



# University of Central Florida

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## Target Cancer Cells with Coated Nanoceria

### Introduction

UCF researchers have created a new weapon in the fight against cancer by coating nanoparticles of cerium oxide, nanoceria, with polymers to affect the localization of nanoceria within cells and modulate its toxicity based on pH, to fight cancer cells while protecting normal cells.

Even in the presence of oxygen, many cancers preferentially obtain their energy by converting glucose into lactic acid, by glycolysis. This leads to a pH difference between cancer cells and normal cells, determining which cells within a patient's body will be attacked by the cancer treatment because cerium oxide exhibits optimal antioxidant (beneficial) properties at physiological pH, but oxidant (toxic) properties at acidic pH. While prominent cancer treatments like radiation and chemotherapy attack cell types indiscriminately, the selective cytotoxicity of nanoceria means a patient can benefit from greater overall health during cancer treatment.

### Technical Details

These engineered nanoparticles consist of nanoceria coated with a polymer—namely, but not limited to, polyacrylic acid (PNC), aminated polyacrylic acid (ANC), or dextran (DNC)—that endows the nanoceria with a negative, positive, or neutral surface charge, respectively. Nanoparticles can also include an encapsulated dye, such as DiI, to be used for intracellular tracking as the surface charge or charges on polymer-coated nanoceria determine the cellular internalization and subcellular localization among normal cells and malignant cells. When in an acidic environment, the engineered nanoceria particles exhibit cytotoxicity, selectively harming malignant cells with a higher pH than normal cells.

### UCF Inventors

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### Benefits

- Selective cytotoxicity

### Applications

- Cancer treatment
- Specific cell lines used in testing for this technology include:
  - Lung carcinoma cells (A549)
  - Breast carcinoma cells (MCF-7)

### Tech Fields

Cancer, Nanotechnology

### Keywords

cancer, pH, cerium oxide, nanoceria, breast cancer, lung cancer

**If you or your company are interested in this opportunity, Contact:**

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