Dye: Quantum dot (Q-dot 565 and 705) nanocrystals

Q-dot nanocrystals from Molecular Probes, Invitrogen are nanometer scale (roughly the size of a protein) atom clusters which contain a few thousand atoms of a semiconductor shell such as zinc sulphide. This zinc sulphide shell enables the optical properties of the material to be improved.

Q-dot nanocrystals are extremely efficient at generating fluorescence due to their intrinsic brightness and the fluorescence generated is often many times greater than that observed with other classes of fluorophores. Q-dot nanocrystals are also very photostable compared to traditional fluorescent dyes.

Applications

Q-dot nanocrystals are often used for multicolour and multiplexed assays and western blots. Q-dot nanocrystals are ideal for multicolour detection due to their emission being narrow and symmetric therefore overlap with other colours is minimal allowing many more colours to be used simultaneously.

Visualization

Applications using the Q-dot 565 nanocrystal can be easily visualized using Syngene's Dyversity and G:BOX Chemi range of cooled camera image capture systems. The Q-dot 565 nanocrystal has an excitation peak of 550nm and an emission peak of 565nm (Figure1).

Applications using the Q-dot 705 nanocrystal can also be easily visualized using Syngene's Dyversity and G:BOX Chemi range of cooled camera image capture systems. The Q-dot 705 nanocrystal has an excitation and emission peak of 700nm and 705nm respectively (Figure 2).

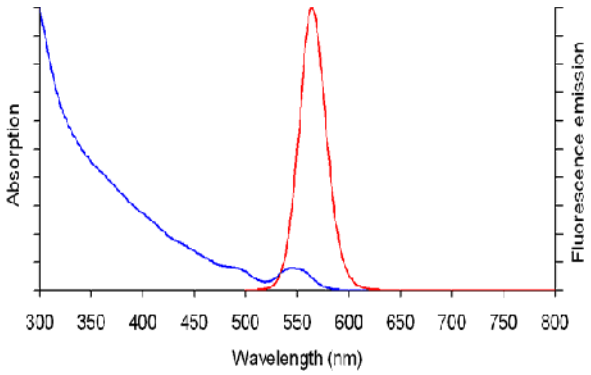

Figure 1 – Excitation (blue line) and emission (red line) spectra of Q-dot 565 nanocrystal

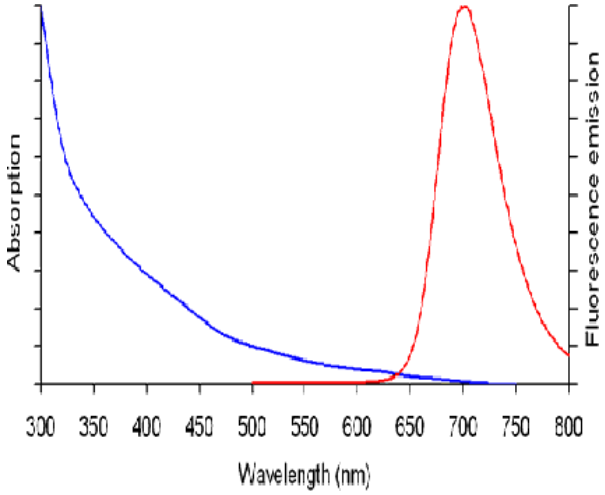

Figure 2 – Excitation (blue line) and emission (red line) spectra of Q-dot 705 nanocrystal

Q-dot 565 nanocrystal

System	Lighting	Filter
Dyversity and G:BOX Chemi range using cooled cameras	Epi Short wave UV Epi Medium wave UV	Filt525

Table I - Recommended lighting and filter selection for visualizing the Q-dot 565 nanocrystal using Syngene image capture systems

Q-dot 705 nanocrystal

System	Lighting	Filter
Dyversity and G:BOX Chemi range using cooled cameras	Epi Short wave UV Epi Medium wave UV	Filt705

Table II - Recommended lighting and filter selection for visualizing the Q-dot 705 nanocrystal using Syngene image capture systems

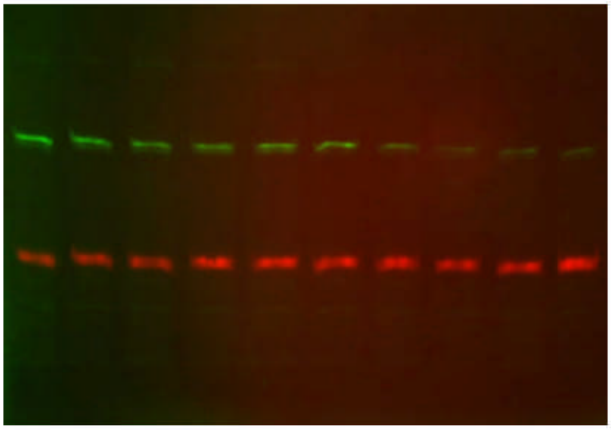

Figure 3– Multicolour western blot using Q-dot 565 and 705 nanocrystals visualized using the G:BOX Chemi image capture system

Polypyrimidine tract binding protein (PTB) and the heterogeneous nuclear ribonucleoprotein were transferred from acrylamide gel onto a nitrocellulose membrane. The membrane was incubated with the Q-dot 565 goat anti-rabbit IgG and the Q-dot 705 goat anti-mouse IgG secondary antibodies.

The images were captured using the G:BOX Chemi Syngene image capture system with overhead Epi UV light. To detect each Q-dot's colour the special emission filter for each Q-dot was selected and an exposure time of 20 seconds was selected using GeneSnap (Syngene) software. The best image of each Q-dot colour was chosen and the two different coloured images were overlaid to create a composite image showing both Q-dot colours. In this image PTB protein labelled with the Q-dot 565 are shown in green and heterogeneous nuclear ribonucleoprotein labelled with the Q-dot 705 are shown in red.

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