Quantitative Molecular Sensors and Imaging Techniques for Diagnostic Detection of Infectious Diseases

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Bio-imaging Showcase
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0.2 μm

National Institute of Standards and Technology

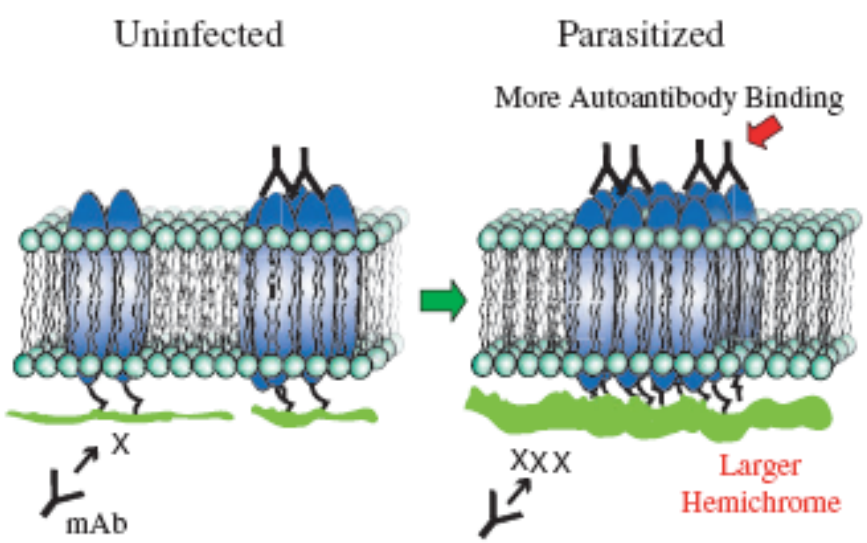
NIST

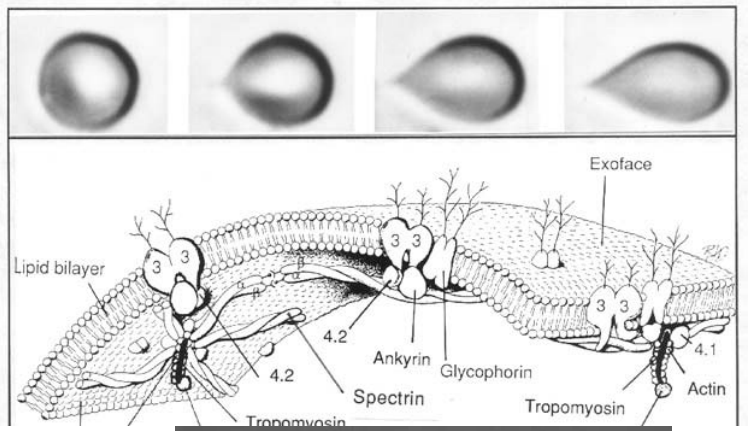
...working with industry to foster innovation, trade, security and jobs

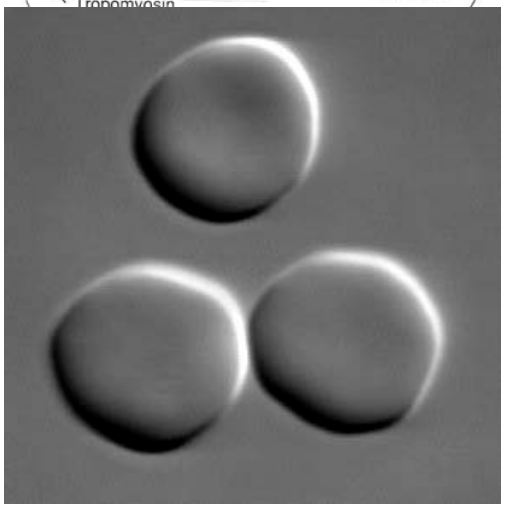
I. Malaria infected human red blood cells

Fuyuki Tokumasu (NIAID)

J. Cell Science (2005)





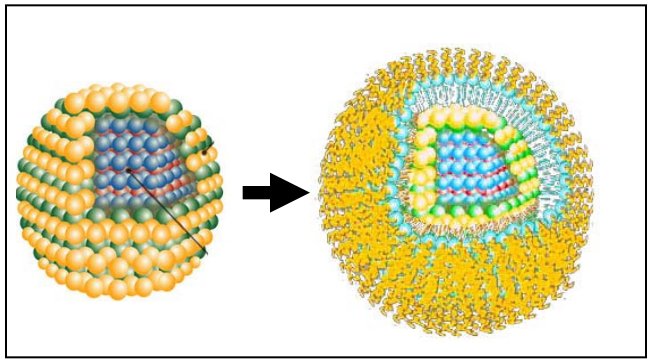


James A. Dvorak (NIAID)

