

Nikon A1R - Overview

Basics of laser scanning confocal

A laser scanning confocal microscope produces high resolution images of 3D samples of up to 15 microns. It operates using pinholes on the laser beam path, blocking the out of focus light from the specimen. Images are acquired point by point with a PMT (Photo Multiplier Tube) while scanning the laser beam. Each point will be reconstructed as one pixel of the resulting image.

The size of the pinhole (circular aperture) can be modified. When the pinhole is open to its maximum the detector receives more light and the reconstructed image will be brighter but the resolution will be lower. On the other hand, when the pinhole is at its minimum the reconstructed image will be dimmer but with higher resolution.

Laser scanning confocal microscopy is ideal for fixed samples 5 to 15 microns thick, it achieves very good optical sectioning. Scanning the laser beam is a slow process and therefore not appropriate for all live samples. Image reconstruction is done in the image viewing software.

Nikon A1R parts

The Nikon A1R microscope operates with several different laser lines (405nm, 488nm, 561nm, 638nm) all combined into an optical fiber. The laser output is then scanned with a galvanometer (a mirror electronically controlled) or a piezo-electric device (resonant mode) and goes through the pinhole and microscope objective before reaching the sample.

Two types of detectors are used:

Nikon PMT for the 400-500nm range

GaAsP PMT for the 500-600nm range

There is the option to use an Okolab stagetop incubator with CO₂, temperature and humidity controls.

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