



Prime™ Scientific CMOS Camera

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Gene Expression, Quantitative Time-Lapse Microscopy

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BACKGROUND

The Locke Group investigates noise in gene expression with a particular interest in cell response to environmental signals. One such research interest is the circadian clock of cyanobacteria which, as a photosynthesizing organism, must respond to day and night cycles as well as faster environmental changes.

The group observes these responses at the single-cell level using quantitative time-lapse microscopy. This method reveals novel dynamics that were previously obscured by bulk averaging effects.

CHALLENGE

Christian Schwall, PhD Student from the Locke Group shares “Cyanobacteria has a slow division cycle that can take upwards of twelve hours which necessitates long time-lapse exposure over the course of several days.” The research team previously used CCD cameras for this type of imaging but decided to look for a way to reduce exposure times and illumination levels. Their goal was to find a solution for reducing photobleaching and cellular damage without compromising signal to noise.

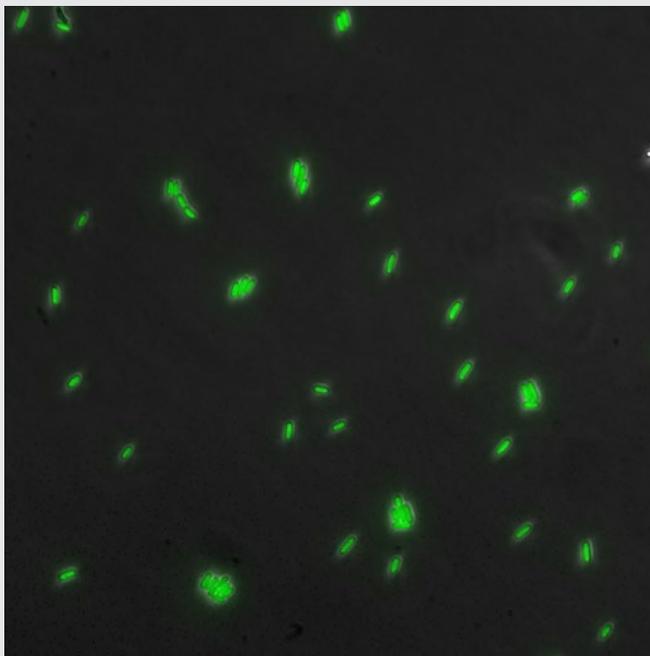
“We chose the Prime camera because it provides very high signal sensitivity while minimizing noise.”

Additional information about the Locke Group is available at: <http://www.slcu.cam.ac.uk/research/locke-group>

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SOLUTION

A number of imaging options were tested before making the decision to purchase the Photometrics Prime sCMOS camera. Schwall explains, "We chose the Prime camera because it provides very high signal sensitivity while minimizing noise. Prime gives us the signal to noise improvement we needed." Additionally, the camera's large field of view enabled the group to increase their throughput, which in turn increases the amount of data collected in a single exposure. Schwall summarizes "Our images just look better with the Prime sCMOS camera."



Time lapse exposure of cyanobacteria *Synechococcus elongates* labeled with GFP under 100x magnification.



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