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Smart nanoparticles for targeting cancer cells

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Smart nanoparticles have recently been of great interest to researchers due to their potential use in different fields. These materials have the ability to instantly and reversibly change their physicochemical properties in response to environmental changes according to the previously designed trigger. This can be used in different applications including drug delivery. Another advantage of smart materials is their flexibility where they can be easily attached to different functional groups which help design particles with different properties, triggers and functions. Our work aims at using smart nanoparticles to specifically target cancer cells and deliver chemotherapeutic drugs. This would help in killing cancer cells while avoiding healthy ones, thus avoid side effects such as hair loss and destroying healthy organs. A p(NIPAM) based particle was designed, synthesized, characterized and used for targeting cancer cells. The synthesized particles were introduced to a co-culture media of both cancer and normal healthy cells, flow cytometry results show that the particles targeted only cancer cells in the initial hours. The localization of the nanoparticles in healthy cells was found to be a second stage after cancer ones were targeted. *In vitro* MTT toxicity studies suggest the bioavailability of the novel particles.

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