

## Photodynamic lipolysis with indocyanine green

Alexandra M. Kozina; Irina Yu. Yanina; Yulia I. Svenskaya; Elina A. Genina;  
Sergey A. Portnov; Alexey N. Bashkatov; Dmitry A. Gorin; Valery V. Tuchin

Saratov State University, Russia

The problem of the overweight is worldwide. Hypodermic fat depot not only bring about psychologic problems but present a real risk for human health. Today the most popular method of destruction fat depots is lipoplasty. Besides the traditional suction-assisted lipoplasty, other options include ultrasound-assisted and external ultrasound – assisted liposuction, power – assisted liposuction, and laser lipolysis. It is necessary the development of novel optical technologies of photodynamic and photothermal therapy.

The goal of our work is development of photodynamic method using capsular Indocyanine Green.

### Methods and Materials:

Indocyanine green (ICG) (Fig. 1.), a tricyanocyanine dye with a strong absorption band between 600 and 900 nm, has been used in medicine since 1956 and exhibits some characteristics of an ideal photosensitizer. In our experiment we used capsular ICG. Shells are spheres with radius 4-5  $\mu\text{m}$ . The encystations process is presented here (Fig. 2.):

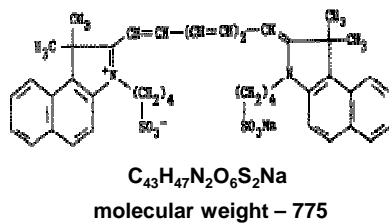


Fig. 1.

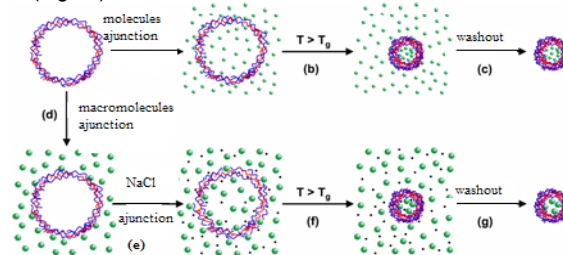


Fig. 2.

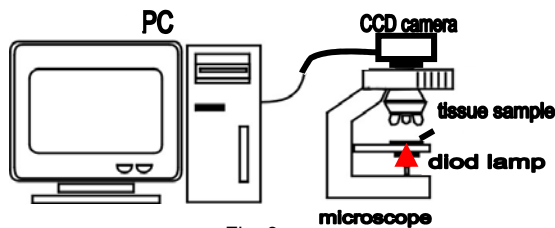


Fig. 3.

### Experimental setup (Fig. 3.) and methodology:

- Human fat tissue (post-surgical material) was used. After refrigeration thin tissue were cut (thickness about 100  $\mu\text{m}$ ). The sample was set up on micrometer stage.
- Some drops of solution with dye encystes were applied topically. Then the tissue was being irradiated during 1 minutes by diode laser OPC-B015-MMM-FCTS (Opto Power Corp., USA) (irradiation power is 1.5 W, wavelength is 805 nm).
- The sample was being observed during 2 – 3 hours, with certain temperature maintenance. Photos were taken every 5 minutes.

### Results:

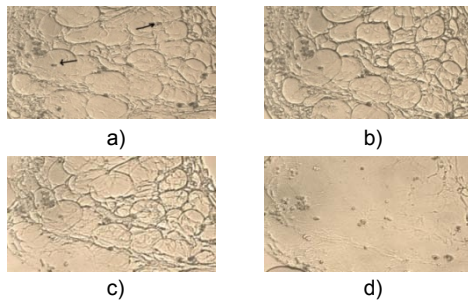
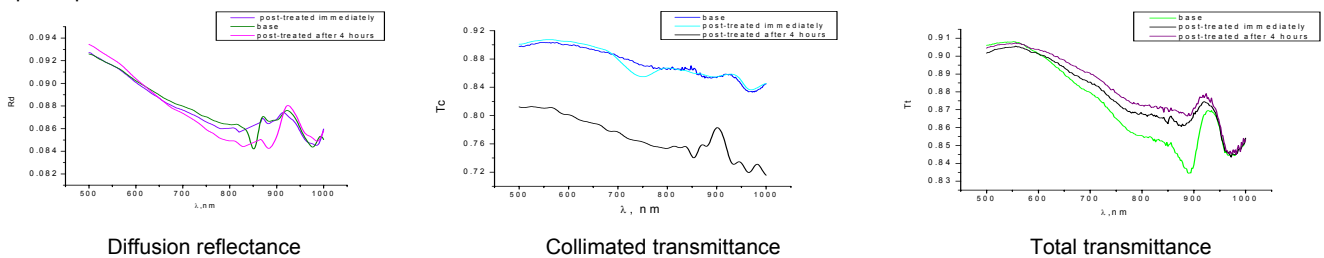


Fig. 4. Fat tissue state before and after dyeing and irradiation:

- Photo of fat tissue immediately after irradiation
- Photo in 45 minutes after irradiation
- Photo in 2 hours after irradiation
- Photo in 2 hours 45 minutes after irradiation

Spectrophotometric measurements of collimated and total transmittance and diffusion reflectance of ICG shells in water.



### Conclusion:

Light irradiation of stained fat tissue leads to damage of fat cells by means of apoptosis mechanism. Low intensity irradiation of stained cells leads to damage of their membranes and ICG leaks away in intercellular area. So it is possible to actualize lipolysis process

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