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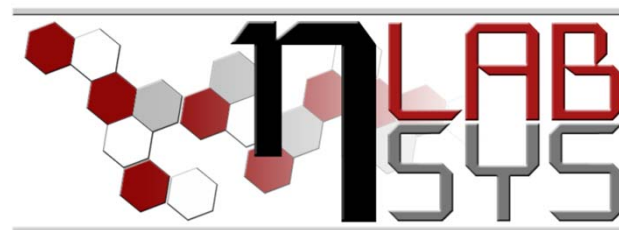
Název: **KVANTOVÉ NANOMATERIÁLY V ZOBRAZOVÁNÍ  
V IN VIVO – ÚVOD**

Školitel: Prof. Ing. René Kizek, Ph.D.

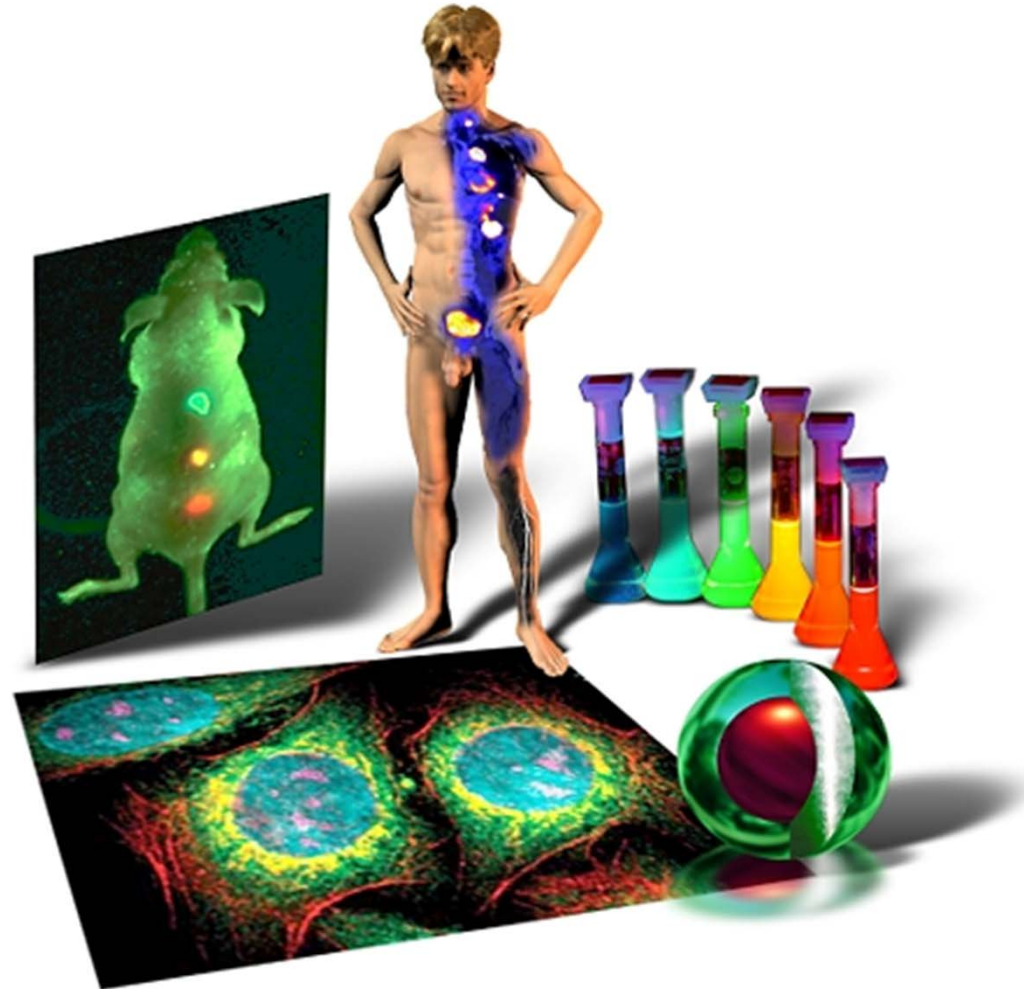
Datum: 11. 10. 2013

Reg.č.projektu: CZ.1.07/2.3.00/20.0148

Název projektu: Mezinárodní spolupráce v oblasti "in vivo" zobrazovacích technik

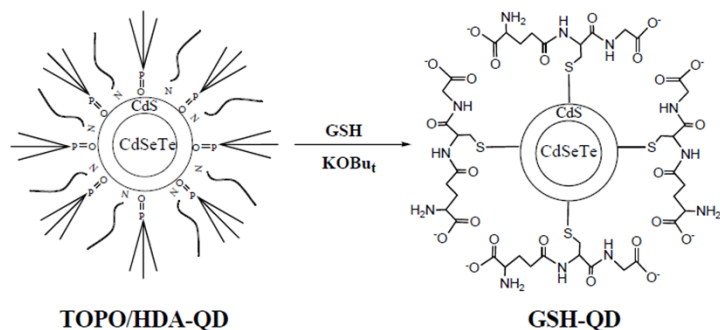


*Int. J. Mol. Sci.* **2010**, *11*(1), 154-163;  
doi:[10.3390/ijms11010154](https://doi.org/10.3390/ijms11010154)

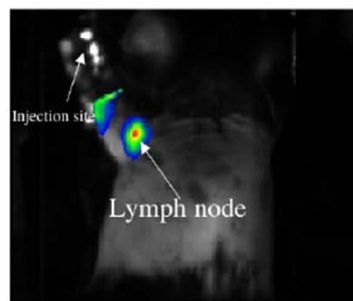


# Preparation and Characterization of Highly Fluorescent, Glutathione-coated Near Infrared Quantum Dots for *in Vivo* Fluorescence Imaging

