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Explore the molecular mechanisms underlying hair growth cellular crosstalk using compartmented culture model.

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The process of hair shaft growth involves many cell types and the communication between them makes the study of the hair growth cycle regulation complex. However, the actual study using conditioned media is time-consuming and provides information only on one-way cell signaling. Already existing compartmentalized co-culture systems help to study indirect cell communication but most of them provide only two compartments or do not allow a classical visualization by microscope, and often present specific application methods.

This work presents a new 3D-printed insert with 4 compartments as a specific tool to investigate the cell communication of several cell types in direct or indirect interaction (Figure 1).

To evaluate this compartmented insert, we compared it with a conventional cell culture using conditioned media. We studied the effect of KORS (keratinocytes of outer root sheath) on HDMEC (human dermal microvascular endothelial cells) migration over 24h (Figure 2).

The results demonstrated that the insert allows to obtain similar results on HDMEC migration¹ as with conditioned media, while observing and measuring the proliferation of HDMEC in the same assay.

The inserts present numerous advantages for easily setting up co-culture models and performing cell biology functional assays (proliferation, migration, pseudotube formation, differentiation...) and biochemical tests (extraction of DNA, RNA, protein, lipids...). Next, the new insert will allow to investigate the cell communication between 4 cell types of hair follicle, providing a more predictive model that mimics cellular and molecular events *in vivo*.

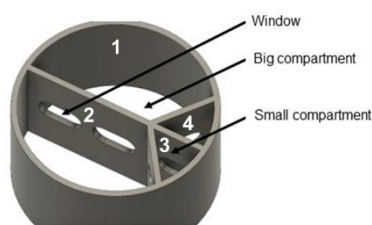


Figure 1: Representative picture of the 3D-printed insert with its 4 compartments. (1) KORS, (2) HDMEC (3) HDMEC, (4) empty.

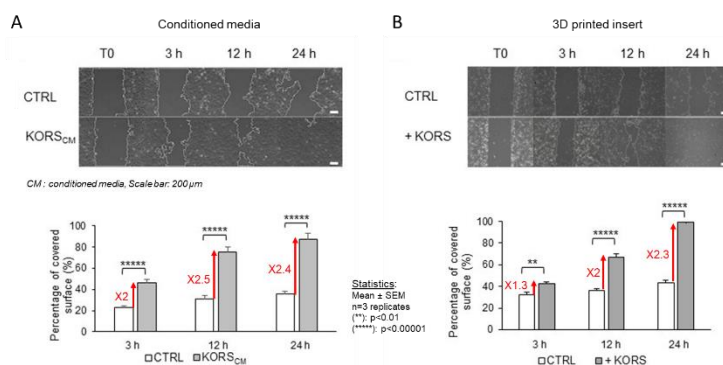


Figure 2: Effect of KORS on HDMEC migration (% of recovery). (A) in the conditioned media (B) in 3D-printed insert

References :

1. Colin-Pierre C, et al. J Vis Exp. 2023 Jan 6;(191). doi: 10.3791/64655. PMID: 36688565