Goals: quantitative imaging of the following aspects of malaria infection in human red blood cells:

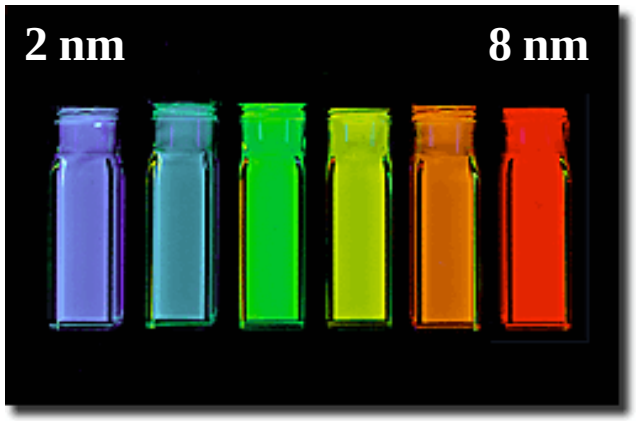
- Change in membrane protein components
- Hi-*f* component of thermal vibration of RBC
- Clustering of Band3 proteins

Bio-conjugated quantum dot (QD)

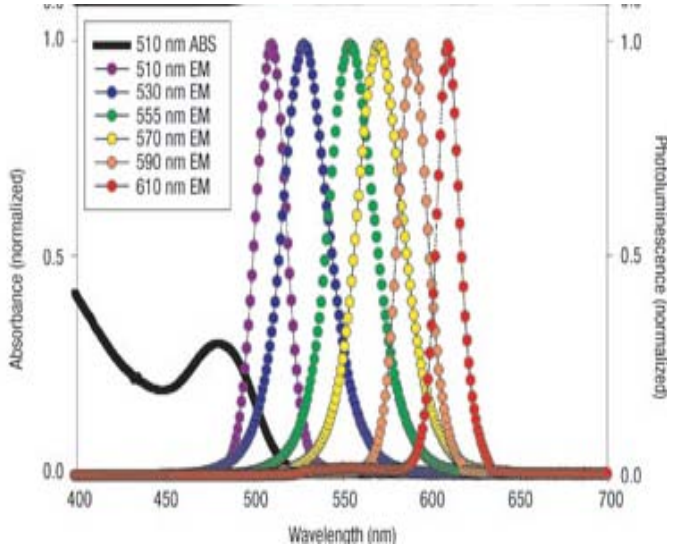


CdSe/ ZnS Functional Coating

- Attractive fluorophores for bio-imaging due to its broad absorption and narrow symmetric emission spectra
- Higher quantum yield and more photostable than conventional organic dye
- Size and composition dependent tunable absorption and emission pattern
- Bio-functional Coating