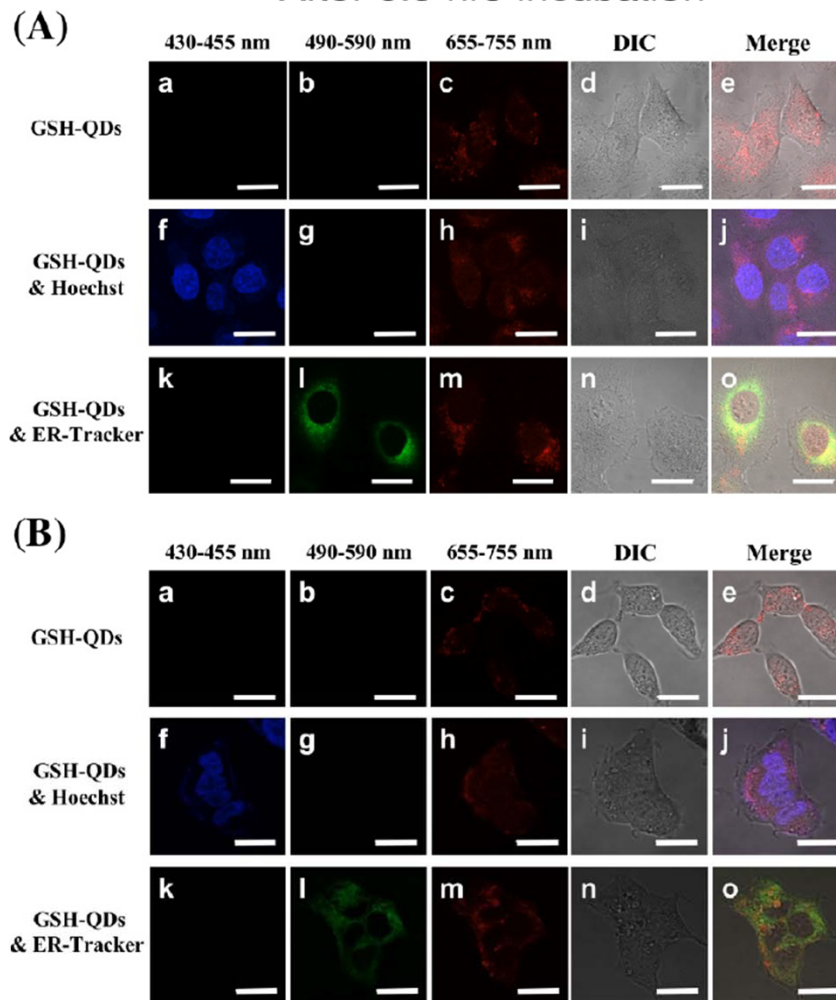
**Figure 2.** Schematic representation for the preparation of GSH-coated QDs. GSH coating is performed in a mixture of THF-water at 60 °C. Potassium *t*-butoxide (KOBu<sub>t</sub>) is used as a deprotonation reagent.



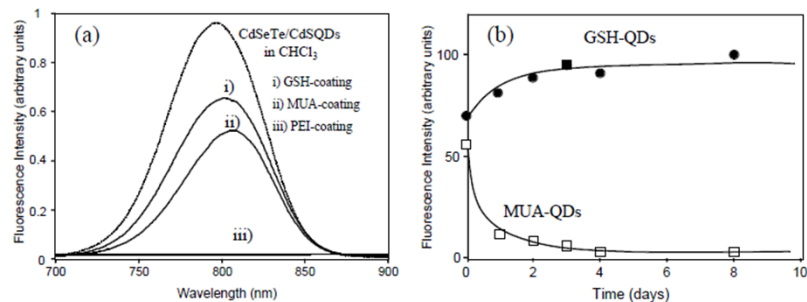
**Figure 9.** *In vivo* imaging for a lymph node in a mouse. NIR-light was illuminated by an array of the laser diodes with a 785 nm band-pass filter, and the NIR-fluorescence was detected by a cooled CCD (PIXIS-2048B, Roper Industries) with an 845 nm band-pass filter. The time of NIR-illumination was 10 sec. A pseudo-colored fluorescence image was superimposed on a monochrome visible light image.



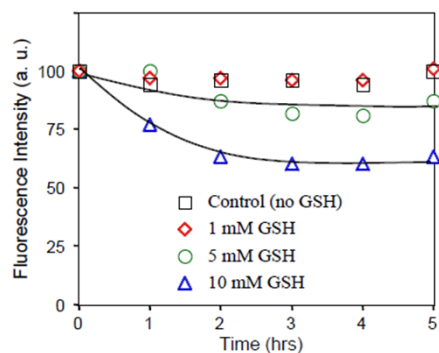
ALTER 0.5 hrs incubation



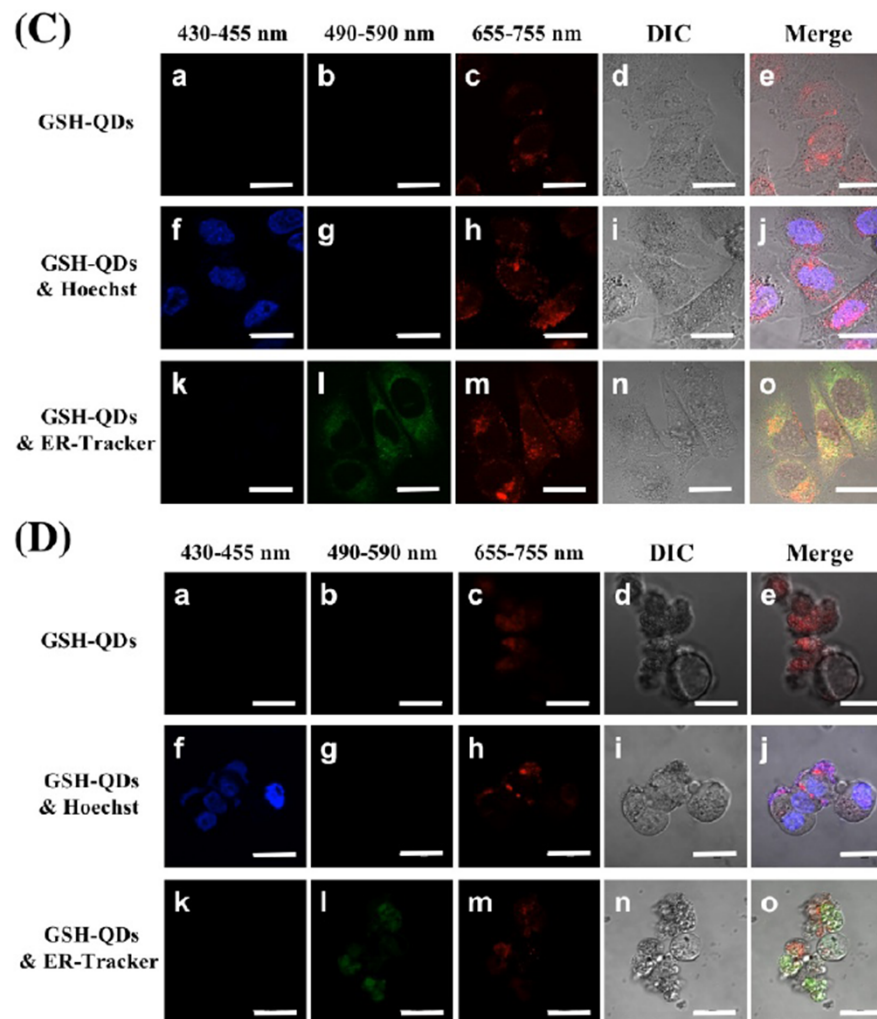
**Figure 3.** (a) Fluorescence spectra of CdSeTe/CdS QDs before and after surface modification with GSH, MUA and PEI. The spectra of GSH-, MUA- and PEI-coated QDs were measured in 10 mM PBS buffer. Excitation was performed at 480 nm. The absorbance at 480 nm was set to be 0.05 OD for all samples. (b) Changes in the fluorescence intensity (800 nm) of the GSH- and MUA-coated CdSeTe/CdS QDs (GSH-QDs and MUA-QDs) in 10 mM PBS buffer (pH = 7.4).



