Electronic Supplementary Information

# Connecting Quantum Dots with enzymes: Mediator-based approaches for the light-directed read-out of glucose and fructose oxidation

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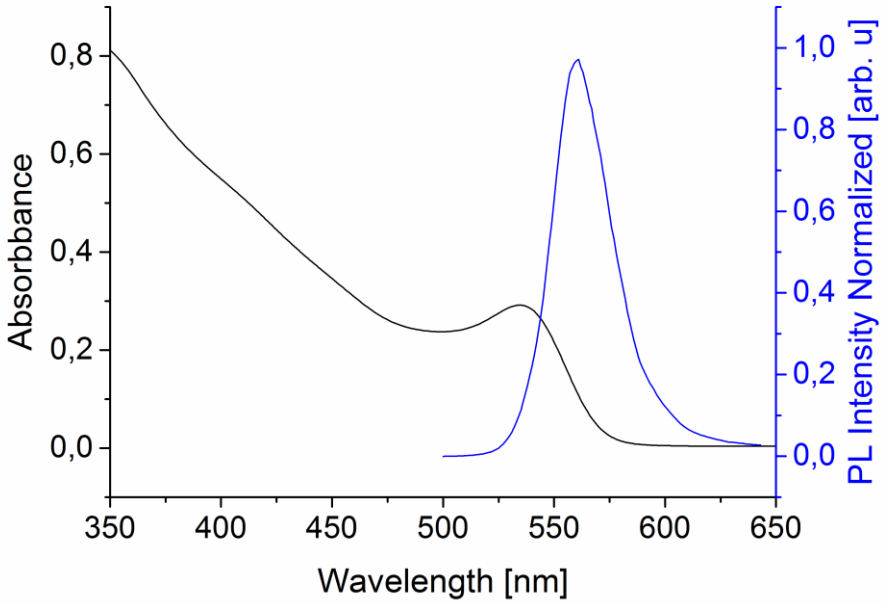


**Figure S1** Absorption and fluorescence spectra of CdSe/ZnS QDs in chloroform.

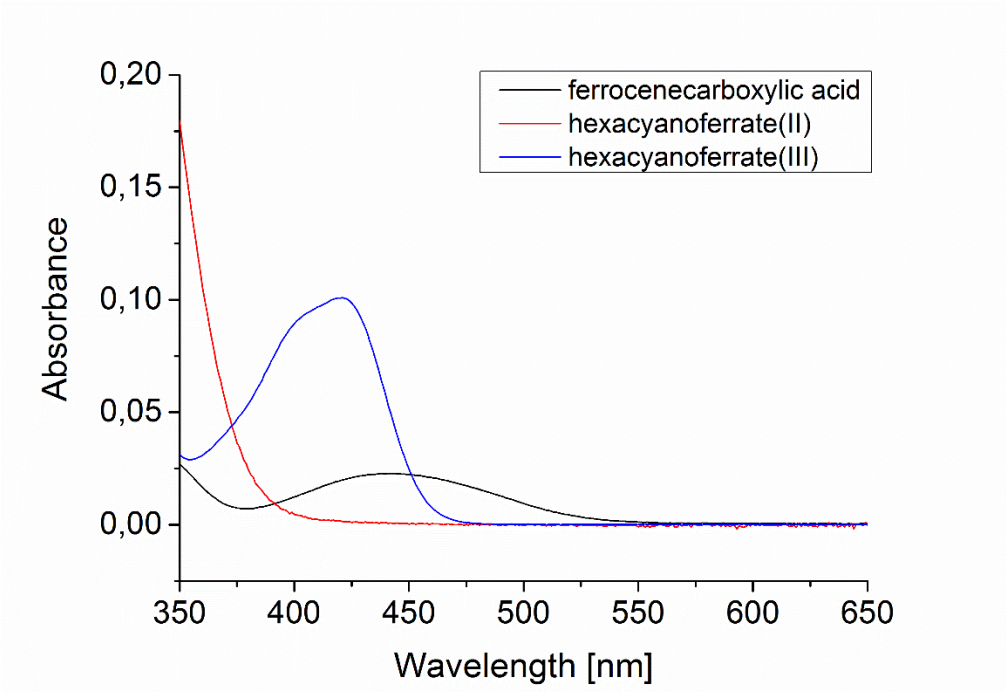


**Figure S2** Absorption spectra of 100 µM ferrocenecarboxylic acid, hexacyanoferrate(II) and hexacyanoferrate(III) in 100 mM HEPES pH 7.

