

Factsheet



FULL TITLE FORCE REPAIR – smart and multiFunctional 3D printable prO-Regenerative biologiCal matrix modulating mEchanotRansduction as advancEd theraPy to treAt skIn chronic wounds

PROGRAMME HORIZON-CL4-2022-RESILIENCE-01

CONTRACT NUMBER 101092243

ABSTRACT Due to population lifestyle changes, i.e., obesity, diabetes and an ageing population, chronic wounds (CW) which fail to follow the typical healing process are a major medical and socioeconomic challenge. Current wound management is clearly insufficient and advanced therapies have failed to keep their promise of reliable skin regeneration. The aim of FORCE REPAIR is to develop a smart and multifunctional wound dressing providing a pro-regenerative environment and mechanical stability to treat CW. Thus, FORCE REPAIR will combine state-of-the-art technologies in a biological scaffold tailored to patients' needs:

(1) Antibacterial and bioadhesive bioink with antibiotics and anti-inflammatory loaded nanocapsules, (2) Elastin-like polypeptides promoting innervation and vascularisation, (3) Wharton Gel Complex preventing oxidative stress and boosting key extracellular matrix proteins. Also, the dressing activated by UV light will induce contractile force to help wound closure and activate skin regeneration. A customised 3D bioprinter with user-friendly 3D trajectory software will help to strategically place the biological compounds to address and mitigate the degenerative process occurring in CW, i.e., infection, inflammation, and tension forces to promote skin regeneration. The 3D-printed dressing will be tested in relevant *in vitro* models with a human exudate library and in relevant key healing steps (i.e., re-epithelisation, angiogenesis, cell proliferation, etc.). Selected candidates will be tested *in vivo* on pig CW models and mice with a bacterial infection. To ensure translation to clinical practice and to reach patients, a regulatory framework, HTA and a business model will be defined for a viable exploitation strategy that will decrease the economic burden of wound care management and improve patients' quality of life. Finally, to ensure market acceptance, health professionals will guide the development of FORCE REPAIR to offer a dressing that treats CW efficiently and can be used by medical staff.

DURATION 48 months (01/01/2023 – 31/12/2026)

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