

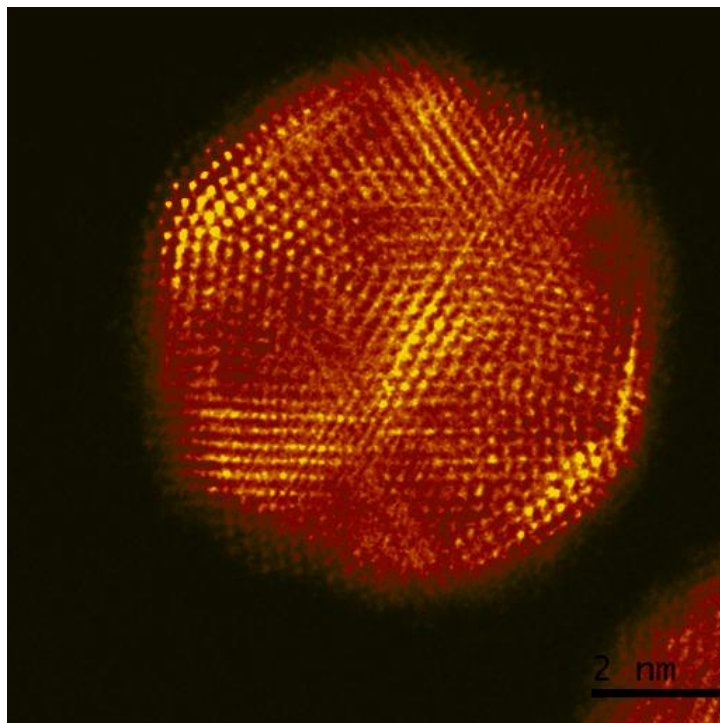
IS HIGH RESOLUTION ELECTRON MICROSCOPY OF BIOLOGICAL MATERIAL POSSIBLE?

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Nanotechnology is the study and use of matter at the nanolevel (10^{-9} m) is opening new avenues for improving human life. Nanotechnology is producing new cancer treatments, extremely powerful electronics, new ways to use solar energy and new methods to deliver drugs to the targeted organ that is sick.

In order to study the matter at the nanolevel, microscopes of increased power are being developed. A revolution has been created in Electron microscopy by the development of new electromagnetic lenses that can correct the lenses aberrations. There has been a recent development; the resolution of images has surpassed the Angstrom limit for the first time. There are currently very few microscopes available in the world that can achieve that level of resolution. As can be seen in Figure 1 below, individual atoms can be imaged with the new generation of microscopes. The figure depicts an example of a gold nanocrystal and the bright spots are individual columns of atoms.



It is possible to obtain chemical analysis and holography of samples.

However; the advanced Technique of electron Microscopy has been used mainly in physical sciences. In this talk we will discuss the new applications in Biology. Traditionally, medical researchers have used microscopy in a low mag –High contrast mode using staining to increase the contrast of poorly scattering biological material. Staining imposes a limit on resolution and hampers any chemical analysis. In this talk we will also discuss new methods to increase contrast in biological material which opens the door for high resolution images not possible before.

Figure 1