

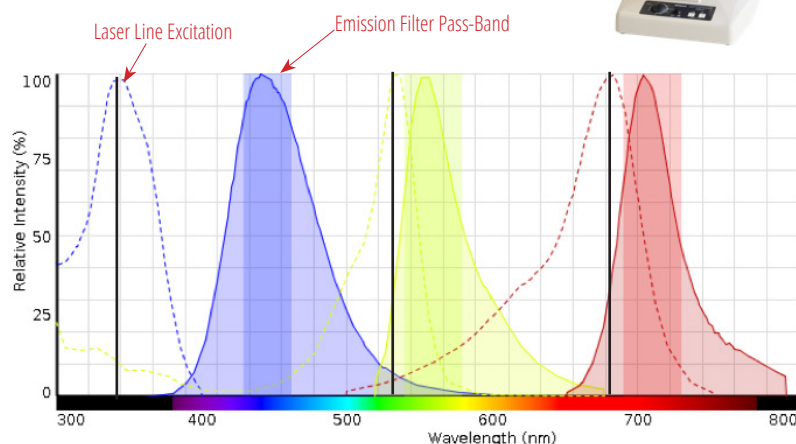
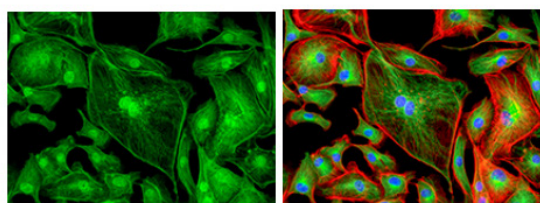


HYPERSPPECTRAL BIO-MEDICAL IMAGING: UNFILTERED FLUOROPHORE IMAGING

Improve workflow efficiency and reduce experiment time by detecting and discriminating multiple fluorophore emissions on a micro or macro scale from a single scan without the use of channel filters.

UNFILTERED HYPERSPPECTRAL FLUOROPHORE IMAGING (UHFI)

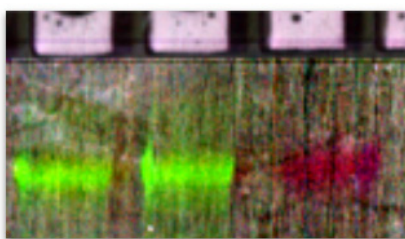
It is common practice for bio and medical researchers to stain tissue samples, excite the samples with various lasers or UV sources, then view fluorophore emissions through channel filters. Care must be taken to select fluorophores without overlapping emission spectra (as shown to the right). If multiple emissions occur within a given channel, information can be lost due to a lack of discrimination within the channel. In the figure below, UHFI spectra, each derived from a single image pixel, demonstrates the ability to separate overlapping emissions with Headwall's Hyperspectral Fluorophore Imaging System.



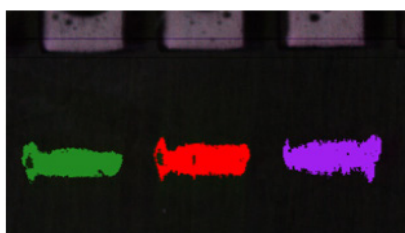
Produced using Fluorescence SpectraViewer on ThermoFisher.com

HYPERSPPECTRAL IMAGING

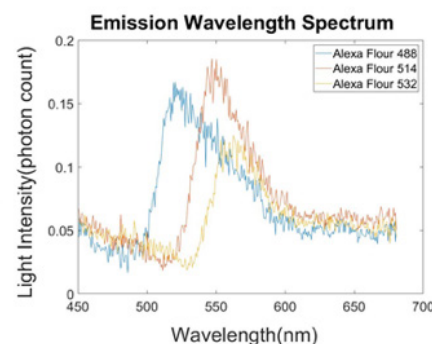
Hyperspectral imaging combines imaging and spectroscopy. Every spatial pixel in a hyperspectral image has an entire spectrum; therefore, unique spectral signatures can produce image contrast rather than the intensity within a fixed bandwidth. This powerful feature allows hyperspectral imaging to separate the signal from fluorophores with overlapping emission spectra. Therefore, hyperspectral imaging can simultaneously distinguish a virtually unlimited number of fluorophores.



Gel electrophoresis on proteins tagged with Alexa Fluor 488, 514, and 532 – standard imaging








False color image of the same gel produced with Headwall's proprietary classification algorithm



Fluorescence emission spectra of Alexa Fluor 488, 514, and 532. The overlapping emission spectra cannot be separated with bandpass filters without significant bleed or loss of signal.



PRODUCTS SUITABLE FOR THIS APPLICATION

IMAGING SENSOR	DESCRIPTION	SPECTRAL RANGE	SPATIAL PIXELS
	Nano-Hyperspec [®] VNIR	400-1000nm	640
	Micro-Hyperspec [®] VNIR A-Series	400-1000nm	1,004
	Micro-Hyperspec [®] VNIR E-Series	400-1000nm	1,600
	Laboratory Scanning Kits	various	various
	Scanning Hyperspectral Microscope	various	various

THE HEADWALL ADVANTAGE

- Simultaneously measure and separate all fluorophore emissions between 400-1000 nm
- Separate and identify fluorophore emissions that are $\geq 4\text{nm}$ apart
- Proprietary separation algorithm
- Imaging processing expertise and custom software
- World leader in original holographic grating production (the heart of the UHF1 Imager)