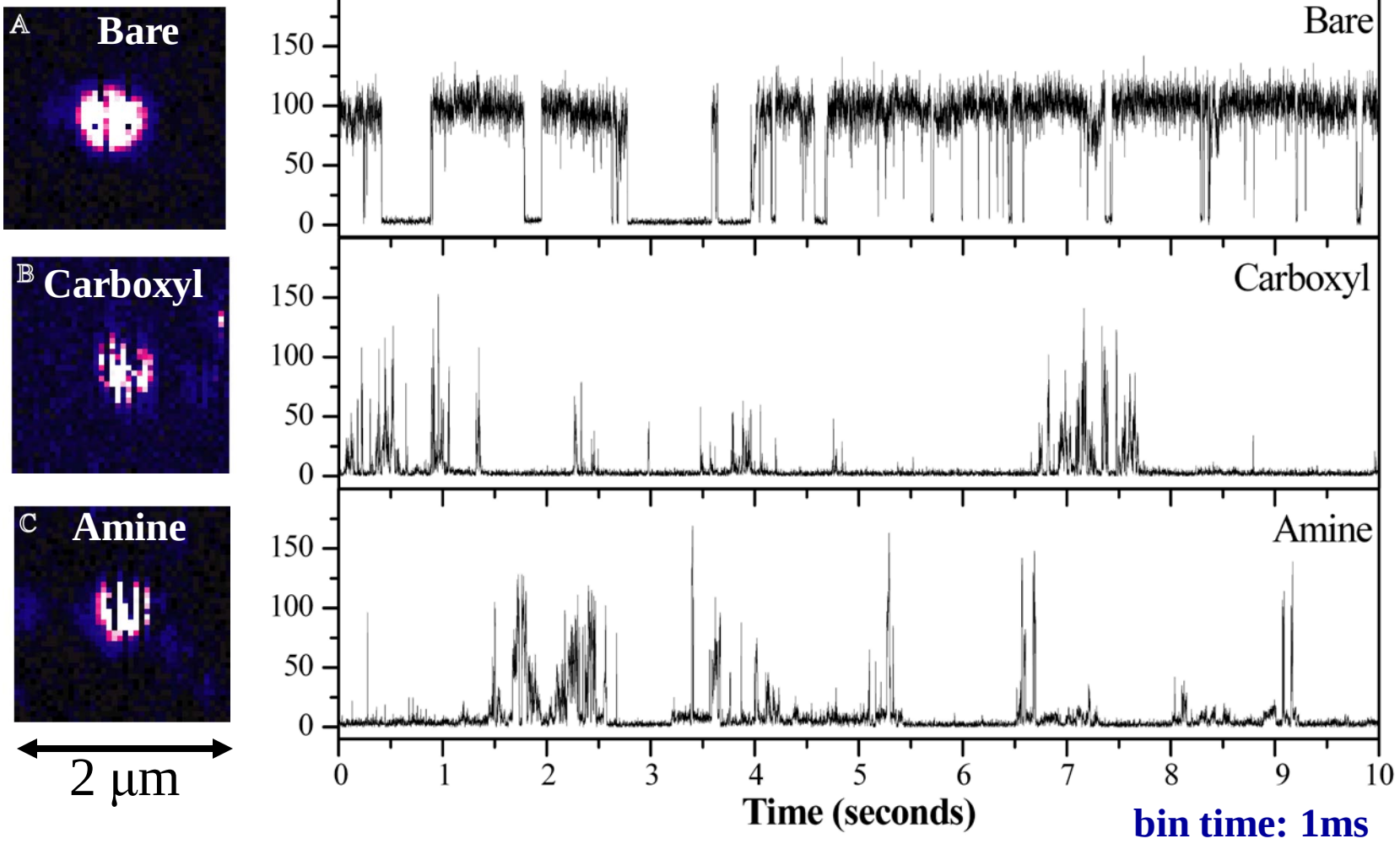


A family of Qdot particles can be made to emit a full spectrum of colors when excited with a single excitation source.



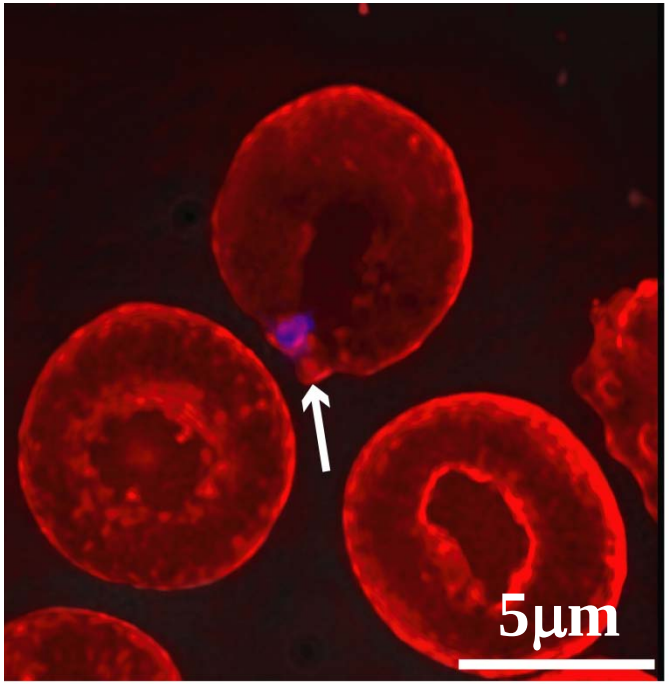
Optical characterization of single QDs

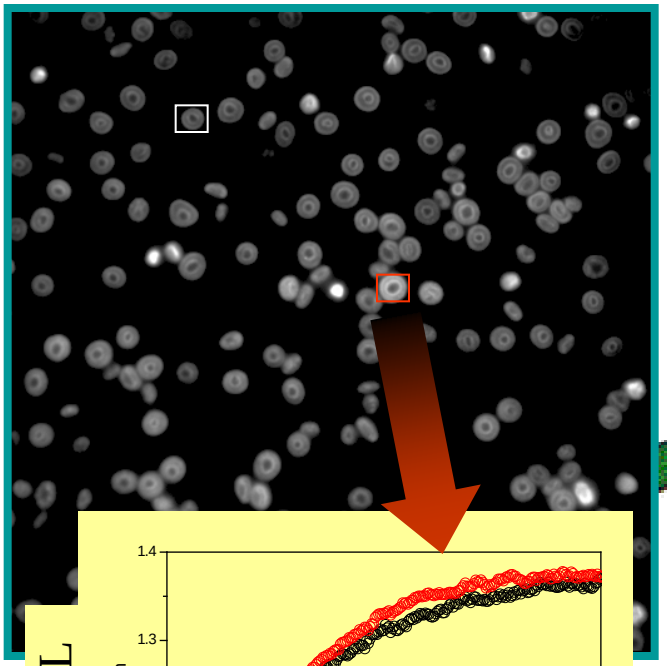
Opt. Comm. (2008)

