X-Cite®
Fluorescence Illumination • In Control

X-Cite® XLED1 provides higher signal to noise ratio for fluorescence detection

Challenge

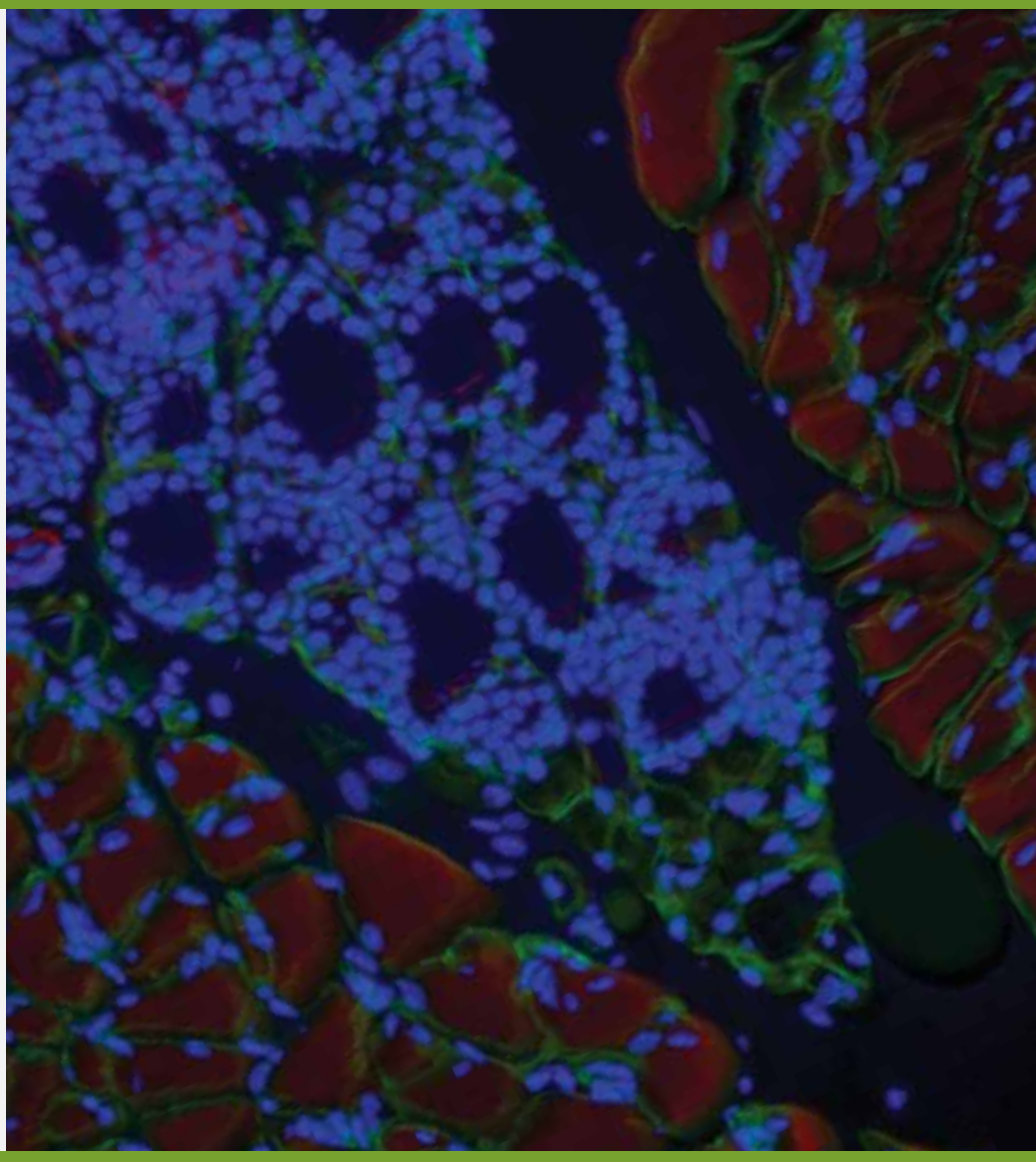
Trying to find an appropriate light source to collect fluorescence data from Xenopus oocytes while minimizing noise reaching the PMT detector.

Solution

XLED1 with light guide delivery.

Benefit

Increased signal to noise and lower heat for live cell fluorescence imaging.



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Case Study: X-Cite® September 2011

Introduction

Our lab conducts studies of voltage-dependent proteins using tetramethylrhodamine (TMR) maleimide in Xenopus oocytes. Fluorescence signals are collected using a PMT to provide increased fluorescence sensitivity for our studies.

We traditionally use xenon lamps connected directly to the microscope for our fluorescence needs because they provide a stable light output when measured with a PMT. The shortcoming of these light sources is that they generate a lot of heat increasing the temperature in our Faraday cage set-up. Another issue is getting to the lamp housing to replace the lamp and the tedious step of aligning it within the confines of the cage which requires some acrobatic abilities. Moving to a light guide lamp or LED system is a better option to prevent the heating up of the Faraday cage. The pre-aligned light source would not require aligning, and the whole light source could be placed outside the cage reducing clutter and sources of noise within the cage as a bonus.

Case

Our search for a light guide xenon lamp system that was stable enough for our experiments took almost a year and was unfruitful. They all generated arc noise that was easily picked up by the PMT. Manufacturers were, for the most part, unaware of this noise because most users used a camera with these light sources and cameras are not as sensitive as PMTs. As a result, we reverted to using a xenon lamp housing attached directly to the microscope to achieve the signal-to-noise that was acceptable for our research and continued to cope with the inconveniencies of these lamps.

We came across the X-Cite® XLED1 in its initial development phase and it was everything we had been looking for. The system uses a light guide to bring the light to any microscope eliminating the excess heating problem as well as the alignment problem. We were able to use the 525nm LED in this four wavelength system to successfully excite the TMR-maleimide. More importantly though, the X-Cite® XLED1 provided a bright, stable light source that matched and even improved on the signal to noise we were accustomed to with our traditional light source.

Conclusion

We were very pleased to see that when using the X-Cite® XLED1 system, we were able to collect a good fluorescence signal without the extraneous noise generated by the xenon lamp light guide systems as well as avoiding the excess heat and inconvenience of the attached xenon lamp housings. The convenience of the XLED1 system and light guide delivery was quite pleasant to work with.

> The X-Cite® XLED1 was everything I had been looking for - a light guide system that would not generate extra heat close to my sample with a bright, stable light source that is easy to maintain.
>
> *- Susy Kohout, PhD, Department of Molecular Biology, UC Berkeley, USA*

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