**Figure 4.** Changes in the fluorescence intensity of GSH-QDs (20 nM in 100 mM PBS buffer) in the presence of 0, 1, 5, and 10 mM GSH.

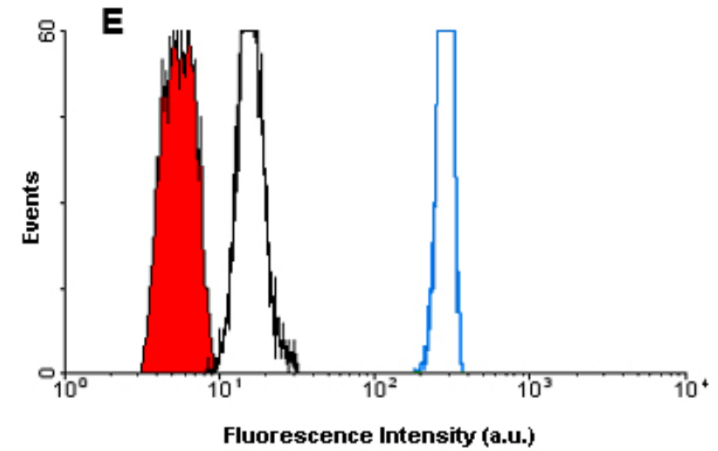
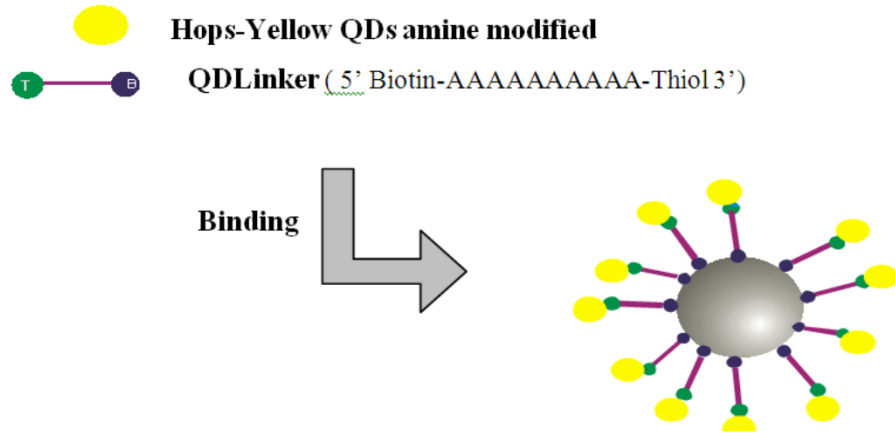


After 12 hrs incubation

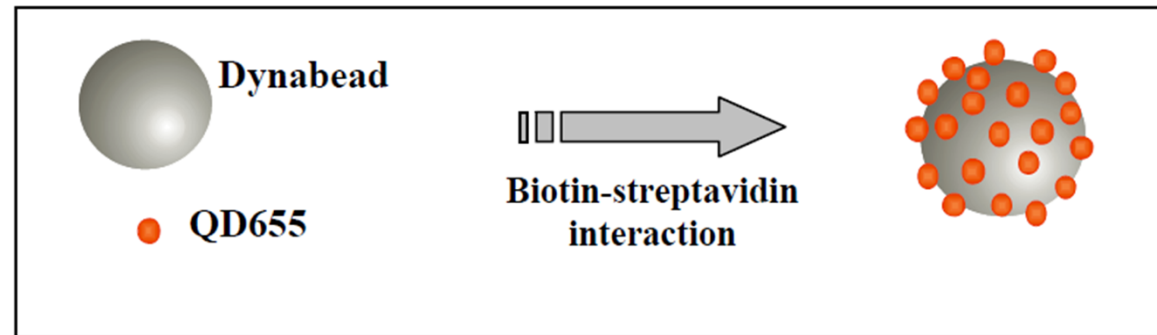


# Potential Use of Quantum Dots in Flow Cytometry

*Int. J. Mol. Sci.* **2008**, *9*(12), 2622-2638;  
doi:[10.3390/ijms9122622](https://doi.org/10.3390/ijms9122622)



**Figure 1.** Schematic representation of Dynabeads labelled with QD655 by the biotin-streptavidin interaction.



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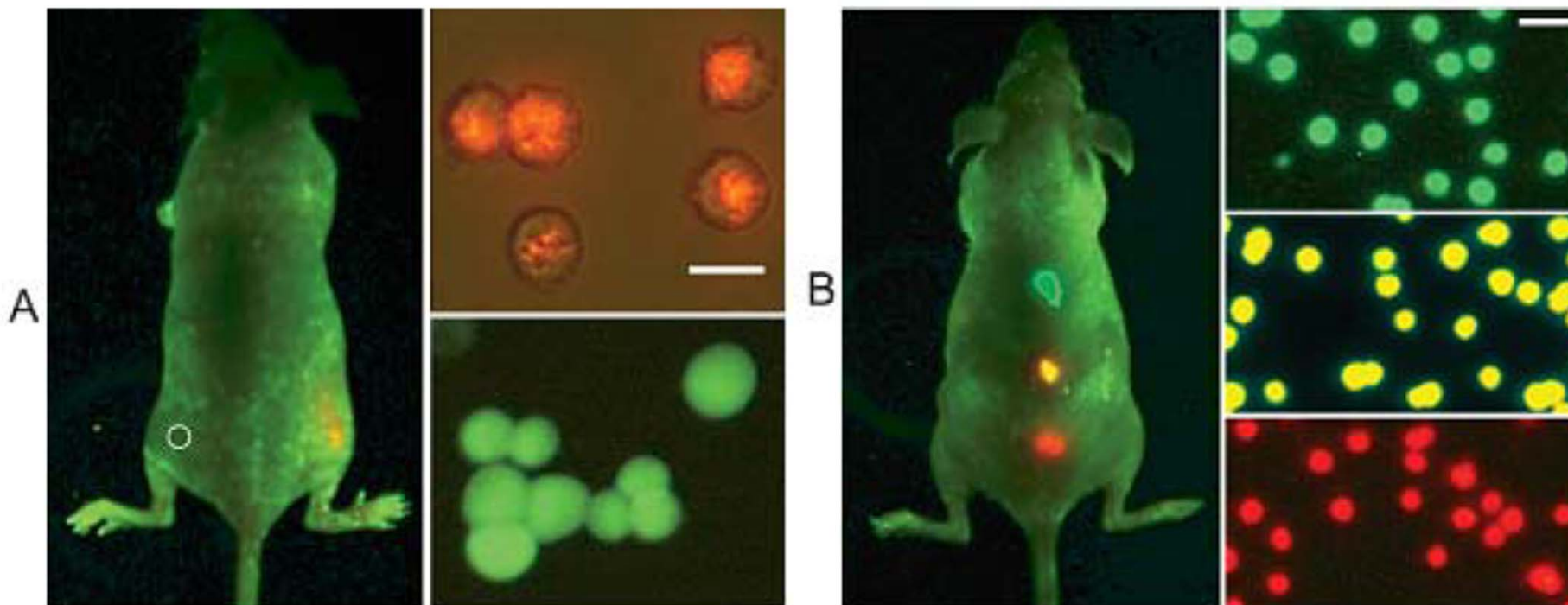
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# Quantum Dots for Live Cell and *In Vivo* Imaging

