

NEW METHODOLOGICAL APPROACH TO FOLLOW THE RE-EPITHELIALIZATION PHASE IN THE WOUND-HEALING PROCESS ON A 3D FULL THICKNESS SKIN MODEL

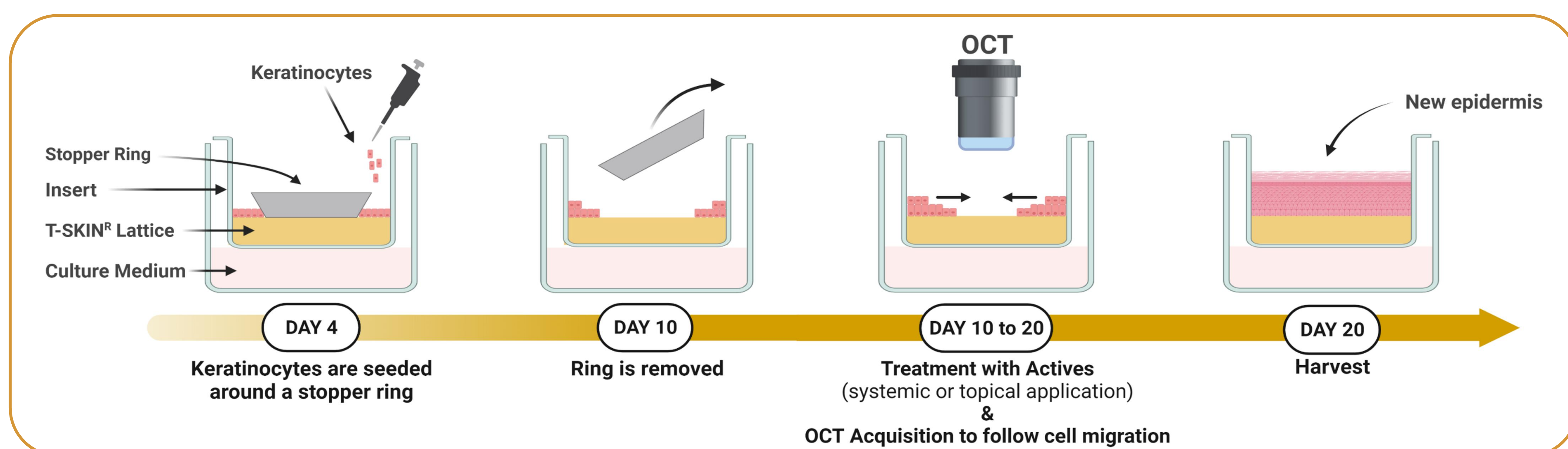
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1 INTRODUCTION

In the *in vitro* evaluation architecture of skin regenerative actives, the different mechanisms of action of ingredients need to be investigated to identify new candidates in skin regeneration, in the context of healing or anti-aging axis. A 3D migration model has been developed to mimic the re-epithelialization phase III and IV of the wound healing process [1]. Thanks to this model, in 2017, a method was developed to analyze the regenerative process using an invasive technology, i.e., Papanicolaou staining and histological observation at each day of the study.

3 MATERIALS & METHODS



OCT is a non-invasive imaging technique, based on the analysis of infrared light reflected by tissues and on the creation of an interference signal [2]. This technique allows to visualize the surface aspects, the 2D and the 3D structures of the migration model during re-epithelialization and thus to follow the kinetics of closure.

Through acquisition and segmentation with specific algorithms, epidermal and dermal thicknesses, and epidermis profile of the tissue after reconstruction are also determined.

