

Griseofulvin Formulation for Therapy of Wet Macular Degeneration

Sustained-release ocular therapy reducing injection frequency in macular degeneration patients.

Researchers at Purdue University have developed a formulation that allows sustained release of drugs for treatment of wet age-related macular degeneration (AMD). Currently, treatment for wet AMD involves intravitreal injections of anti-VEGF agents. However, around 40% of patients do not respond to anti-VEGF therapy. Individuals that do respond often incur adverse effects, such as increased intraocular pressure or endophthalmitis, because of repeated intravitreal injections. To address these pitfalls, Purdue researchers have developed a polymeric nanoparticle formulation for long term ocular delivery of griseofulvin (GRF), an antifungal drug repurposed for antiangiogenesis, as an alternative wet AMD therapy. The particle size and nanoparticle component molecular weights were optimized to limit burst release of GRF. Release studies of nanoparticle-encapsulated GRF displayed 5.6% release in 1 hour and ~75% release over the course of 30 days. Cell based proliferation assays with human retinal endothelial cells demonstrate the efficacy of this sustained release formulation. GRF-loaded nanoparticles inhibited the proliferation of human retinal endothelial cells about half as much as free GRF over 48 hours at a concentration equivalent to 100 micromolar GRF, as expected for a slow-release formulation. This technology could prove to be a safer and more effective treatment option against wet AMD upon further development.

Advantages

- Novel Age-Related Macular Degeneration Target
- Reduce Frequency of Ocular Injections
- Less Expensive than Existing Formulations for AMD

Applications

- Wet Age-Related Macular Degeneration

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2020-YEO-69132

Category

Biotechnology & Life
Sciences/Bioinformatics &
Computational Biology
Artificial Intelligence & Machine
Learning/AI Model Optimization
& Acceleration Tools
Pharmaceuticals/Drug Discovery
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-Sustained Drug Release

Technology Validation:

Dynamic light scattering displayed homogenous size distribution of GRF-encapsulated nanoparticles. Burst release was reduced by optimizing particle size and molecular weight of encapsulating polymers. Scanning electron microscopy showed spherical particles with smooth surfaces. Cell based proliferation assays show comparable activity of GRF-loaded nanoparticles to free GRF.

TRL: Pharmaceuticals

Intellectual Property:

Provisional-Patent, 2020-06-26, United States

NATL-Patent, 2021-06-24, Europe

NATL-Patent, 2021-06-24, India

PCT-Patent, 2021-06-24, WO

NATL-Patent, 2021-06-24, China

NATL-Patent, 2022-12-22, United States

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