SINGLE NANOCRYSTAL SPECTROSCOPY

a.. THE BACKGROUND Our group like many others is using confocal microscopy and dark filed microscopy to collect and investigate the spectra of single nanocrystals. These may be either fluorescent semiconductor nanocrystals, often termed Quantum Dots (QDs) or small metal particles such as gold.

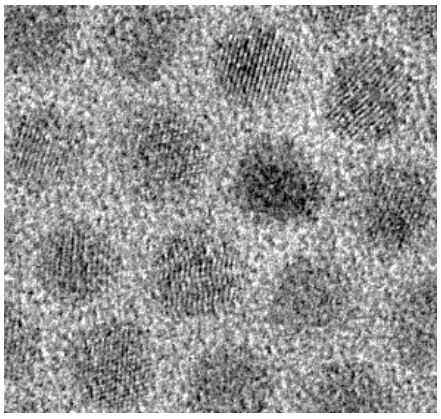
Our goals will be to attach these nanocrystal labels to biological objects and measure things such as the diffusion coefficient, rotational correlation time, membrane permability and residence time of the biomolecules.

b.. THE OUTCOMES

* Ultimately our goal will be to study biology on the single molecule level, and to glean information about metabolism and energy conversion in cells at the nanoscale level.
* Commercially we hope to be able to manufacture single antibodies and oligonucleotides with single nanocrystal labels.
* In collaboration with colleagues at the Ludwig cancer Institute we aim to investigate EGFR behaviour in cancerous cells.

c.. TWO PICTURES

The picture below shows a high resolution electron micrograph of some of our 7.8nm diameter CdSe@CdS nanocrystals, while the next image shows the well-known exciton emission from our CdSe@ZnS particles.



d.. PROGRESS TO DATE

We can make tunable photostable QDs in water, gold rods, cubes, prisms, pentagons and core-shell structures.

e.. THINGS STILL TO DO - one or two lines.

We need to discover more flexible methods for conjugating the nanocrystals and biological targets. This is an on-going problem worldwide. One can imagine various polymer, surfactant, core-shell routes etc, but no method seems to work consistently on all particles.

f.. CONTACT DETAILS - yours preferably. Professor Paul Mulvaney, ARC Federation Fellow School of Chemistry, University of Melbourne, Parkville, VIC, 3010; ph: 61-(0)3-8344-6486; fax: 61-(0)3-9347-5180; http://www.nanoparticle.com