

Technology Offer

CSIC/XA/019

## Light-controlled beta blockers for the treatment of ocular diseases



**Compounds useful as reversible visible-light-regulated antagonists for the localized and temporally restricted activation of beta-adrenoceptors, with application for the treatment of ocular diseases such as glaucoma.**

### Intellectual Property

European priority patent application filed

### Stage of development

*In vivo* proof of concept in a mouse model

### Intended Collaboration

Licensing and/or co-development

### Contact

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### Market need

Glaucoma is a complex and progressive eye disease characterized by damage to the optic nerve, often due to elevated intraocular pressure. While beta-blockers are effective in managing chronic glaucoma, their use requires careful consideration of potential systemic side effects and a fine control of the patient's medication, particularly in patients with respiratory or cardiac conditions. Another possible application of beta-blockers for eye diseases include diabetic corneal sensory nerve dysfunction. Therefore, there remains a critical need for novel therapeutic approaches that can manage glaucoma more effectively while minimizing adverse effects.



### Proposed solution

Novel beta blockers which are photoswitchable with light above 405 nm, which is highly present in the spectrum of sunlight and artificial light sources from medical devices, and which have short thermal relaxation times (less than 10 minutes). The photochemical and pharmacological properties of these compounds are ideal for the development of eye disease therapies, as the drug rapidly returns to its inactive configuration in the absence of light.

These compounds would respond to wavelengths suitable for intraocular pressure (IOP) regulation under visible light while remaining inactive in respiratory and cardiac tissues, thereby preventing adverse effects that are frequently observed in glaucoma patients treated with beta-blockers.

### Competitive advantages

- Provide a novel and highly advantageous approach compared to traditional drugs, offer precise control over the timing, location, and intensity of drug action, and enhance treatment efficacy.
- Offers the possibility of treatments with greater localized precision, reducing side effects on internal organs and distant tissues.