Technology Offer

HELPER-DEPENDENT ADENOVIRAL VECTOR DELIVERING A CRISPR/CAS9 GENOME EDITING SYSTEM TO EXCISE EXON 80 OF COL7A1 FOR THE TREATMENT OF EPIDERMOLYSIS BULLOSA

Results achieved from researches from CIBER, CIEMAT, UC3M and IIS-FJD offer an evidence of a novel treatment for Recessive Dystrophic Epidermolysis Bullosa (RDEB)

The need

EB refers to a group of diseases characterized by strong skin fragility. The recessive dystrophic subtype (RDEB) is the most severe phenotype of the disease.

A large number of mutations have been described within *COL7A1* gene, making this gene the main target of gene therapy strategies RDEB.

The solution

The proposed medicinal product consists of a topically administered helper-dependent adenoviral (HDAd) vector delivering a CRISPR/Cas9 genome editing system specifically designed to excise exón 80 of COL7A1.
The vector is administered within a fibrin matrix directly onto affected skin areas, enabling in vivo genome editing of keratinocytes and dermal fibroblasts within regenerating wound beds.

Innovative aspects

- **Genetic restoration**. Restores the open reading frame of COL7A1, enabling the expression of an internally truncated but functional collagen VII protein.
- **In situ correction of the molecular defect**. Enables correction of the endogenous genetic defect directly in the tissue, under physiological gene regulation, without requiring surgical transplant of bioengineered skin products.
- **Long-term genetic correction**: Non-clinical data support the potential for durable genome editing of the endogenous COL7A1 locus, including long-term correction of epidermal progenitor and stem cells.
- **Sustained functional restoration**: Promotes long-term recovery of dermal-epidermal adhesion, potentially resulting in a prolonged therapeutic benefit.
- **Advantages over existing approaches**: May provide a longer-lasting therapeutic effect than transient episomal gene delivery strategies, reducing the need for repeated treatments and complex ex vivo skin graft procedures.
- **Minimally invasive administration**: Topical administration.

Stage of Development:

Advanced non-clinical proof-of-concept stage. Studies in patient-derived primary cells and a humanized RDEB skin graft model have demonstrated the feasibility of topical HDAd-mediated CRISPR/Cas9 genome editing, restoring collagen VII expression and dermal–epidermal adhesion.

Orphan Drug Designation in 2026 in Europe: EMAOD0000355640

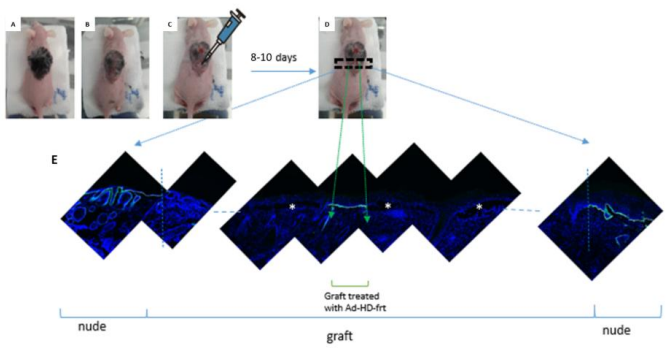


Figure 1. Topical treatment with HDAd-SpCas9.gFRT restored collagen VII expression in the treated skin areas in the *Col7a1*^flneo/flneo homozygous mouse model.

Aims

Seeking partners interested in licensing and/or co-development agreements to advance this technology toward clinical translation and commercialization.

Contact details

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