

Development of new fullerene containing compounds for biomedical applications and their testing *in vitro* and *in vivo*

S.V. Kozyrev**, E.J. Melenevskaja*, V.G. Platonov, P.A. Pogorelyj, A.V. Slita, P.P. Yakutseni**, V.V. Zarubaev, and V.N. Zgonnik*

*Influenza Research Institute, Russian Academy of Medical Sciences,
St. Petersburg, Russia*

**Institute of Macromolecular Compounds, Russian Academy of Sciences,
St. Petersburg, Russia*

***Center for Advanced Studies of the St. Petersburg Polytechnical University,
St. Petersburg, Russia*

Results on fullerene C₆₀ modifications are presented that were made by means of polyvinylpyrrolidone (PVP), tetraphenylporphyrin (TPP), non-saturated carbon acids, natural plant oils in Diels-Alder reaction of fullerene solution in the specific environments by the certain technique. The received compounds were non-toxic and are absolutely tolerant in relation to biological systems. On their basis the technique of obtaining the micellar forms for application *in vitro* and *in vivo* was developed.

The quantitative estimation of biological activity of C₆₀ containing complexes was carried out. For testing, following water-soluble complexes were chosen: C₆₀+PVP(12 kD); C₆₀+PVP(12 kD) +KBr; C₆₀+PVP(12 kD)+TPP; C₆₀+PVP(8 kD).

Following cell lines were used: Hep-2 – human epithelial carcinoma; human rhabdomyosarcoma; MA-104 – normal monkey kidney cells; T-98 – human glioblastoma; M - 22 – normal human fibroblasts;

Preparations of complexes were added to cell monolayer in confluent stage. Morphological changes of monolayers were observed for four days by light microscopy and fluorescent microscopy.

Tests of water-soluble triple fullerene complexes on model of a lethal influenza infection on laboratory animal (mice) were carried out. For testing preparations were used: PVP+C₆₀+KBr; PVP+C₆₀+TPP; C₆₀+natural plant oils.

The received results give the basis to suppose that action of the investigated preparations is comparable to action of remantadin widely used in Russia for treatment and prevention of influenza.