PATENT

ciber CENTRO DE INVESTIGACIÓN BIOMÉDICA EN RED

NANO-ENGINEERED MESENCHYMAL STEM CELLS TO TREAT OCULAR DISEASES

The Need

Although mesenchymal stem cells (MSC) transplantation is, to a certain degree, effective to treat limbal stem cell deficiency (LSCD) and other ocular diseases; this strategy alone is not enough to totally eliminate alterations associated to LSCD. Therefore, new and innovative therapies are needed.

The Solution

Nanoengineered mesenchymal stem cells having nanoparticles internalized in them which are loaded with a therapeutic agent for the treatment of inflammatory ocular diseases or ocular symptoms of autoimmune diseases.

Innovative Aspects

No pre-corneal elimination leading to low drug absorption by the eye

Targeted arrival of the active principle to the damaged tissues due to MSCs chemotactic migration properties into damaged (inflamed) ocular tissues

Treat-to-target system: *in situ* anti-inflammatory effects

Migration from the administration area (conjunctiva) to the limbus and cornea

Controlled release of the active principle and maintained over time, increasing its time of action

Useful for all aetiologies and all bilateral cases

Cells must not be autologous, cells can be allogeneic

Cells are non-immunogenic and they will not be associated to immunosuppressive (immunosuppressant)

No use of invasive techniques (such as surgery) and no use of anaesthetic agents

Preferably administered by the subconjunctival route

Can be administered by the ophthalmologist

Organic solvents are not used for their elaboration

No excipients which might cause adverse secondary effects, particularly in subjects having damaged ocular surface

No toxicity associated

Stage of Development: Preclinical

Intellectual Property

European patent application (Priority date: November 14, 2025)

Suitable for international extension (PCT application)

Available for:

- **Licensing**
- **Further development**

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Bioingeniería, Biomateriales y Nanomedicina

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