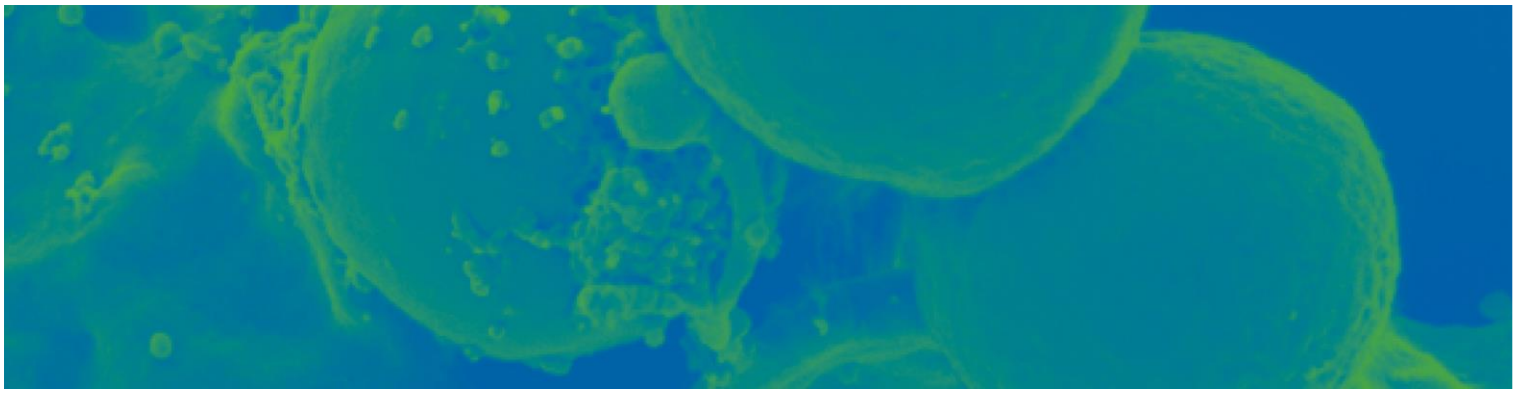

Innovative Hochschule

Eine gemeinsame Initiative von Bund und Ländern

TRANSFER PROFILE

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

Life Sciences

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

STATUS

Proof of principle *in vitro*

Scientifically published:
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