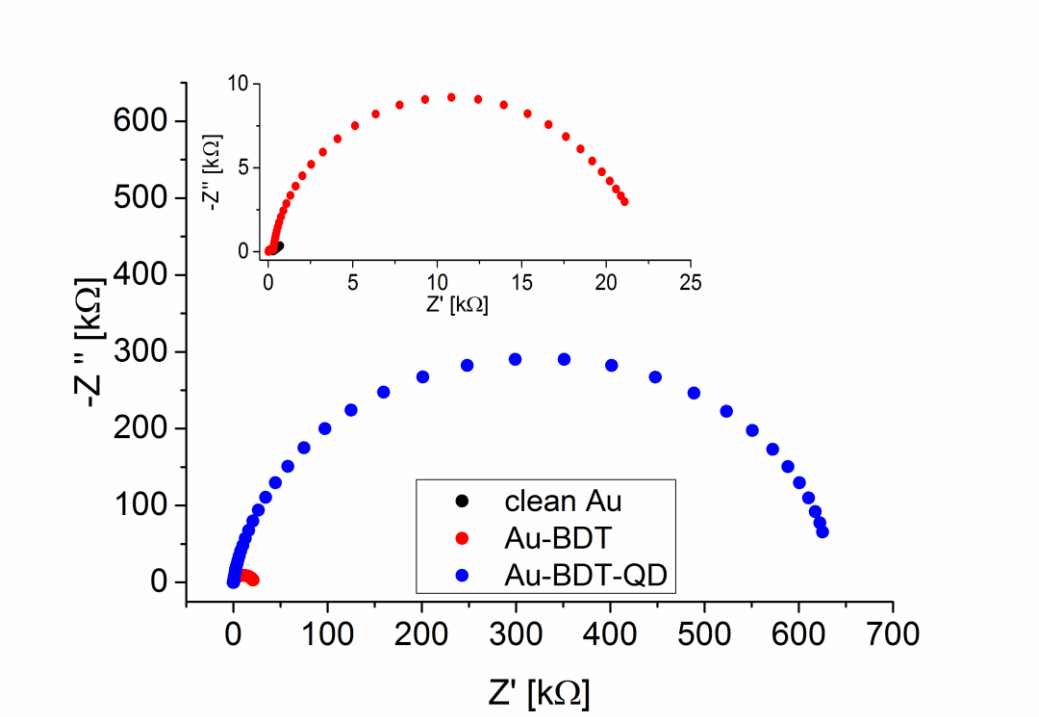


**Figure S3** Impedance spectra of a clean gold electrode (black symbols) and after modification with BDT (red symbols) and QDs (blue symbols) in the dark depicted as Nyquist plot. Inset: Magnification of the Impedance spectra. (100 mM sodium phosphate buffer pH 7, 2 mM hexacyanoferrate(II/III), 100 kHz – 1 Hz, 5 mV AC amplitude, OCP vs. Ag/AgCl, 1 M KCl)

