Researchers at the University of South Florida have synthesized targeted anti-cancer supramolecules that are complexes of cyclodextrin vectors with functionalized estrogens and doxorubicin prodrug. This invention is applicable to the formation of a targeted drug delivery system construction based on cyclodextrin for breast cancer treatment.

Cancer remains one of the most devastating diseases worldwide. The American Cancer Society has reported that it remains the second leading cause of death, accounting for 5.8 million deaths in 2013. Cancer therapies have advanced considerably during the last few decades. However, they are also still hampered by nonspecific delivery of anti-tumor agents to normal cells, resulting in horrendous side effects for patients. This lack of specificity also results in lower efficacy of treatments due to the need for a method of drug delivery directed solely to cancer cells. Targeted therapies that can deliver drugs selectively to the cancer cells without systemic toxicity are well known to improve survival rate and the quality of life for cancer patients.

Our inventors have devised a novel inclusion complex that contains a targeted carrier non-covalently associated with an active agent. The targeted carrier consists of an inclusion host, cyclodextrin, that is conjugated to the targeting moiety estrogen or progesterone and associated with the anti-cancer drug doxorubicin. Altogether, this formulation can be used as an effective drug delivery system that has higher targeting efficiency. This drug, in particular, can specifically target estrogen receptor positive breast cancer cells. The therapeutic benefits of this invention include reduced drug toxicity and improved drug uptake.

**ADVANTAGES:**

- Higher targeting efficiency and better drug affinity
- Specific targeting to estrogen receptor positive breast cancer
- Enhances therapeutic effect and reduces drug toxicity

**Improved Anti-Cancer Therapeutic**

The chemical structure of CDE1-Ada-DOX drug complex

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