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NONINVASIVE CONTROL OF DISTRIBUTION OF RHODAMINE-LOADED CAPSULES IN VIVO

Olga Stelmashchuk, Orel State University named after I.S. Turgenev, Orel, Russia

Evgenia Seryogina, Orel State University named after I.S. Turgenev, Orel, Russia

**Yana Tarakanchikova, Saratov State University, Saratov, Russia, University of Oulu,
Oulu, Finland**

**Gennadii Piavchenko, Orel State University named after I.S. Turgenev, Orel, Russia, Head
of the Laboratory of the Functional Methods of Research, Center of Preclinical Research,
J.-s.c. Retinoids**

**Evgeny Zherebtsov, Aston Institute of Photonic Technologies, Aston University, Aston
Triangle, Birmingham, UK, B4 7ET**

Andrey Dunaev, Orel State University named after I.S. Turgenev, Orel, Russia

Alexey Popov, University of Oulu, Oulu, Finland,

**Igor Meglinski, University of Oulu, Oulu, Finland, Orel State University named after I.S.
Turgenev, Orel, Russia**

ABSTRACT

Optical methods, in particular, fluorescent spectroscopy, are promising tools for diagnostics in the modern medical practice. In this study, processes occurring in a living organism using optical methods of diagnostics were assessed. Using a fluorescence spectroscopy method the distribution and dynamics of the circulation of the fluorescent labelled polymer particles in the blood circulatory system of rats were assessed. As a result of the study, it was concluded that fluorescence spectroscopy can be used for transdermal measurements of the rhodamine-loaded capsules in vivo.

The aims of the study were to find informative points (areas) on the rat skin for transcutaneous fluorescence measurements and to investigate the efficiency of propagation of the fluorescent-labelled (Rhodamine TRITC) nanocapsules injected in the circulatory system.

In the study twelve 100-120 g, Wistar rats were divided into two groups: treated with rhodamine-loaded capsules, injected directly into the bloodstream, (n = 6) and control (n = 6). Fluorescence spectra were recorded from thighs of anaesthetized rats during 90 min with 10 min intervals. The animals were held in quarantine for 2 weeks with temperature, humidity, bacterial contamination and day-night cycle control conditions. During the experiment, the rats were anaesthetized with Zoletil 100 (Virbac, France) in standard doses. Preliminary series of the measurements of the repeatability of the skin fluorescence intensity was conducted in control group. Final points of measurements were selected on the right thigh and at the base of the tail.

The obtained fluorescence spectra show a statistically significant increase in the fluorescence intensity in a group of rats that received nanocapsules with rhodamine. In this group, a marked increase (210% of the baseline level) in the average peak fluorescence intensity from 42 ± 5 to

87±7 a.u. was registered. The results can be used in the field of drug control and in the process of high-throughput screening during drug testing.

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