

Transfer profile

C_{60} fullerene-doxorubicin nanocomplex for combinative cancer photodynamic chemotherapy

Reference No.: 15803

Background

Conventional cancer chemotherapy is limited due to its side effects on normal cells and resistance in cancer cells. We have developed a nanosized drug complex to improve the efficiency of chemotherapy complementing it with photodynamic approach. The photodynamic therapy exploits non-toxic photosensitizer and visible light, which in the presence of oxygen gain a pronounced toxicity. We use a non-covalent complex of a frontline anticancer drug doxorubicin (Dox) with carbon nanostructure C_{60} fullerene, exploiting the latter as a drug carrier and a photosensitizer.

Technology

C_{60} fullerene exhibits a negligible toxicity against normal cells. The method of C_{60} fullerene-doxorubicin complex synthesis is established in water as well as in physiological solution. C_{60} -Dox complex is characterised with a number of physico-chemical techniques. A portable adjustable light source system is constructed based on high power single chip light emitting diode (LED). The facilitated intracellular accumulation of fullerene-bound Dox highlights extensive C_{60} nanocarrier function. The cancer cells extensively die via compact apoptosis after treatment with C_{60} -Dox complex and LED light irradiation. The C_{60} fullerene-based delivery system is shown to have a potential for the synergistic combination of photodynamic and chemotherapies for the treatment of cancer.

Advantages

- ✓ Easy, cost-effective and fast way of synthesis
- ✓ Proven high stability
- ✓ Synergetic combination of photodynamic and chemotherapies against cancer cells

Applications

Photodynamic cancer chemotherapy

Partnership

R&D cooperation with academia (animal model) and industry is requested

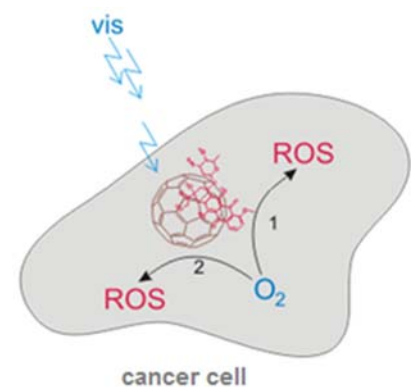


Figure 1: Effects of C_{60} -Dox complex (1 - Doxorubicin action, 2 - C_{60} action)

Keywords

Photodynamic chemotherapy, C_{60} fullerene, doxorubicin, nanocomplex, drug delivery

State of Development

Proof of principle in vitro

IP Status

N/A

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