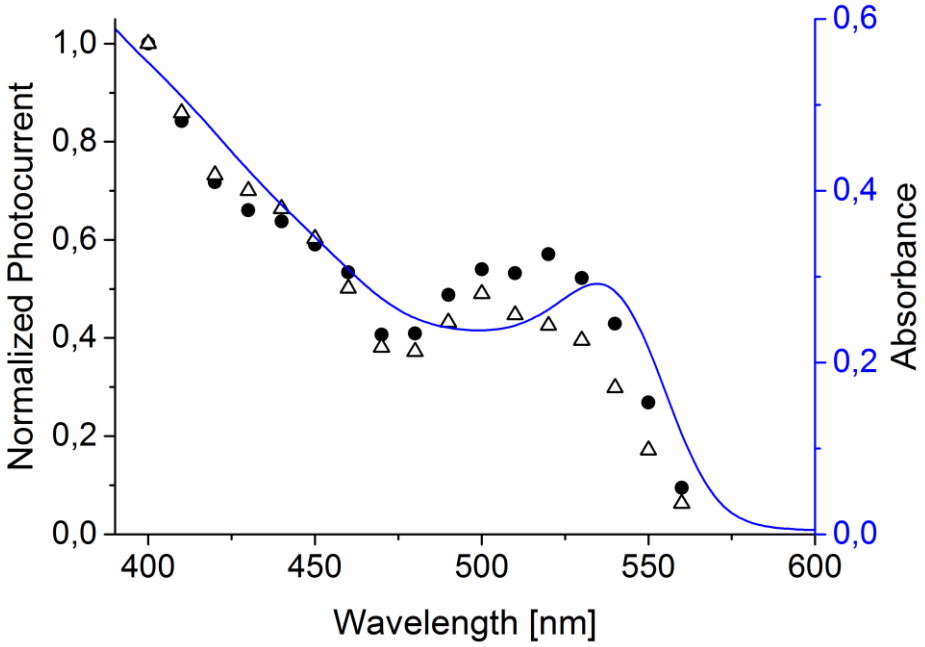


**Figure S4** Wavelength dependence of the photocurrent change ΔI of a CdSe/ZnS-modified gold electrode in buffer (black circle) and after addition of 200 µM hexacyanoferrate(II) (open triangle). For a better comparison the photocurrent is normalized to the value at 400 nm. (100 mM HEPES pH 7, -0.2 V vs. Ag/AgCl, 1 M KCl) Additionally the absorbance spectra of the used CdSe/ZnS QDs dissolved in chloroform is depicted (blue line).

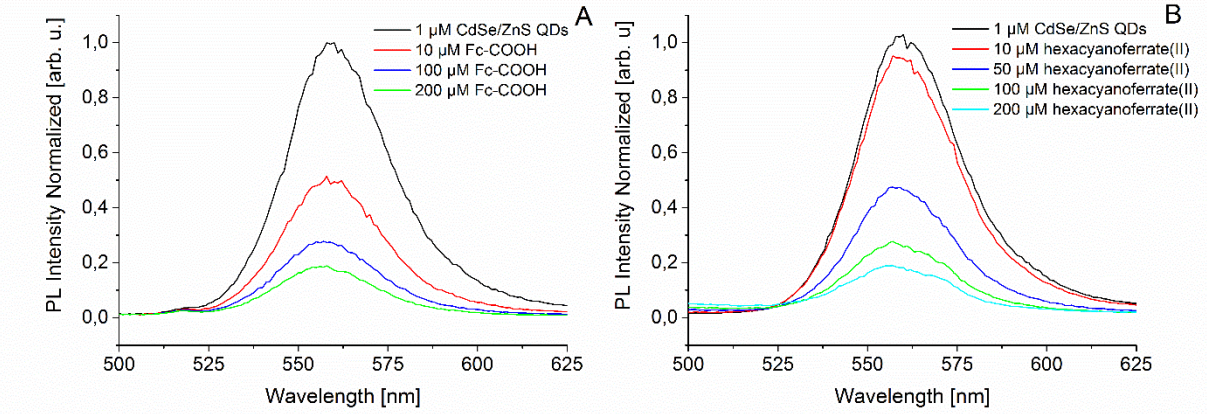


**Figure S5** Normalized photoluminescence spectra of a 1 µM CdSe/ZnS QDs solution in the absence and presence of ferrocenecarboxylic acid (A) and hexacyanoferrate(II) (B) with different ratios. For hexacyanoferrate(II) and ferrocenecarboxylic acid an excitation wavelength of 420 nm and 380 nm, respectively has been used.

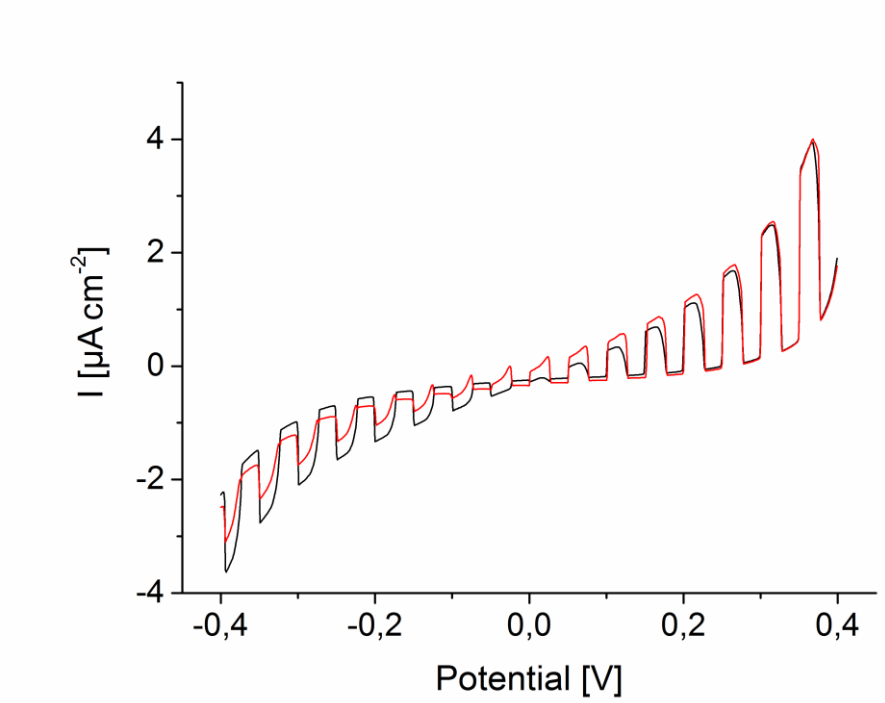


**Figure S6.** Chopped light voltammetry of a QD electrode in the absence (black curve) and presence of 500 µM hexacyanoferrate(III) (red curve). (100 mM HEPES pH7; light pulses of 5 s, scan rate 5 mV $s^{-1}$; potential vs. Ag/AgCl, 1 M KCl from +400 mV to -400mV)