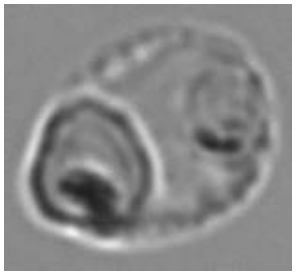


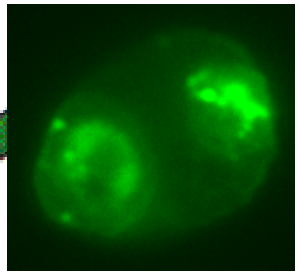
Imaging cellular processes with nanosensors

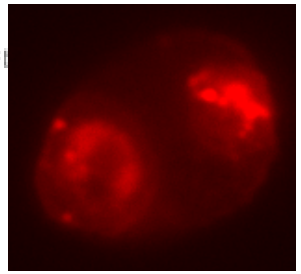
Review of Nanomedicine and Nanotechnology, in print

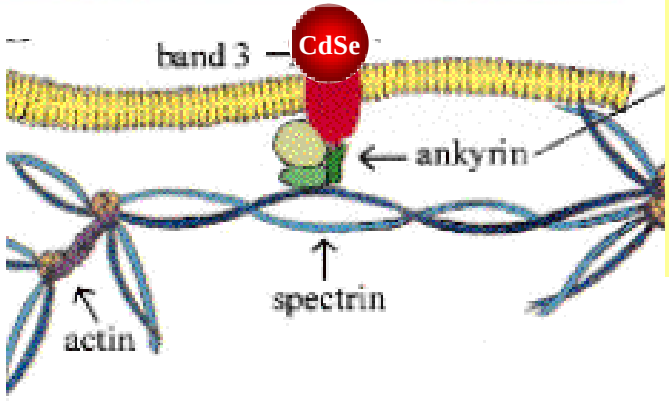


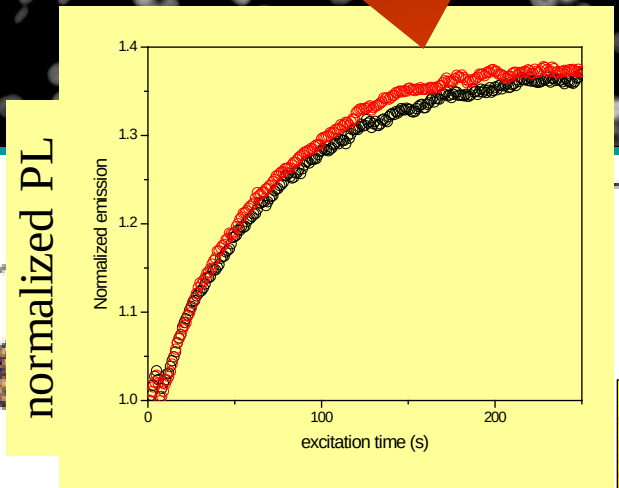


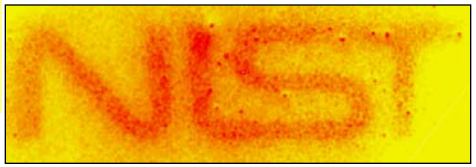




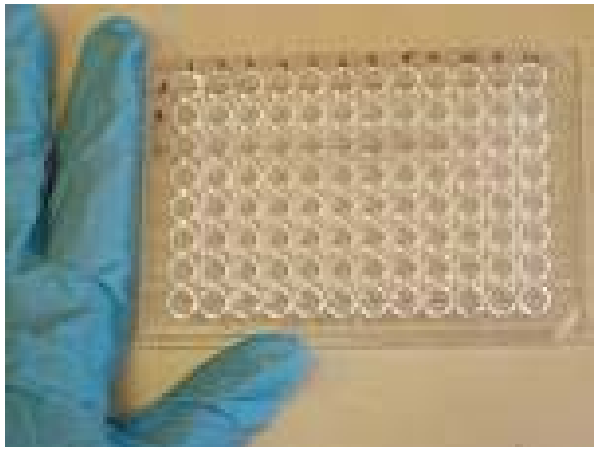


