

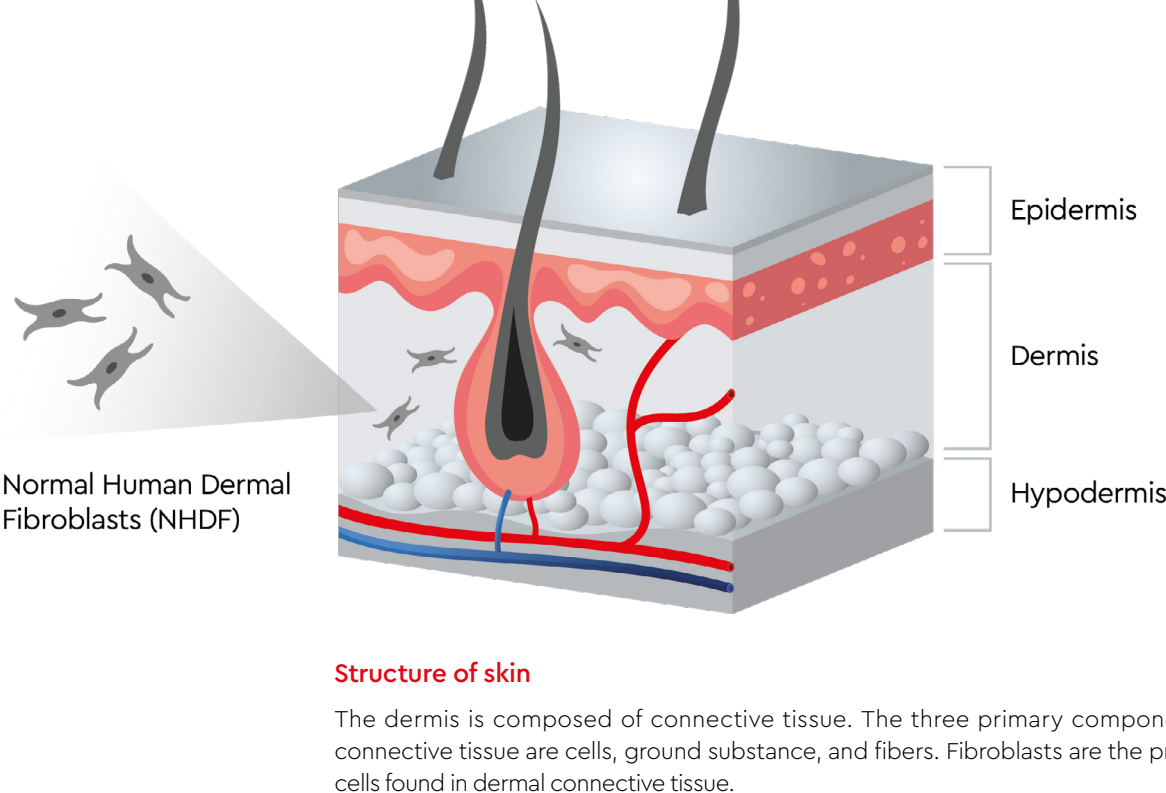
# Defined and animal component-free dermal fibroblast culture infographic

PromoCell®

Learn about defined and animal component-free fibroblast culture for your dermatology research

## Introduction

Dermatological research is progressing in new ways due to technological advances. Recent developments in dermal fibroblast research offer fresh insights into skin biology, aiming to improve skin repair after damage caused by disease, injury, or burns.



**Structure of skin**  
The dermis is composed of connective tissue. The three primary components of the connective tissue are cells, ground substance, and fibers. Fibroblasts are the predominant cells found in dermal connective tissue.

## What is defined, animal component-free cell culture media?

A defined and animal component-free (D-ACF) cell culture medium is a specific formulation that excludes any ingredients derived from animal or human sources ("ACF") and incorporates inorganic salts or complex semi-synthetic or synthetic molecules, including peptides ("defined"). Defined and animal component-free formulations for cell culture ensure consistency, reproducibility, and compliance with regulatory and ethical standards.