*Int. J. Mol. Sci.* **2009**, *10*(2), 441-491;  
doi:[10.3390/ijms10020441](https://doi.org/10.3390/ijms10020441)



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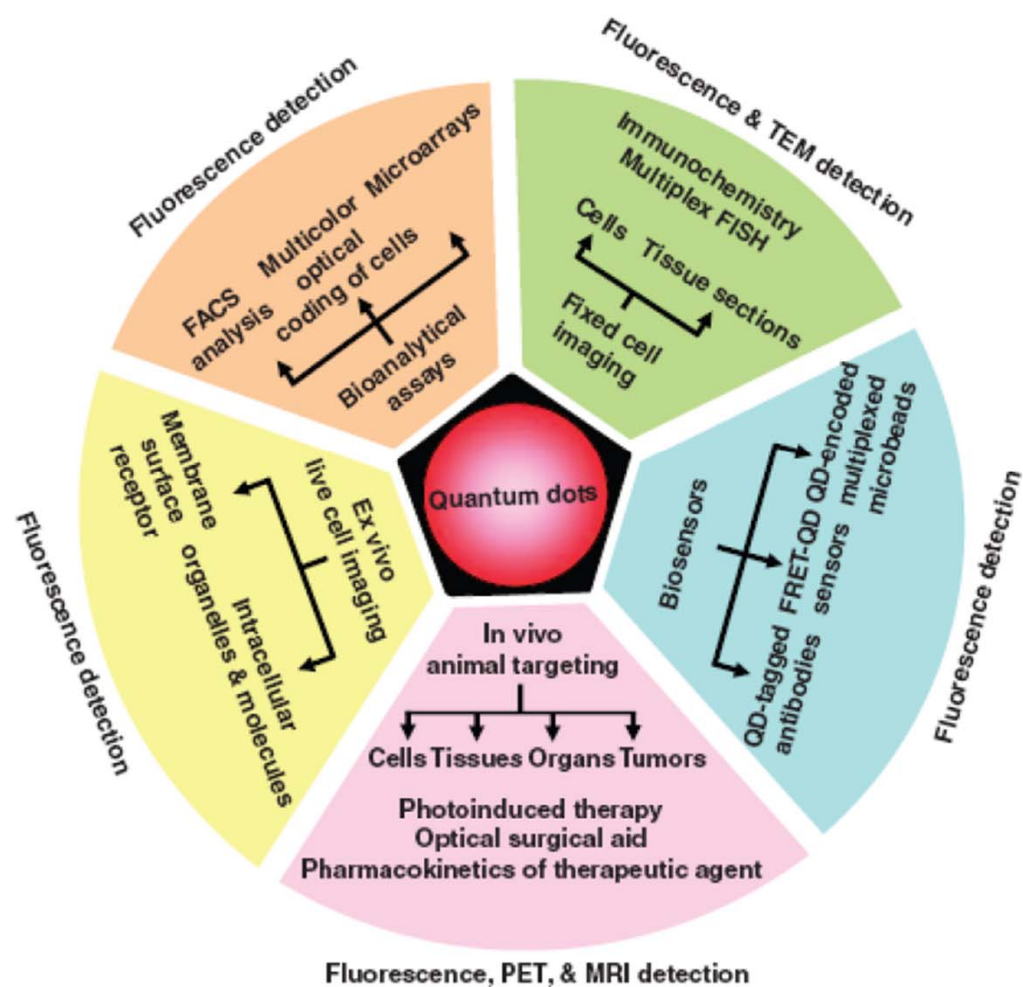
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**Figure 5.** Applications of quantum dots as multimodal contrast agents in bio-imaging. Reprinted with permission from [61].



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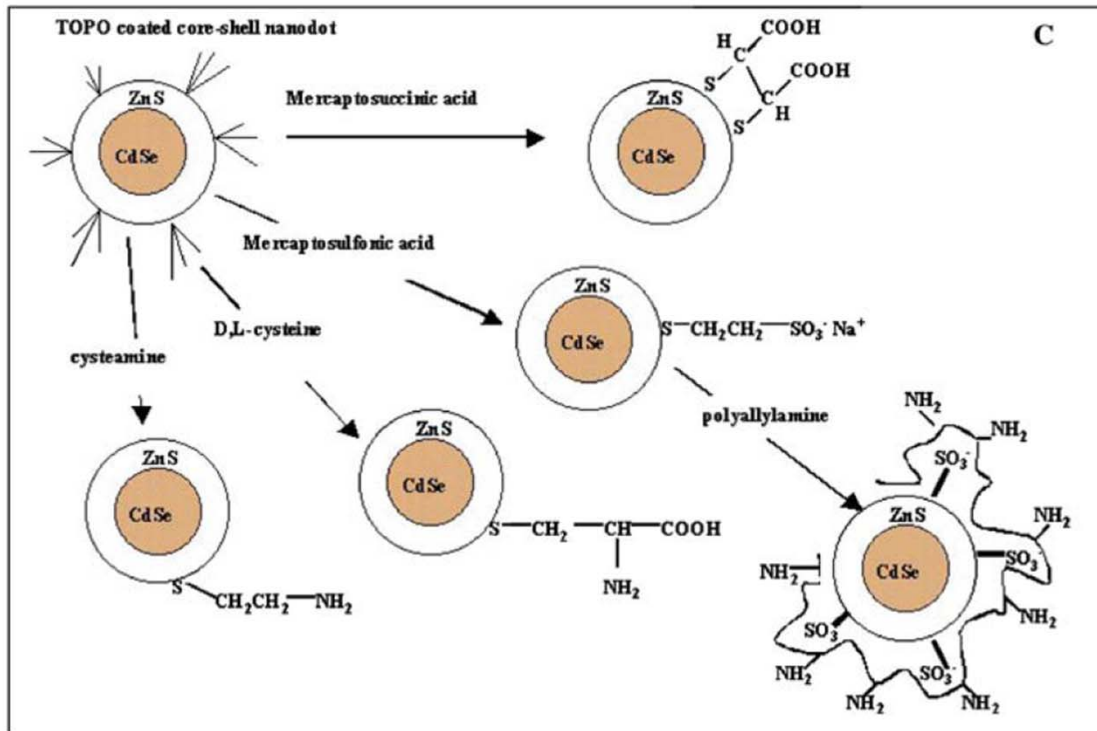


