Sensing enhanced by DNA nanotech

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In recent years, DNA nanotechnology has matured to enable robust production of complex nanostructures and hybrid materials. We have combined DNA nanotechnology with sensitive optical detection to create functional single-molecule devices that enable new applications in single-molecule biosensing and superresolution microscopy. Starting with superresolution nanorulers and brightness reference samples we determined the resolving power of superresolution microscopes and evaluated the sensitivity of smartphone cameras[1-3]. To improve the sensitivity, we created DNA origami optical antennas for metal enhanced fluorescence[4]. The unique ability of our DNA origami nanoantennas to place molecular assays specifically in the plasmonic hotspot is used for detecting Zika-virus and antibiotic resistance related nucleic acids[5, 6]. Furthermore, DNA origamis are used in biophysical assays to work at locally increased concentrations[7], to apply forces as well as to sense further physical parameters[8].

References

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