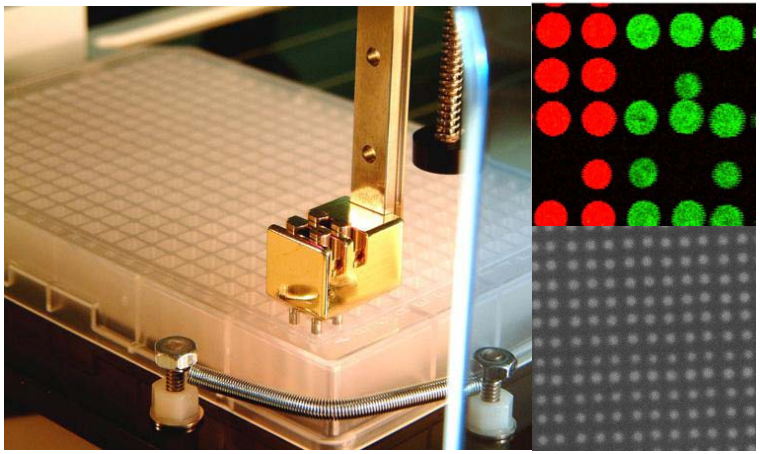




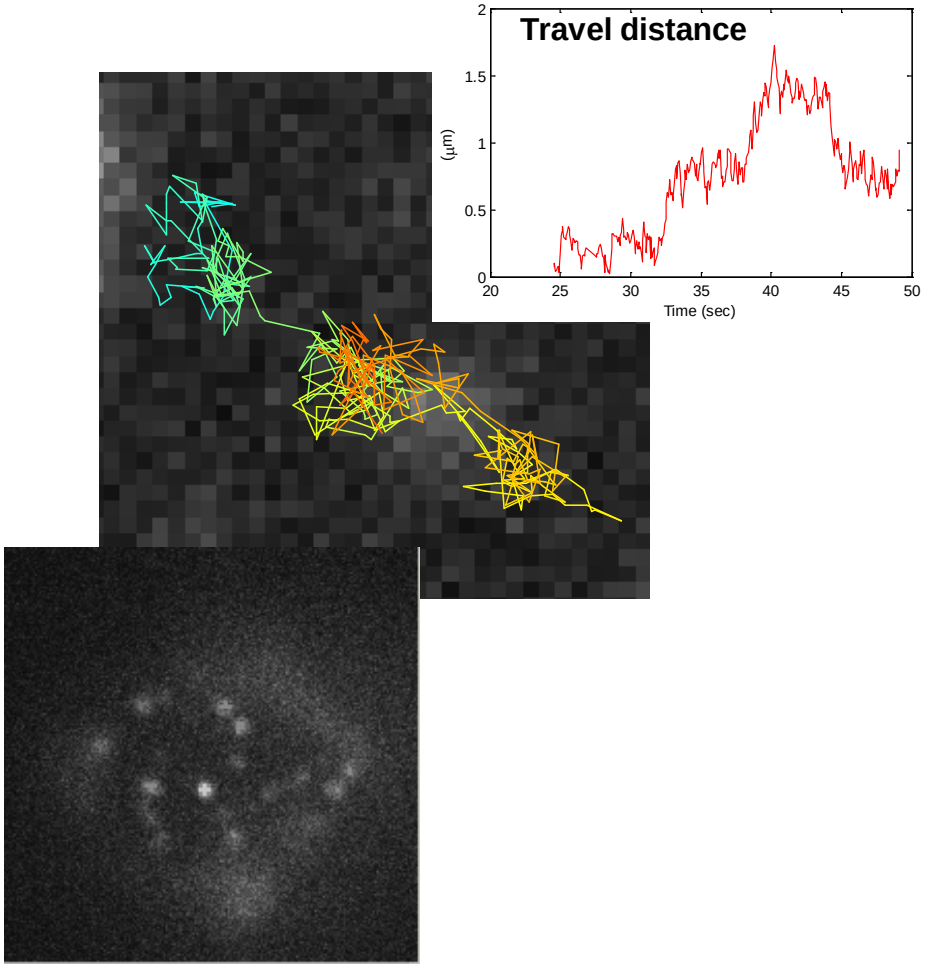


Opportunities…





Microarray fabrication for high-throughput ELISA



Analysis of single CD4 proteins on T cell membrane

Contact Information

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For further details, check with posters by Matthew Clarke and Georgeta Crivat