

Spectrally Mapping Fe₂O₃ Nanoparticles in Stained Tissue

Ex-vivo confirmation of the presence of nanoparticles in targeted tissue is critical in determining the efficacy of nano theranostic therapies. An important element in this confirmation process is the ability to observe nanoparticle localization quickly and accurately across a large number of tissue samples.

CytoViva's Enhanced Darkfield Hyperspectral Microscope is now being used extensively to optically observe and spectrally map nanoparticles in ex-vivo tissue. This includes noble metal, metal oxide, polymeric and carbon based nanoparticles. The system supports this nanoparticle confirmation process in both stained and unstained tissue samples. Hyperspectral images, captured in seconds or minutes, provide a spectral response measurement in every nanoscale pixel of the image. These spectral response measurements can be taken in any pixel with the click of a mouse.

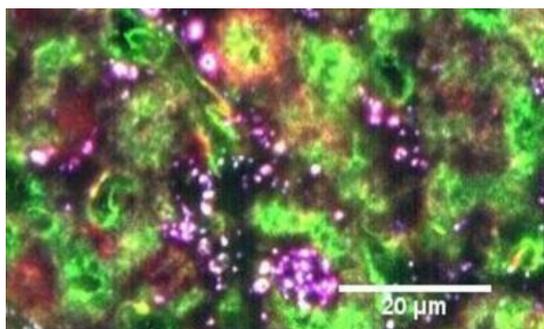


Figure 1: Fe₂O₃ Nanoparticle Aggregates in Stained Tissue

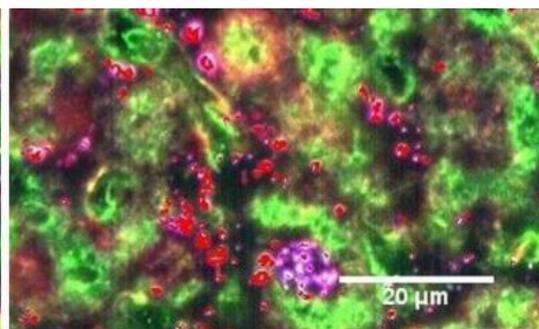


Figure 2: Spectral Mapping (in red) Fe₂O₃ in Tissue

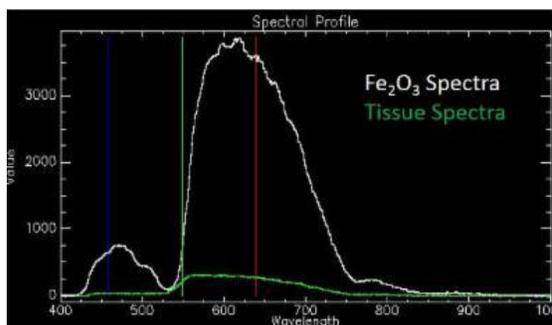


Figure 3: Pixel level spectra of Fe₂O₃ Nanoparticles and Tissue

Classification	# of Pixels Mapped	Percentage
Unmapped Tissue	101,935	94.47%
Fe ₂ O ₃ (red)	5,969	5.53%

Figure 4: Class Distribution Pixel Mapping of Fe₂O₃ Nanoparticles in the Hyperspectral Image

See above in Figure 1, stained tissue with Iron Oxide (Fe₂O₃) nanoparticle aggregates. The nanoparticle aggregates generally appear white or pink. Based on the unique spectral response of these nanoparticles as compared to control tissue (shown in Figure 3) the pixels containing nanoparticle spectra can be mapped. In Figure 4 the class distribution data illustrating the number and amount of pixels mapped in the total image for Fe₂O₃ is shown.

CytoViva's Enhanced Darkfield Hyperspectral Microscope was specifically designed to be a fast and effective tool for observing, spectrally characterizing and mapping nanoparticles in ex-vivo tissue and a wide range of other environments. Please contact CytoViva at info@cytoviva.com to learn more about this technique and how it may advance your nanoparticle or related experiments. CytoViva can arrange to test image samples for your research group. Please click on the Goggle Scholar link below to learn how other research labs are currently using CytoViva technology in nanoparticle - tissue studies.

[Google Scholar - Use of CytoViva in Nanoparticle Tissue Studies](#)

More Information

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Contact Us at info@cytoviva.com