

DNA-based nanodevices for diagnostic and drug-delivery applications

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DNA nanotechnology uses synthetic DNA (or nucleic acids) as a versatile material to rationally engineer tools and molecular devices that can find a multitude of different applications (e.g., in-vivo and in-vitro diagnostics, drug delivery, genetic circuits etc.).

During this presentation I will introduce the field of DNA nanotechnology and I will show how to exploit the “designability” of DNA to fabricate nature-inspired DNA-based nanoswitches and nanodevices that are specifically designed to undergo a conformational change (switch) upon binding to a specific input (i.e. target). This input-triggered conformational change can be used for diagnostic, drug-delivery or synthetic-biology applications.

I will demonstrate how to characterize and recreate in-vitro several mechanisms to control the response of DNA-based nanodevices and how to regulate their activity with different chemical and environmental stimuli including pH, antibodies, enzymes, small molecules and redox inputs.