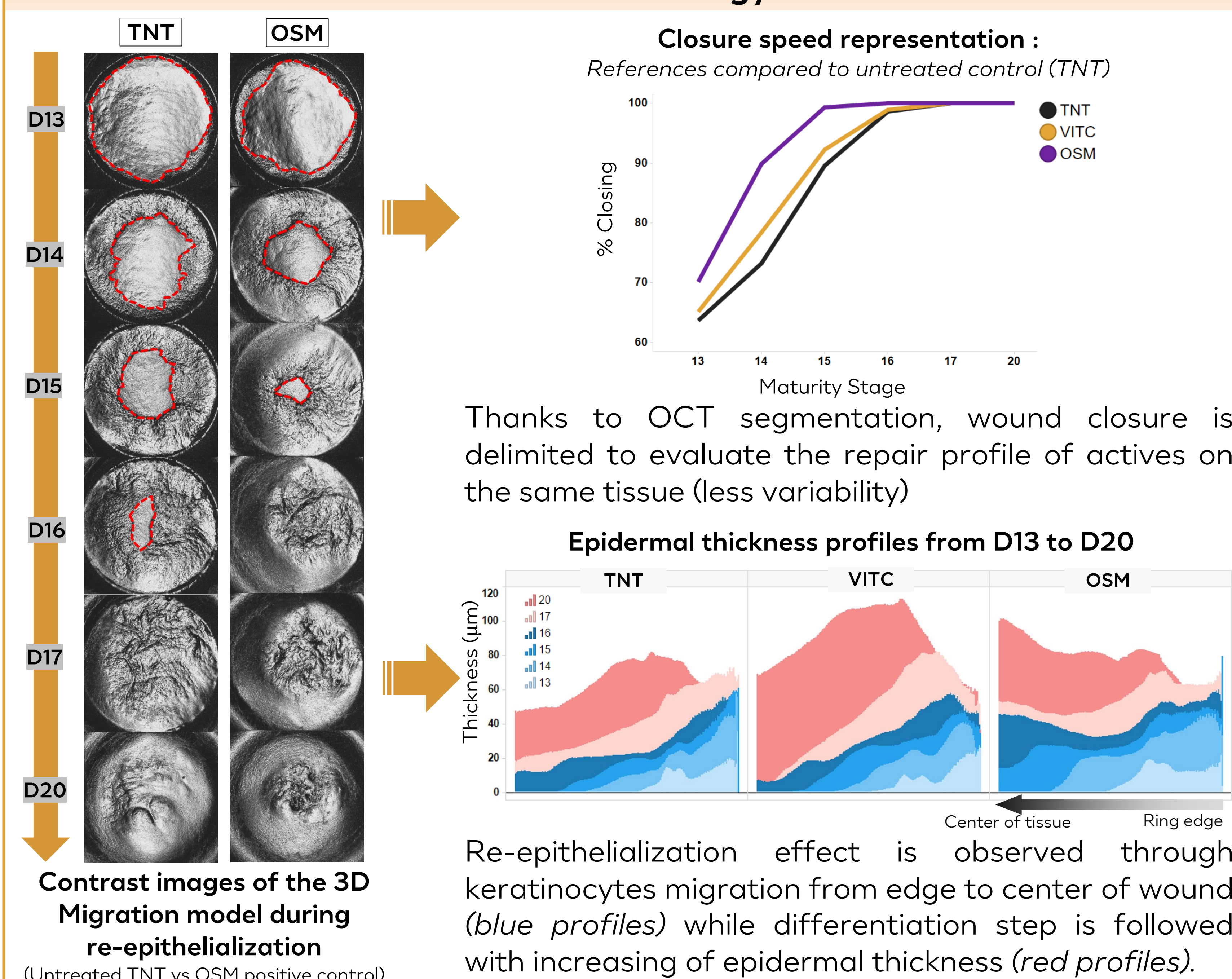
Then, global morphology of the treated tissues is scored at the end of treatment by histology [3].