## Importance of D-ACF media for dermatology research

D-ACF formulations offer several advantages over traditional cell culture media:

- Making regenerative medicine research translatable and relevant.

- Reducing "masking effects" of animal components that may influence experimental result.

- Optimal for drug screening, drug development, and genome editing applications

- Complying with no animal testing for cosmetic research.

## Use of dermal fibroblast research in different fields

Dermal fibroblasts are an invaluable tool in various research areas:

Wound healing

Aging studies

Non-healing skin ulcers, such as pressure ulcers

Hair follicle regeneration

Drug discovery

Oncology

## Dermal fibroblast research in numbers

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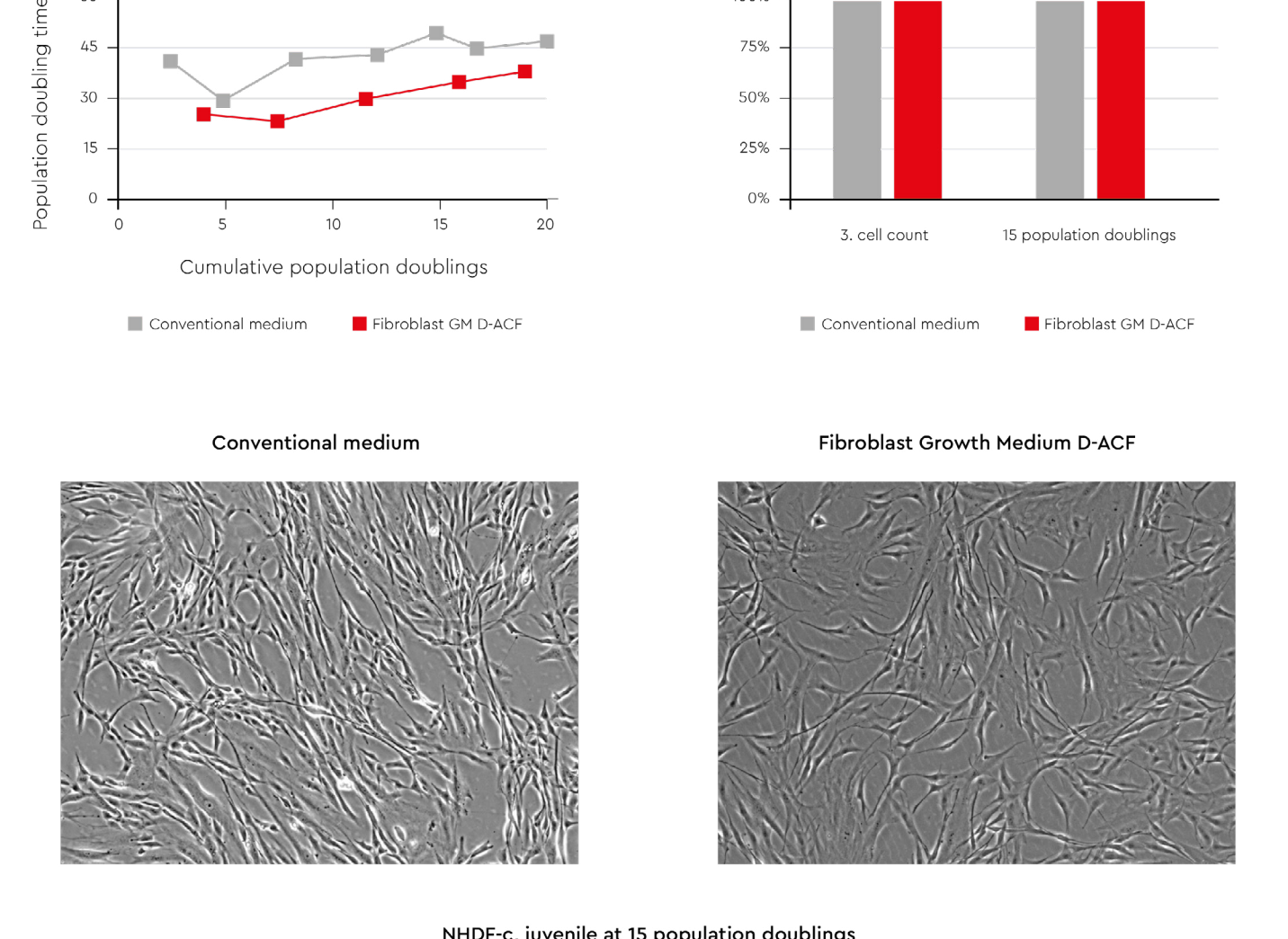
800 publications using human dermal fibroblasts in the last 12 months

