

EXPANDING CONFOCAL IMAGING INTO THE NEAR INFRARED WAVELENGTHS

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Since the introduction of the confocal microscope, 3D imaging has become the norm. By using the confocal.nl RCM upgrade box, a confocal microscope is created on the basis of an imaging microscopy setup, that has 3x better sensitivity, that has 40% better resolution than other (traditional) confocal microscopes on the market. Because of the disruptive product concept we can offer our confocal solution at a very affordable price level. On top of that, the RCM confocal microscope is very easy to use, offering consistent results for all users.

One of the unique features of the RCM confocal microscope is that it is camera based. Cameras are made with different resolutions, different sensitivities but also with different wavelength sensitivities. Recently new cameras have been released offering 95% QE. These new cameras make the RCM confocal microscope 3x more sensitive than a typical GaAsP PMT (30% QE) based confocal microscope.

By optimising the internal optics for NIR wavelengths (650 - 850nm) and changing the camera type to a NIR camera, a sensitive NIR confocal microscope is created. Normally the use of NIR wavelengths is associated with lower resolution because of the longer wavelengths, but the re-scanning principle of the RCM improves the resolution again. At 780nm excitation the resolution of a confocal microscope is 330nm but RCM improves this to 250nm!

For deep imaging typically a multi-photon microscope is used. In this way a high-power pulsed laser is used at wavelengths 900 - 1300 nm generating visible light excitation pulses deep in the specimen. The emission light is visible and suffers from scattering deep in the tissue. In molecular imaging (eg whole mouse imaging studies) NIR dyes are used to avoid this unwanted scattering. The RCM-NIR now offers true confocal imaging with improved resolution when using the NIR dyes, opening up new applications for confocal microscopy avoiding the need for a high-power pulsed laser.

RCM-VIS and RCM-NIR are available as complete microscope systems but also as upgrade versions from confocal.nl