

# Hydrogel Nanomaterials for Cancer Diagnosis and Therapy

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## Introduction

Cancer remains a major burden for our modern society. Despite the tremendous advances made in the understanding and fighting against different cancers, the deaths caused by them continue to grow significantly each year: it is estimated that, worldwide, this number will reach 13 million per year within the next two decades (WHO 2014). Conventional therapies based on specific ligand-receptor interactions are compromised by the great complexity of cancer cells and their resistance to current therapeutic drug regimens (Zhou and Xu 2015). Thus, new paradigms are urgently needed to change this devastating pattern. In the last few years, self-assembly of small molecules has emerged as a powerful tool to develop novel selective and functional nanomaterials that enhance our understanding about disease specific pathways and, thus, aid both cancer treatment and diagnosis. The main rationales for using such systems is their ability to operate in the cellular environment; the unique properties that these systems have upon organization in ordered nanostructures; and their intrinsic dynamic nature related to their rapid responsiveness to physiological signals (e.g., pH, enzymatic activity, etc.)

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