4 RESULTS AND DISCUSSION

2 clinical references are used for their positive effect on the test :

- ✓ **Oncostatine M (OSM)** increases the speed of migration and proliferation of keratinocytes (eq. wound closure)
- ✓ **Vitamin C (VITC)** improves quality of reconstruction, organization and differentiation (eq. quality of skin)

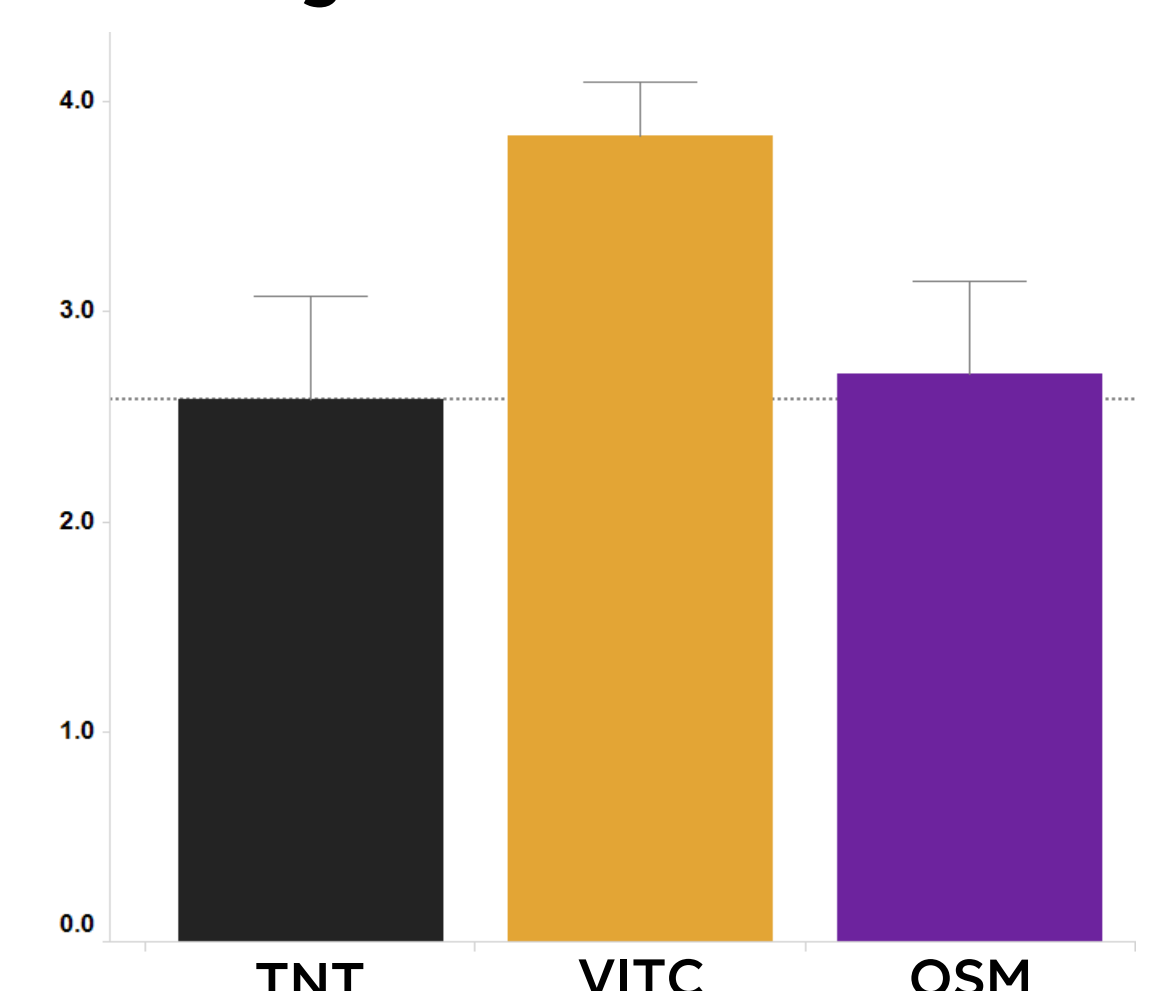
OCT Technology



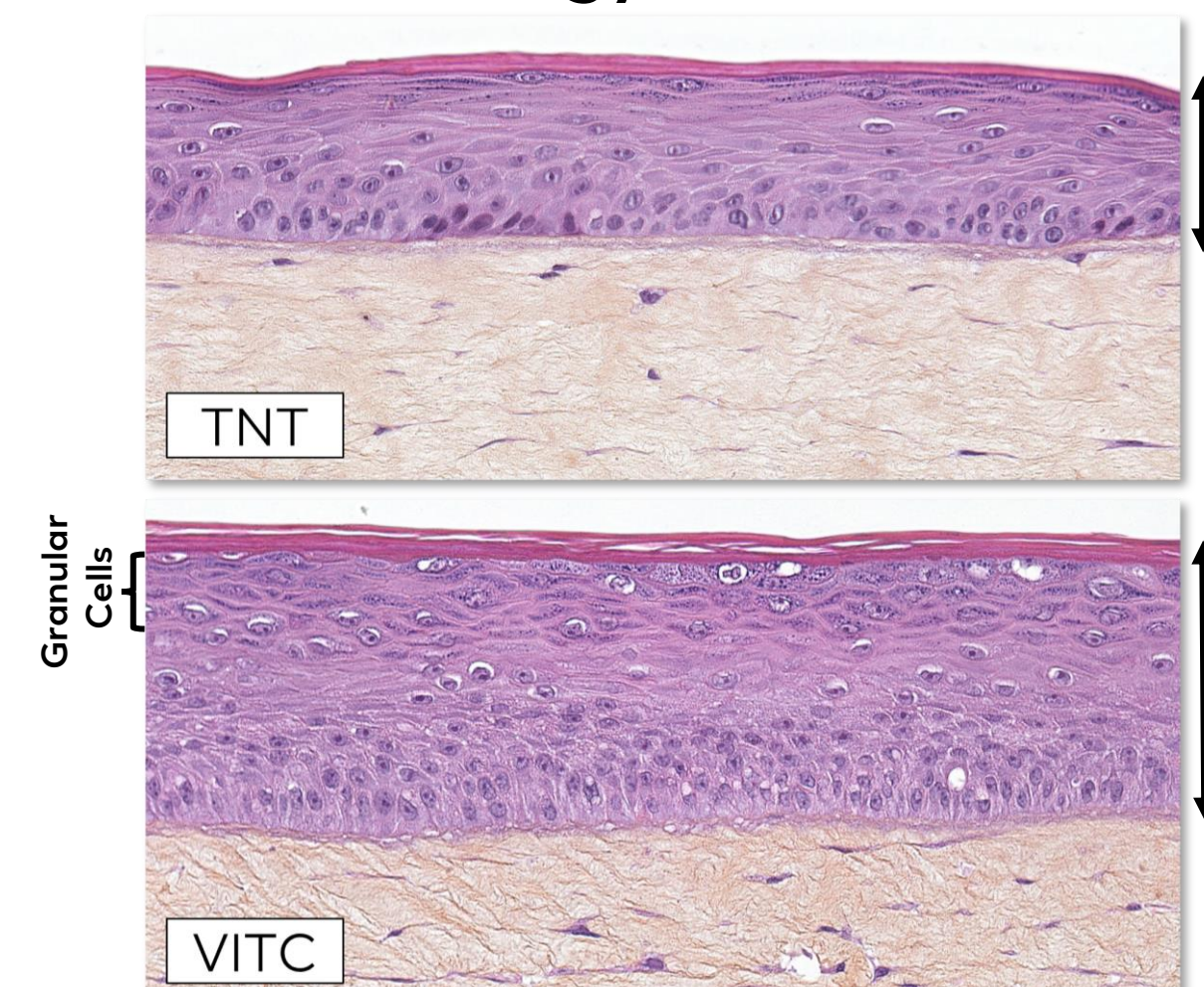
Tissues morphology

The global tissue quality is evaluated using a new scoring with a scale out of 4 based on proliferation and differentiation criteria.

