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Photomodulation of Bioelectric Bacterial Signalling via a Membrane-Targeted Amphiphilic Azobenzene

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Optogenetics and covalent approaches to bio conjugation allow achieving large and effective cell photo-stimulation, yet these are invasive methods that might encounter severe limitations on the way towards clinical applications in photopharmacology. The non-covalent affinity of photoresponsive molecules to biotargets represents an attractive alternative.[1] In this context, we have recently proposed an amphiphilic azobenzene photochromic molecule (ZIAPIN2) whose selective dwells in the plasma membrane and enables modulation of the cell potential, remarkably permitting to evoke light-induced neuronal firing in vitro as well in vivo.[2–5]

Here, we show ZIAPIN2 can be exploited to modulate bacterial membrane potential. We observe that while in the dark proliferation is hindered, light illumination in the visible range leads to a restoration of bacterial growth for *Bacillus Subtilis*. We relate such an effect to the photoinduced modification of the bacterial transmembrane voltage, which in turns can permit to elicit photoinduced intercellular signaling.

References

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