
Molecular beacon specific for survivin mRNA as potential theranostic agents

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Abstract

Molecular beacon specific for survivin mRNA are proposed as potential theranostic agents capable to combining the sensing of specific mRNA with the silencing activity. The molecular beacon makes use of ATTO 647N and BBQ650 as fluorophore/quencher pair, covalently bound to its distal ends. Its internalization was achieved using polymethylmethacrylate core-shell nanoparticles (PMMA-NPs) as cargo structures capable of delivering the oligonucleotidic sequence through the cellular membrane uptake inside the cell. The PMMA-NP are also doped with fluorescein so that it is possible to perform differential localization of the NPs and of the molecular beacons. After a deep characterization Tests performed in human lung A549 cancer cells evidenced the capability of the molecular beacon to binding the specific mRNAs inside the cell. At the same time the therapeutic effect of the molecular beacon was proved by verifying in cell culture that its use was accompanied with a reduction of survivin mRNA and protein, proving its silencing action.

Keywords: Molecular beacon, nanoparticles, surviving, theranostics

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