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CUSTOMER REFERENCE

Prime BSI™ Scientific CMOS Camera

Live Cell Time Lapse Imaging

Prof. Kurt Anderson and Dr. Matt Renshaw

Crick Advanced Light Microscopy (CALM), Francis Crick Institute, London, UK

BACKGROUND

Prof. Anderson is the head of the Crick Advanced Light Microscopy (CALM) facility. Prof. Anderson and senior laboratory research scientist Dr. Renshaw oversee >16 advanced microscopy systems in the CALM facility, including point scanning confocal, spinning disk confocal, multi-photon, light-sheet, TIRF and more. CALM staff also train scientists to use these specific systems so they can better obtain quantitative imaging data for their experiments, running microscope courses frequency throughout the year.

One of these systems is used for long-term time-lapse (LTTL) imaging of live cells, a microscope in a closed controlled environment system designed for up to 48 hour experiments. Researchers from all over the Crick Institute use the LTTL system for cell documentation.

> “By changing to the Prime BSI, it allowed users to reduce the magnification from 60 to 40 or 20, letting them take images with a much larger FOV without a loss of sensitivity.”

CHALLENGE

Because of the lengthy nature of the time lapses, frame rate and camera speed is far less important than the sensitivity and field of view (FOV). Users of the LTTL system want a big field of view in order to track as many cells as possible over the long term, in order to look at mitosis and other cell behavior.

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SOLUTION

The large FOV and high resolution of the Prime BSI is a good fit for the LTTL system. As some experiments involve cells that aren't so sensitive to light, users have the option to switch to 12-bit mode, dropping exposure and intensity and working in low light conditions, thanks to the sensitivity of the BSI. As mentioned by Dr. Renshaw, "we originally had a CCD solution, the smaller sensor would only capture a quarter of the FOV as the sCMOS, so would need four times the images and exposures to capture the same number of cells." The CALM facility has access to a number of scientific camera solutions, with Dr. Renshaw also saying "we had a EMCCD with very big pixels, by changing to the Prime BSI with smaller pixels, it allowed users to reduce the magnification from 60 to 40 or 20, letting them take images with a much larger FOV without a loss of sensitivity".

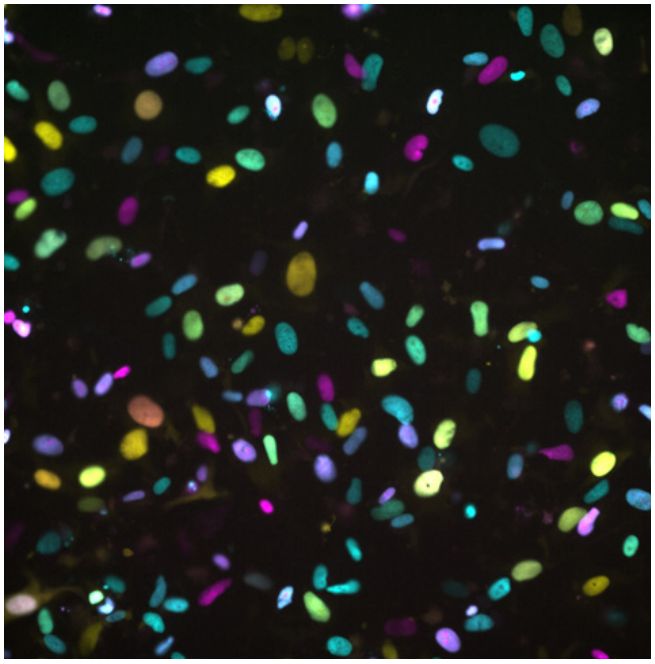

Figure 1 Cells expressing a FUCCI cell cycle sensor. Image is a single time point from a longer time-lapse, from Jingkun Zeng in the Diffley Lab, Crick Institute.