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DNA-BASED RECEPTORS CONTROLLED BY REDOX INPUTS

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Synthetic DNA is an extremely versatile and programmable building block often employed to engineer nanoscale supramolecular devices with potential applications in the field of diagnostic and drug-delivery. Despite the wide range of inputs used to control DNA-based reactions and nanomachines (pH, small molecules, enzymes, antibodies or metal ions) the possible use of redox inputs has seen very limited efforts. This appears surprising considering the importance of redox regulation inside the cell. Redox regulation is in fact one of the most important and plays an essential role, not only in cell survival, but also in cellular signalling systems. Motivated by the above arguments, we propose here a new strategy to rationally modulate the activity of DNA-based nanodevices through redox inputs. We demonstrate the possibility to control the loading and release of a molecular cargo using redox inputs in a reversible and transient way and we also demonstrate the capability to modulate this kind of control. The possibility to use redox inputs will expand the available toolbox of molecular stimuli and could open the door to many applications including redox-triggered nanostructures assembly.