

Photoreact365: Uniform, directed and reproducible UV light irradiation for photobiological and photochemical applications

In the rapidly expanding field of photodynamic therapy, powerful, targeted illumination devices are increasingly in demand. Drug development in this field is often limited by a lack of off-the-shelf light sources capable of providing uniform illumination to a 2D surface.

To address this problem, we invented a prototype light delivery system capable of irradiating multi-well plates for high-throughput assays (Bounds et al., 2021). PhotoReact365 has now been developed into a commercially available platform which provides uniform illumination of samples with UV-B radiation at 365nm, with an irradiance of up to $13\text{mW}/\text{cm}^2$ and a radiant exposure of $23.4\text{J}/\text{cm}^2$. The NRTL certified, CE marked system has been designed to accept MWP's in any format as well as up to 5 microscope slides or a standard size petri dish.

The Photoreact365 has been used by researchers at LightOx Ltd to examine the effects of our phototherapeutic compounds on cell viability in both bacteria and mammalian cells. We have shown that by photoactivating our compounds we can induce cell death via photoactivation as well as inhibiting bacterial growth.

The Photoreact365 can also be used to diminish autofluorescence in histological samples by harnessing the power of photobleaching. Autofluorescence is notoriously problematic when trying to distinguish true fluorescent signal above background in mammalian tissues. By using the Photoreact 365 to photobleach histological samples prior to immunofluorescent staining, we can significantly enhance the signal-to-noise ratio without compromising the integrity of the antigen of interest.