9 ongoing clinical trials registered at clinicaltrials.gov

3 FDA-approved dermal fibroblast therapies

## Proliferative potential of dermal fibroblasts

Dermal fibroblasts play a key role in the initiation of wound healing. They facilitate regeneration by secreting extracellular matrix (ECM) components that enhance wound healing. The proliferative capacity of dermal fibroblasts is essential for research on skin regeneration, including chronic wound healing. Fibroblasts also regulate skin aging by secreting collagen, glycoproteins, and elastic fibers, which are the main structural components of ECM. As fibroblasts age, their ability to proliferate and produce ECM components decreases. This results in a decline in the skin elasticity and firmness.



NHDF-c, juvenile at 15 population doublings

**Fig. 2:** Comparison of population doubling time and CD90 expression in juvenile NHDF cultured in Fibroblast Growth Medium D-ACF and conventional growth media. Compared to conventional growth media, our Fibroblast Growth Medium D-ACF ensures a shorter population doubling time for juvenile NHDF for at least 15 population doublings. CD90 expression in juvenile NHDF cultured in Fibroblast Growth Medium D-ACF is comparable to that in cells cultured in conventional, serum-containing media for up to 15 population doublings. Abbreviations: NHDF, normal human dermal fibroblasts; PD, population doubling; PDT, population doubling time.

## Human juvenile fibroblasts for regenerative medicine research

“Younger fibroblasts provide pro-regenerative cues when compared to adult fibroblasts.”

(Gomes et al., 2021)

“Fibroblasts are the most suitable cell source for regenerative medicine due to their high intracellular fibroblast growth factor 2 content”

(Yanagihara et al., 2023)

“The amount of fibroblasts decreases markedly with age and their functional activity is also reduced. This inevitably leads to a decrease in the regenerative abilities of the skin”

(Zorina et al., 2022)

“Fibroblasts rejuvenated by MPTR may be applicable for treating skin wounds and improving wound healing”

(Gill et al., 2022)

## The role of CD90 in human dermal fibroblasts

CD90, also known as Thy-1, is a 25–37 kDa glycosylphosphatidylinositol-anchored protein, plays a critical role in dermal fibroblasts by:

- 1

Promoting apoptosis and maintaining skin homeostasis
- 2

Inducing a fibrotic state during skin scar formation
- 3

Interacting with  $\beta 3$  integrins to promote apoptosis
- 4

Contributing to the fibroblastic identity of NHDFs

## Challenges in research with dermal fibroblast and Fibroblast Growth Medium D-ACF as solution

### Challenges

- Reproducibility challenges due to biological variability in animal-derived components
- The potential for immunogenic responses in sensitive applications
- Ethical and regulatory concerns

### Our solution

- Improved reproducibility and consistency
- Enhanced disease modeling
- Avoidance of ethical and regulatory concerns

Reducing the use of animal tests in cosmetic research, maintaining the performance of experiments without inconsistencies, and making dermal research translatable.



Fibroblast Growth Medium D-ACF enables standardized culture of fibroblasts and reduces the risk of cross-contamination, enhancing research translation and ensuring reproducible results without the additional cost of media optimization.

## References

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