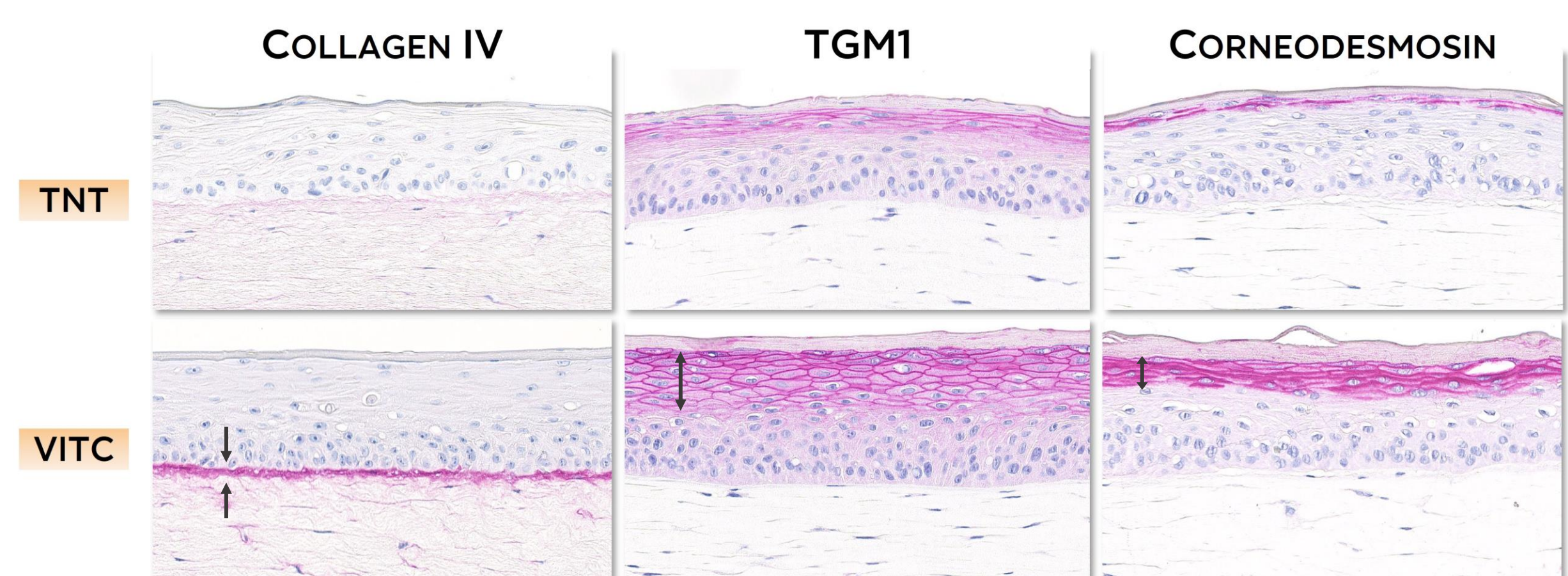
Histological score of references



Histology HES (x20)



With immunohistochemistry, actives effects on the new re-epithelialized epidermis are highlighted.



5 CONCLUSION

Thanks to this work, a new reliable, robust and relevant non-invasive evaluation method has been developed, essential to understand the mechanisms of actions of our actives in the process of skin regeneration and healing.

REFERENCES

- [1] Deshayes et al-2017-*Experimental Dermatology* 1-3
- [2] Mcheik A., 2008. OCT Speckle statistical modelisation applied on skin image segmentation.
- [3] J. Kanitakis, « Anatomy, histology and immunohistochemistry of normal human skin », *European Journal of Dermatology*, vol. 12, no 4, p. 390-401, juill. 2002.

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