. Sci.*, 1998, vol. 13, no. 3, pp. 160–171.
- [8] van Gemert M.J.C., Jacques S.L., Sterenborg H.J.C.M., Star W.M. Skin optics. *IEEE Trans. Biomed. Eng.*, 1989, vol. 36, no. 12, pp. 1146–1154.
- [9] Fawcett D.W. A Textbook of histology. New York, Charman&Hall, 1994, 964 p.

Lesnichaya A.D. — student, Department of Medical and Technical Information Technologies, Bauman Moscow State Technical University, Moscow, Russian Federation.

Orlova V.G. — student, Department of Medical and Technical Information Technologies, Bauman Moscow State Technical University, Moscow, Russian Federation.

Scientific advisor — L.P. Safonova, Cand. Sc. (Eng.), Assoc. Professor, Department of Medical and Technical Information Technologies, Bauman Moscow State Technical University, Moscow, Russian Federation.
