

Can you detect single molecules with your smartphone?

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State of the art smartphones are equipped with low-cost but well performing camera sensors. This enables smartphone based point-of-care devices for testing food-allergen, blood analysis, as well as detecting single-particles, cells, bacteria and biomarkers including proteins and nucleic acids. [1]

Compared to laboratory-grade fluorescence microscopes which can routinely detect single-molecules, the detection sensitivity of smartphone based fluorescence microscopes is limited. So far, the limit of detection of smartphone based microscopes has not been comprehensively characterized.

Here we present how DNA origami nanobeads labeled with a defined number of dye-molecules can be used to quantify the sensitivity of a smartphone-based fluorescence microscope.[2] Our results show that samples containing up to 10 dyes can be already detected with state of the art smartphones.

References

- [1] Ozcan, A. in Lab. Chip 14 3187-3194 (2014)
[2] Vietz, C. et al. in ACS Omega 4 (1) 637-642 (2019)