Transposon-based, targeted ex vivo gene therapy to treat age-related macular degeneration (AMD)

Result in Brief

Project information

TARGETAMD

Grant agreement ID: 305134

Status
Closed project

Funded under:
FP7-HEALTH

Overall budget:
€ 7 772 860,37

EU contribution
€ 5 976 298

Coordinated by:
UNIVERSITE DE GENEVE

Regenerative gene therapy for retinal degeneration

A European study has designed an innovative personalised therapeutic strategy for treating retinal degeneration. It is based on the delivery of a genetically modified advanced cell product that will regenerate the disrupted retinal architecture in the eye of neovascular AMD patients.

Age-related macular degeneration (AMD) is a chronic progressive condition that results from age-related alterations in the retina. There are two types of AMD: a slow-progressing, non-vascular form and a rapidly progressing, blinding form. In the latter, low levels of pigment epithelium-derived factor (PEDF), an inhibitor of vascularisation and potent neurotrophic factor, and high levels of vascular endothelial cell growth factor (VEGF), have been observed, leading to the invasion of the subretinal space by the choroidal vasculature and disruption of the retinal architecture.

Current treatment consists of monthly injections of anti-VEGF antibodies or inhibitors to suppress neovascularisation. However, the high cost and low efficacy of this approach demands a viable therapeutic
The partners of the EU-funded TARGETAMD (Transposon-based, targeted ex vivo gene therapy to treat age-related macular degeneration (AMD)) project, propose to transplant GMP-grade genetically modified cells that overexpress PEDF in a First-In-Man clinical trial as a life-long therapeutic solution for AMD.

The personalised procedure entails introduction of the human PEDF gene into autologous iris pigment epithelial cells ex vivo, and transplantation into the sub-retinal space of AMD patients. Introduction of the PEDF gene in cells will be mediated by the non-viral Sleeping Beauty transposon system that has the capacity to integrate into the host cell's genome. The transplanted cells will secrete the anti-angiogenic and neurotrophic factor in the subretinal space, which will inhibit the choroidal neovascularisation and regenerate the normal retinal architecture.

Preclinical studies have shown consistency of production of a high quality Gene Therapy Medicinal Product and have demonstrated safety and efficacy of the approach in vivo in three species and models. Development and production of novel devices, reagents and plasmids have been successfully completed. In a recent Presubmission Meeting where the preclinical data was presented and discussed, the Swiss regulatory authority, Swissmedic, confirmed appropriateness of preclinical data toward the clinical trial.

The TARGETAMD partners are confident that the major challenge of the procedure, which is associated with the small number of isolated cells, has been successfully overcome and are optimistic that the phase Ib/IIa clinical trial for the treatment of AMD using genetically modified autologous cells will transform AMD treatment.

**Keywords**

Regenerative medicine, age-related macular degeneration, pigment epithelium-derived factor, Gene Therapy Medicinal Product, cell therapy, transposon

**Discover other articles in the same domain of application**

*Low-dose 3D X-ray imaging opens new horizons*

31 October 2019
SCIENTIFIC ADVANCES

The assembly line of the future: automated tool to help synthetic biology research

25 September 2018

NEW PRODUCTS AND TECHNOLOGIES

The IMI EHDEN Consortium Launches Its First Open Data Partner Call

23 July 2019

Share this page

Last update: 8 April 2015

Record number: 158587