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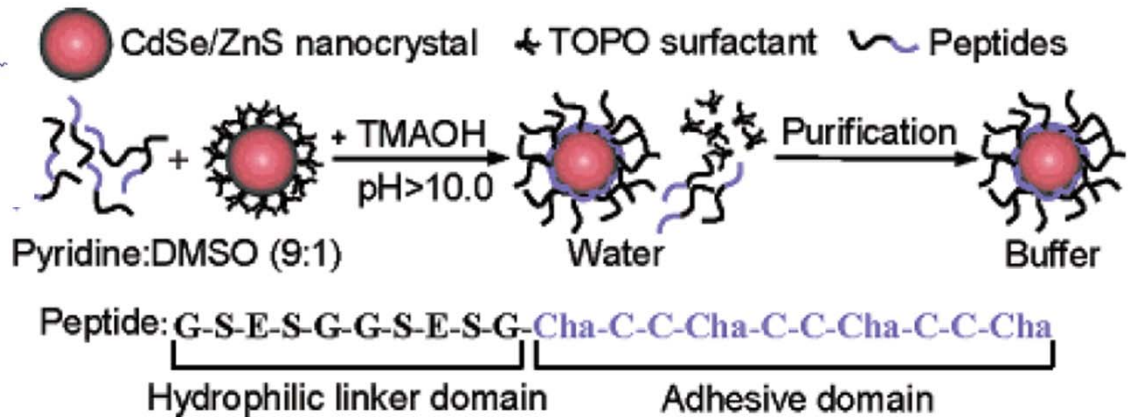
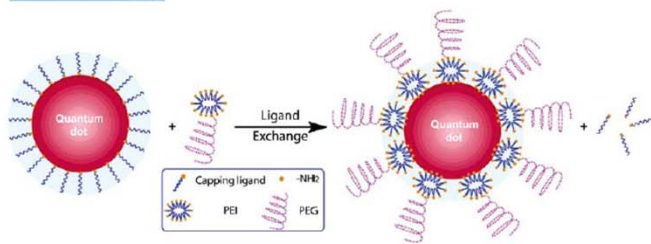
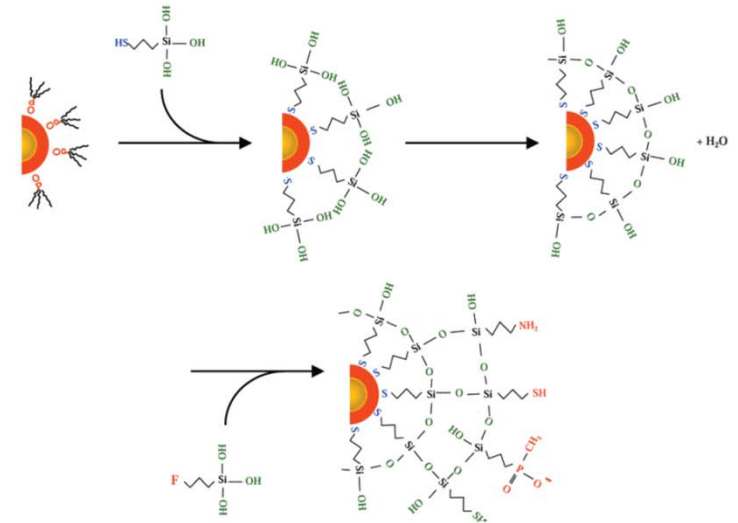


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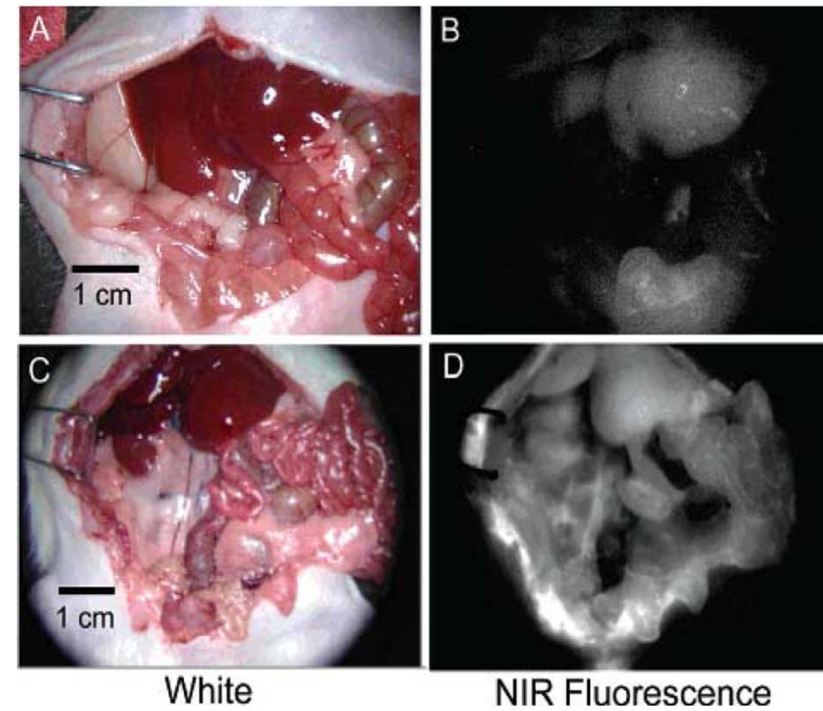
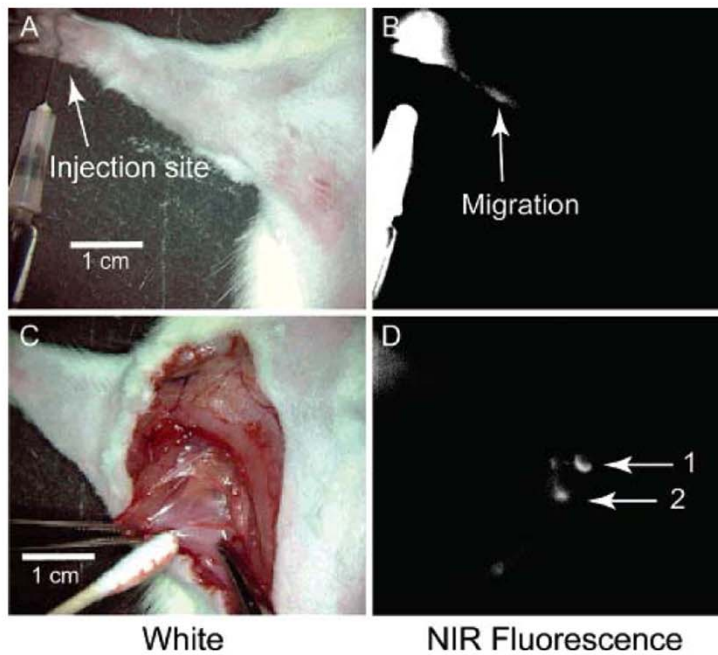


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**Figure 10.** Sequential lymph nodes (1 and 2) and the lymphatic channel between them were imaged (C, D) in a rat by white light and NIR fluorescence five minutes after injection of the quantum dots (A, B). Reprinted with permission from [75].



