

## Finding Nanoparticles Dispersed in Cells

It can often be difficult to confirm the presence of dispersed nanoparticles (NPs) that are deeply embedded in cells or tissue. Whether using enhanced darkfield microscopy, or even scanning electron microscopy, there can sometimes be a qualitative aspect of determining what is a nanoparticle versus other elements within the cells. However, with the addition of hyperspectral imaging onto the CytoViva Enhanced Darkfield Optical Microscope, this issue can be easily resolved.

Hyperspectral images captured with the CytoViva system look similar to optical images. However, each pixel of the hyperspectral image contains the spectral response for that pixel's spatial area. These hyperspectral images are observed using powerful image analysis software which can easily adjust how the spectral data is displayed. By simply modulating the contrast and enhancement settings in the hyperspectral image analysis software, NPs which were hidden can be instantly visible. This enables easy identification of their spectral response for accurate spectral mapping throughout the sample.



Figure 1: Enhanced Darkfield Hyperspectral Image of Gold Nanorods in Cells with Standard Color

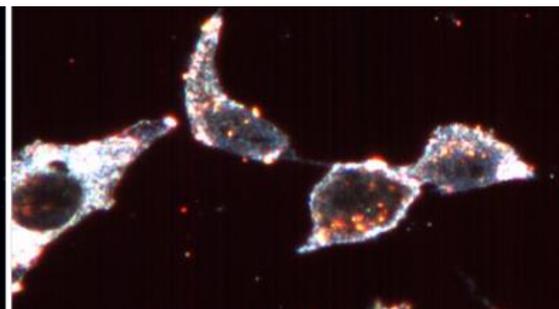


Figure 2: Enhanced Darkfield Hyperspectral Image of Gold Nanorods in Cells with Contrast and Color Channels Adjusted to Enhance Observation of the Gold Nanorods Appearing Gold/Red

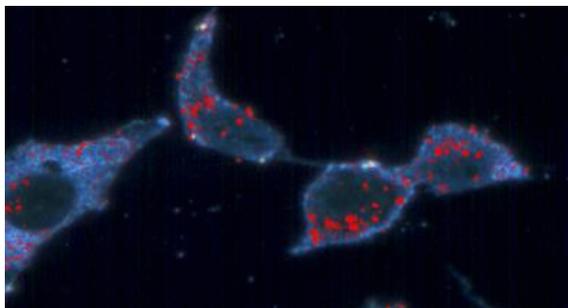


Figure 3: Spectral Angle Mapping of Gold Nanorods (red)

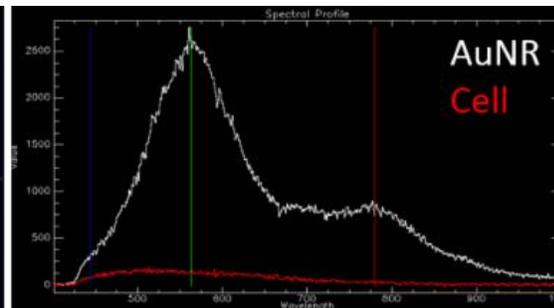


Figure 4: Spectral Comparison of AuNRs and Cells

In Figure 1 above, gold nanorods (AuNRs) were incubated with cells. However, many of the AuNRs are deeply embedded and cannot be easily visualized. In Figure 2, the contrast of the AuNRs (seen in gold/red) was improved with an enhancement filter and adjustment of the color channels. Once the AuNRs were easily visualized, a spectral library was created corresponding to the AuNRs and was mapped onto the original image seen in Figure 3. Figure 4 reveals the drastic spectral difference of the AuNRs and the cells.

The CytoViva system contains tools which enable users to easily uncover hidden NPs and spectrally confirm their presence and location in cells or tissue within minutes. If your research involves NP delivery to biological matrices, CytoViva's Enhanced Darkfield Hyperspectral Microscope can be a vital tool in the advancement of your research.

To learn more about CytoViva's Enhanced Darkfield Hyperspectral Microscopy, contact us at [info@cytoviva.com](mailto:info@cytoviva.com) or 1-888-737-3130. We would be pleased to learn more about your current research and can schedule test imaging of your samples if appropriate.

### More Information

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