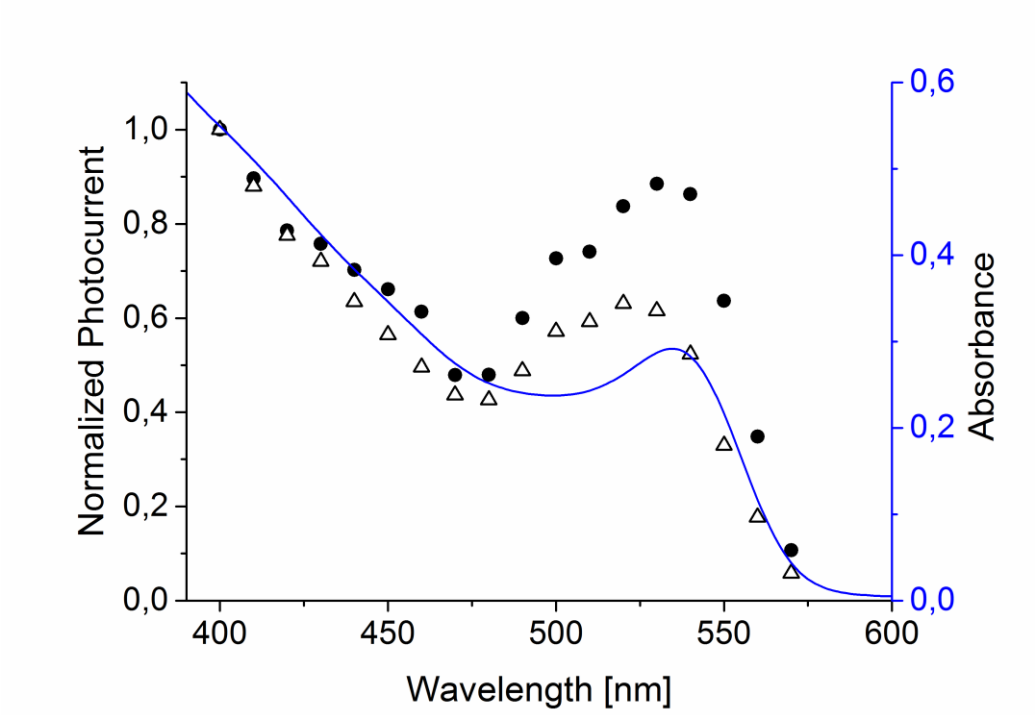


**Figure S7** Wavelength dependence of the photocurrent change ΔI of a CdSe/ZnS-modified gold electrode in buffer (black circle) and after addition of 100 µM ferrocenecarboxylic acid (open triangle). For a better comparison the photocurrent is normalized to the value at 400 nm. (100 mM HEPES pH 7, -0.2 V vs. Ag/AgCl, 1 M KCl) Additionally the absorbance spectra of the used CdSe/ZnS QDs dissolved in chloroform is depicted (blue line).

