Photoresponsive drug delivery systems for the treatment of eye diseases

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Technology

Current treatments for posterior segment eye diseases often require repetitive intravitreal injections, leading to low patient compliance and potential ocular complications. While systemic delivery is less invasive, it is less effective in treating ocular lesions. Our innovative technique addresses these challenges by intravenous administration of photoresponsive nanoparticles, followed by light irradiation to the eye. This approach allows for the targeted release of therapeutic agents within the eye without causing noticeable systemic side effects. This technique presents a comprehensive solution for treating posterior segment eye diseases, including retinoblastoma and age-related macular degeneration.

Stage of Development

Animal evaluations completed in retinoblastoma and laser-induced choroidal neovascularization mouse models

Key Advantages

- Targeted Drug Delivery – Light irradiation to the eye induces drug release from systemically circulating nanosystems for localized treatment of ocular lesions.
- Improved Therapeutic Outcomes – The nanosystems can be integrated with phototherapy agents, allowing for combination therapy.
- Translational Potential – The nanosystems can be fabricated using FDA-approved lipid-polymer materials and designed with prodrugs.

Opportunities

- Versatile light-triggered drug release platforms for localized disease treatment
- Minimally invasive approach for ocular delivery of combination therapeutic agents

Intellectual Property

CN Patent No. 202180029535.X, 2022
US Patent No. 17/904,833, 2022
European Patent No. EP21793651.7, 2022
CN Patent No. 202280052151.4, 2024
US Patent No. 18/293,171, 2024

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