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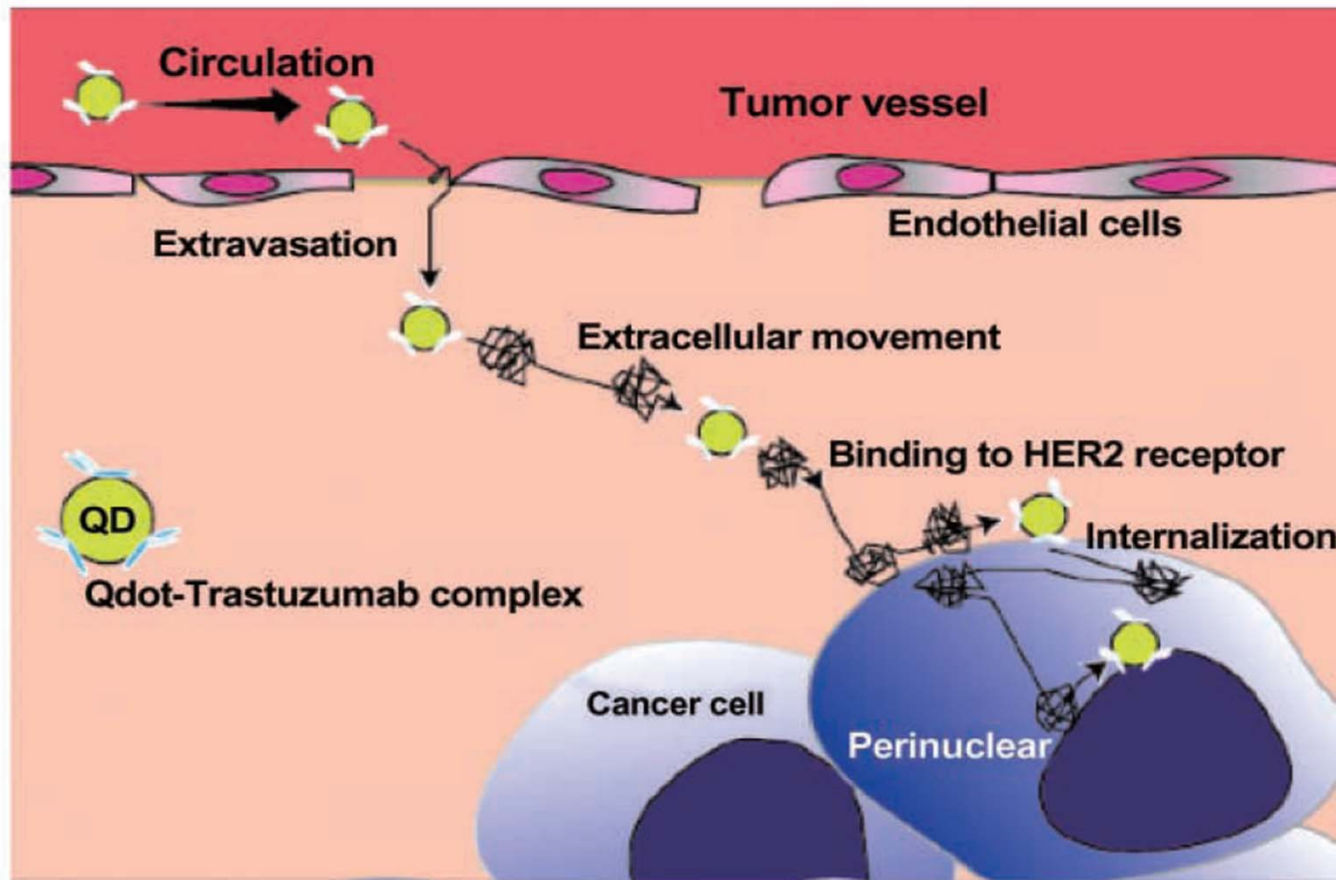


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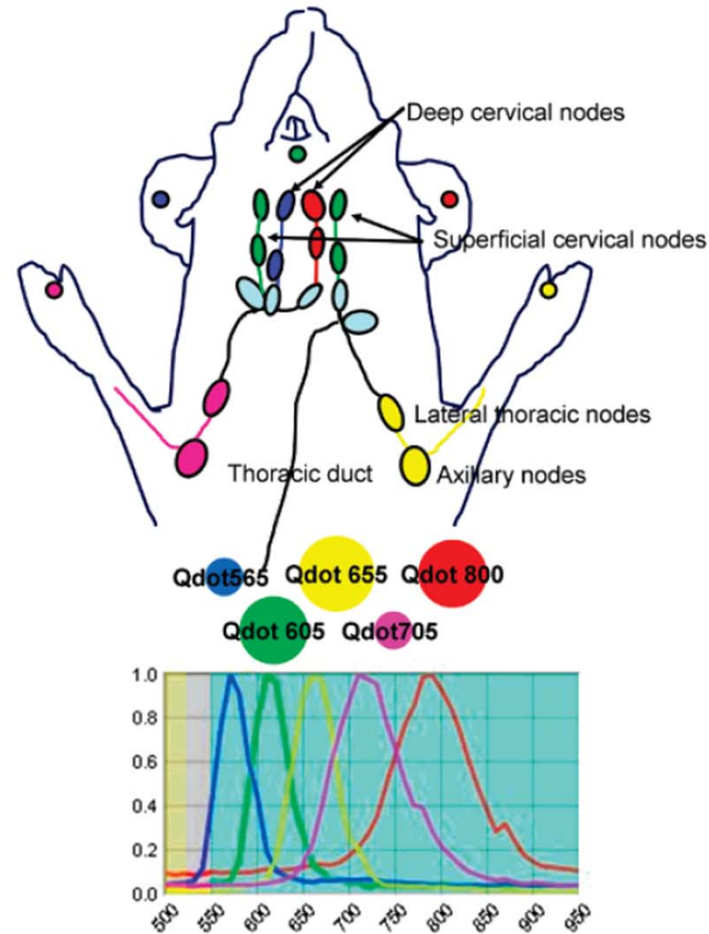