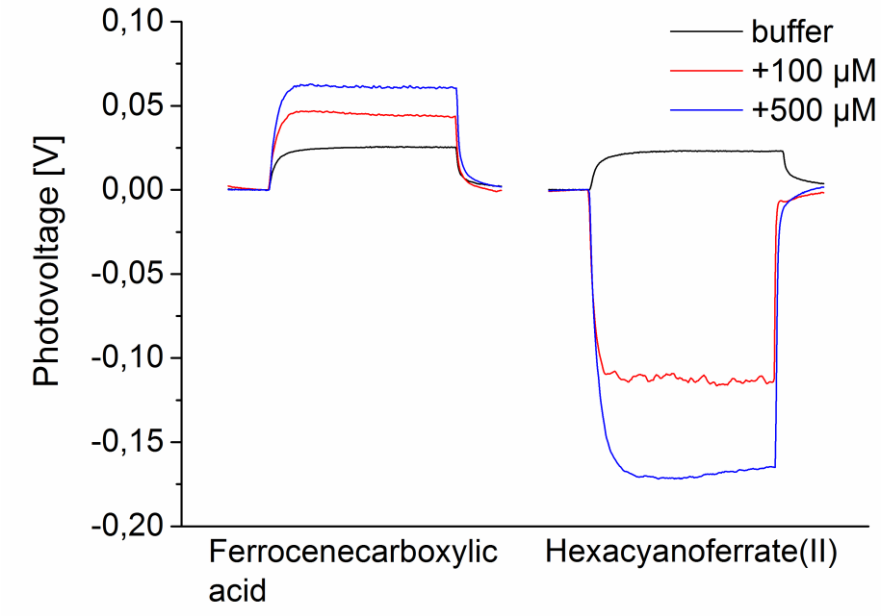


**Figure S8** Photovoltage measurements of a QD electrode in buffer (black curve) and in the presence of 100 µM (red curve) and 500 µM redox mediator (blue curve). (100 mM HEPES pH 7, light pulses of 20 s)

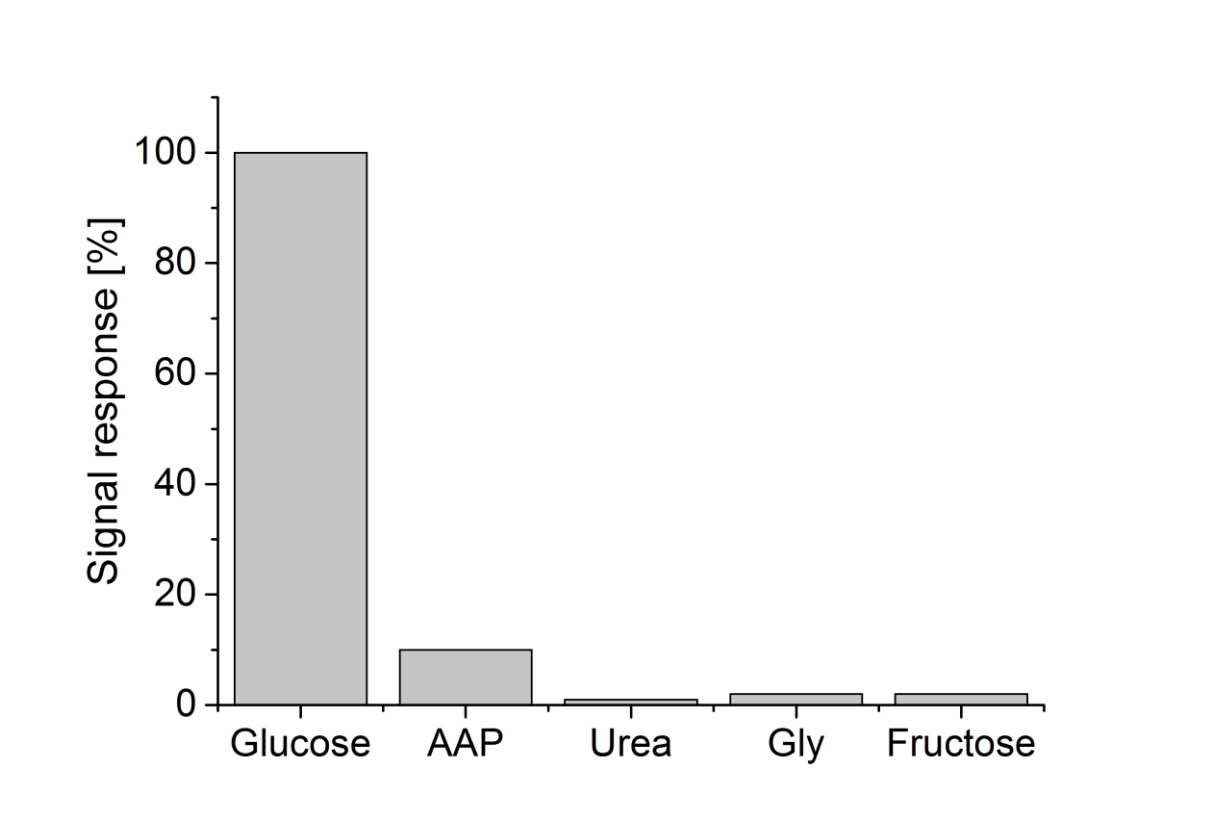


**Figure S9** Normalized photocurrent response of QD electrodes with immobilized (PQQ)GDH and ferrocenecarboxylic acid after addition of 100 µM glucose, 50 µM 4-acetylaminophenol (AAP), 50 µM urea, 50 µM glycine and 100 µM fructose. All values are normalized to the signal response after addition of 100 µM glucose (100 mM HEPES pH 7; +0.1 V vs. Ag/AgCl, 1 M KCl).