Synthesis and Optical Measurments of Photochromic Fluorophores for Enzyme Detection

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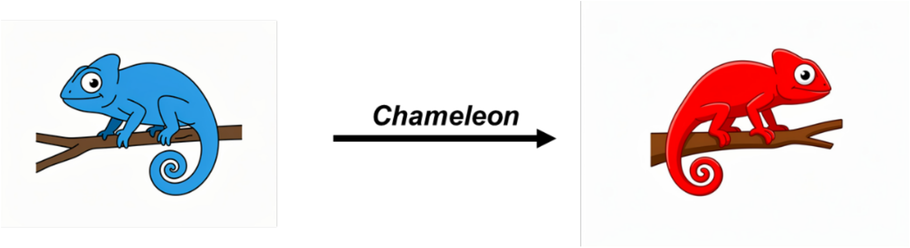

Photopharmacology is an emerging field within medicinal chemistry and chemical biology that takes advantage of light to modulate the biological activity of molecules.[1] In this work, we report the design and synthesis of novel Photoswitchable dyes inspired by the clinically approved inhibitor Axitinib.[2] By integrating a photo-responsive switching unit into the axitinib-derived scaffold, we aim to generate light-regulated analogues with biological applications.

The synthesized compounds exhibit efficient and reversible photoisomerization behavior. UV–Vis spectroscopy shows that the thermodynamically stable isomer displays a strong absorption band centered around 400 nm prior to irradiation. Upon light exposure, isomerization to the trans-isomer occurs, accompanied by a significant bathochromic shift toward longer wavelengths. This red-shifted trans-form presents a distinct absorption profile, allowing optical differentiation between isomeric states. The switching process is fully reversible and demonstrates good photochemical stability over multiple irradiation cycles.

Such red-shifted absorption characteristics are particularly relevant for biological applications, as they enable activation with visible light, minimizing photodamage and improving cell compatibility, such as spiropyrans.[3] Overall, this study demonstrates that axitinib-inspired scaffolds can be successfully transformed into reversible Photoswitchable systems with favorable photophysical properties.

References

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