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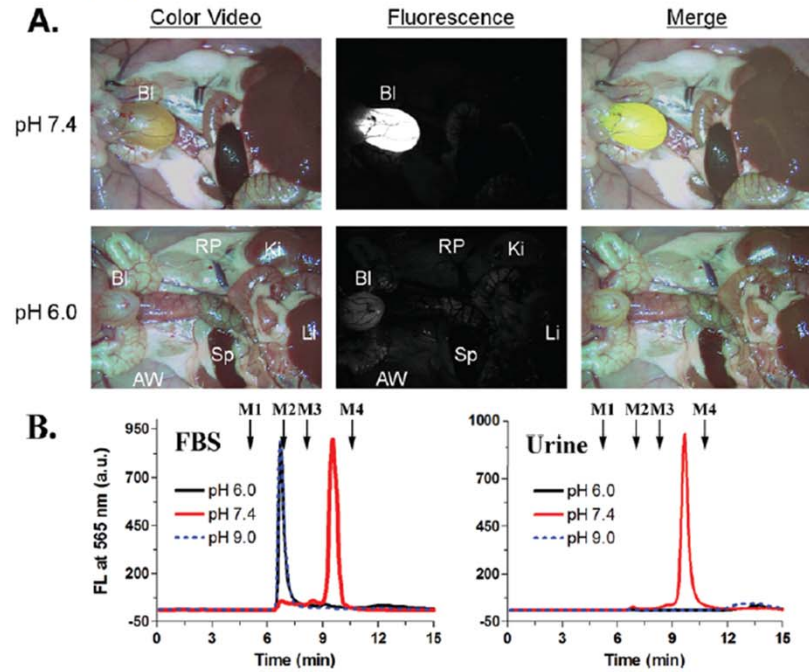


**Figure 15.** Anatomy of the lymphatic system in the upper body of the mouse and a schematic of five-color spectral fluorescence imaging, with a graph of the emission spectra of each of the five carboxyl quantum dots used (Qdot 565, blue; Qdot 605, green; Qdot 655, yellow; Qdot 705, magenta; Qdot 800, red). The colored lymph nodes are the draining lymph nodes visualized in this study. Reprinted with permission from [81].

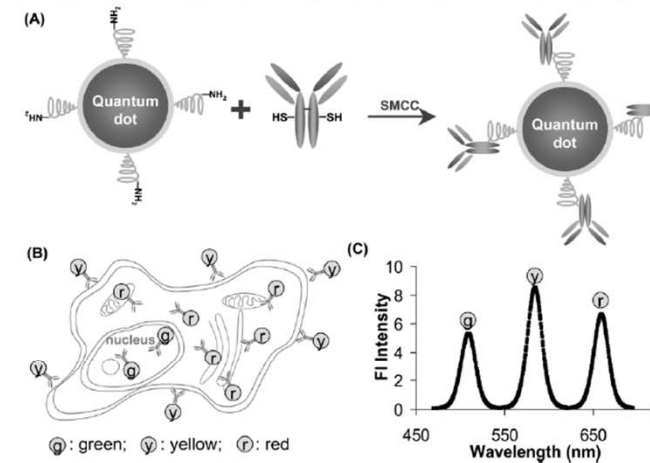




**Figure 17.** (A) Fluorescence images of rats injected with quantum dot-Cys incubated in FBS at the indicated pH, 4 hours postinjection (Bl, bladder; Ki, kidneys; Li, liver; RP, retroperitoneum; AW, abdominal wall, and Sp, spleen.): color image (left), 565 nm fluorescence (middle), merged (right). (B) GFC analysis of QD-Cys incubated in FBS at various pH (left) and in urine (right) 4 hours postinjection (fluorescence detection at 565 nm). MW markers M1 (thyroglobulin, 670 kDa), M2 ( $\zeta$ -globulin, 158 kDa), M3 (ovalbumin, 44 kDa), and M4 (myoglobin, 17 kDa) are shown by arrows. Reprinted with permission from [85].

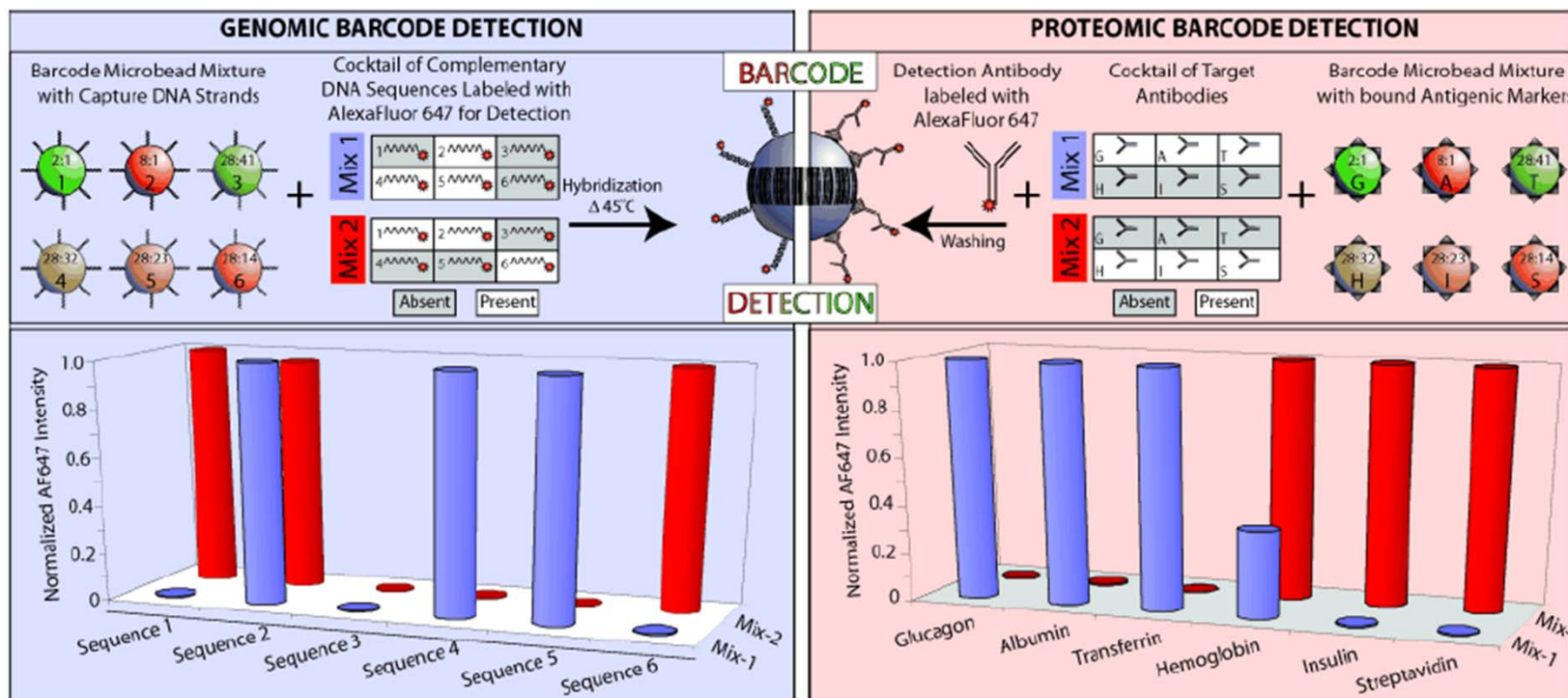


**Figure 18.** Schematic illustration of bioconjugated quantum dots for multiplexed in situ molecular profiling. (A) Multicolor quantum dot bioconjugates prepared with SMCC activated quantum dots and chemically reduced antibodies. (B) Cell staining using multicolor quantum dot-bioconjugates. (C) Quantification of tumor biomarker expression using wavelength-resolved spectroscopy. Reprinted with permission from [92].





