Progress in using magnetic nanoobjects for biomedical diagnostics

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Abstract: A magnetic biochip using the combination of both magnetic nanoobjects as markers and magnetoresistive sensors has proven to be competitive to standard fluorescent DNA-detection at low concentrations. Magnetic nanoobjects additionally provide the unique possibility to actively manipulate biomolecules, on-chip, which paves the way to an integrated 'magnetic lab-on-a-chip' containing detection and manipulation. It is shown that the hybridization process can be accelerated on a biochip. Looking forward, a paradigm change from the 'magnetic lab-on-a-chip' to a 'magnetic lab-on-a-bead' is discussed as a future device solution. The ferromagnetic nanoobjects themselves are thereby directly used both as molecular recognition site and as detection unit.

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