**Figure 21.** Multiplexed protein and DNA assays. Six DNA and six proteomic multiplexed assays were performed on the QD-barcoded beads. Triplicates were performed for each experiment and computed standard deviation was less than 10% in all cases. Reprinted with permission from [57].



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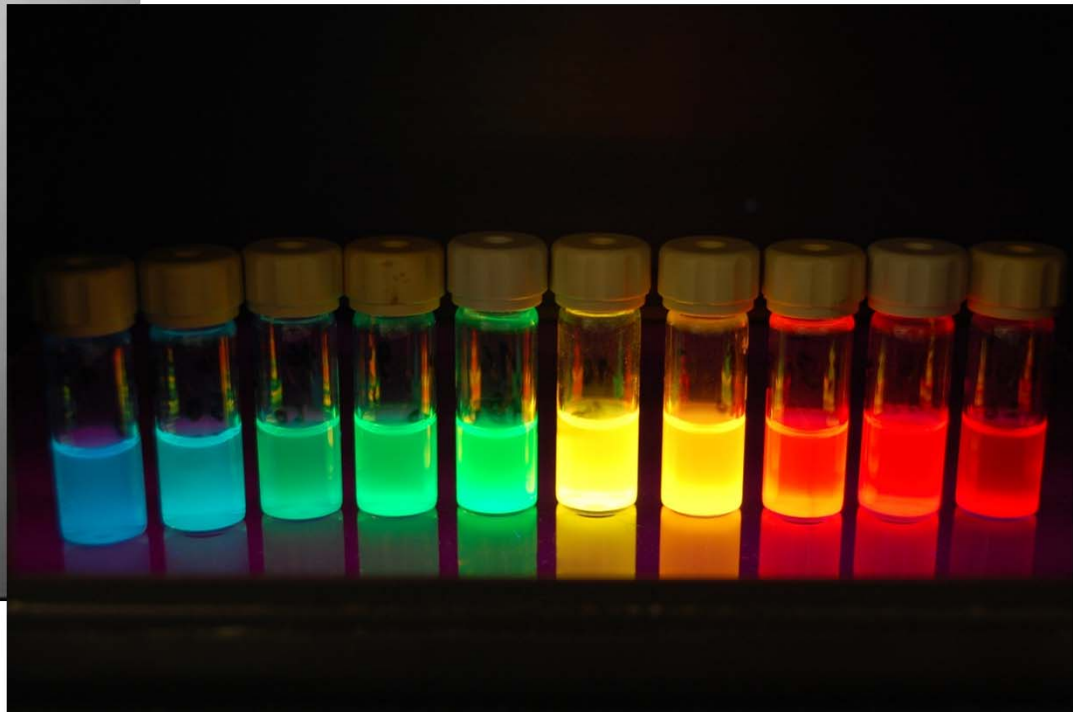
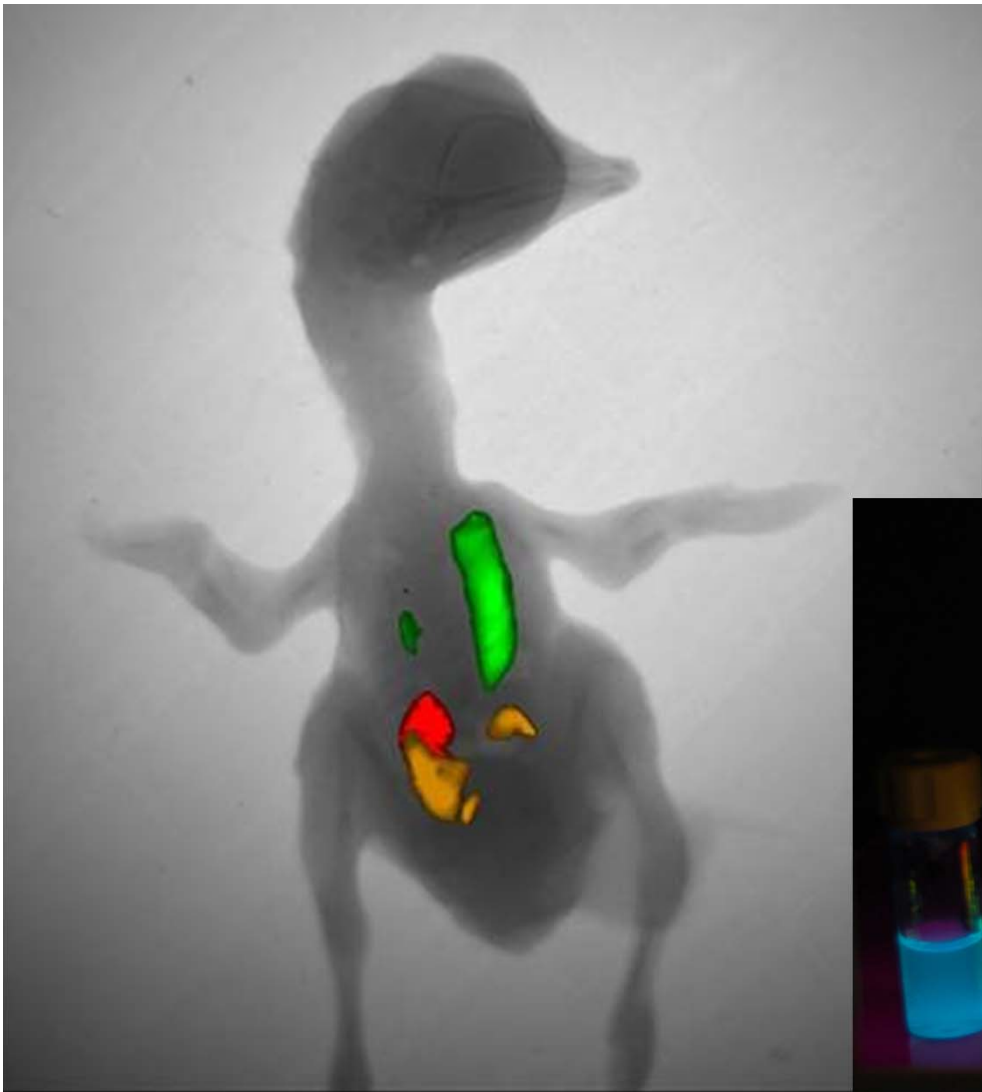


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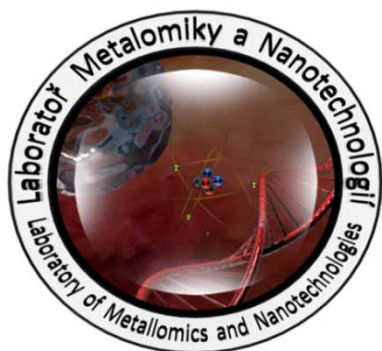
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