BioMeca

§ experimental note#12

Studying smoothing effect of active ingredient or finished product by using fluorescent beads and confocal microscopy

Context

In the context of skin ageing, smoothing effect and especially tension effect could be a relevant claim for cosmetic product.
Changes in skin morphology and physiology is the first observation of ageing process, and this progressively increasing with age. A loss of firmness and elasticity is described as a main modification of skin along ages.
That's why we are always trying to stop this phenomenon and to restore skin at its original state by using specific active ingredient or cosmetic product. Main of this studies are performed on a panel of volunteers once finish product is formulated. In order to screening various active ingredients in an ex-vivo way, BioMeca® suggests to study tissue tension with confocal microscopy by analysing fluorescent beads movements after topical application of product.

Why use **confocal microscopy ?**

Confocal microscopy is interesting to acquire image on different focal planes. In the context of skin tension, we decided to use confocal microscopy to visually follow fluorescent beads placed on skin surface.
In fact, fluorescence beads are dispersed on skin surface at the same time of active ingredient or cosmetic product. Then, confocal microscopy can image a large plan of skin and follow beads displacement over time by acquiring several times the same plan. By using confocal microscopy, we can follow each bead on skin surface even if skin surface is irregular.

Results

First, skin sample is treated with active ingredient or cosmetic product with fluorescent beads. Then skin explant is placed in a specific way to maintain the sample without any physical restraint.

Immediately after application, a first confocal imaging is done and will be the reference point. Then we performed images at different times after application. We compare these results with non-treated skin explant for which only beads solution was applied. Immediately after application, a first confocal imaging is done and will be the reference point. Then we performed an image 8 hours and 24 hours after application of the product.

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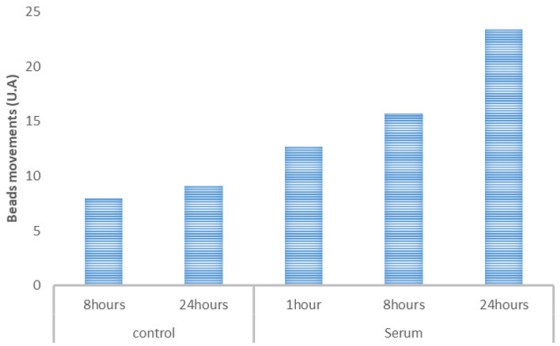
We compare these results with non-treated skin explant for which only beads solution was applied. Then, by analysing images we can convert beads fluorescence signal into vector, in order to show registered movements on skin during the experiment time. The purpose here is to show differences between a control and a skin explant, treated with active ingredient. **Results are presented below :**



Graphic 1 : *Evolution of beads movement over time for each condition.*

Control

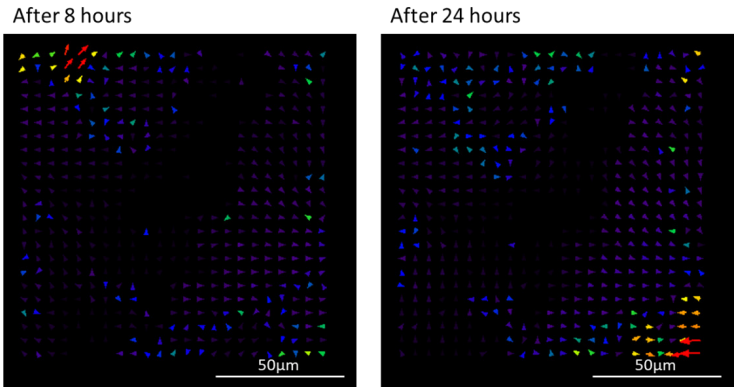
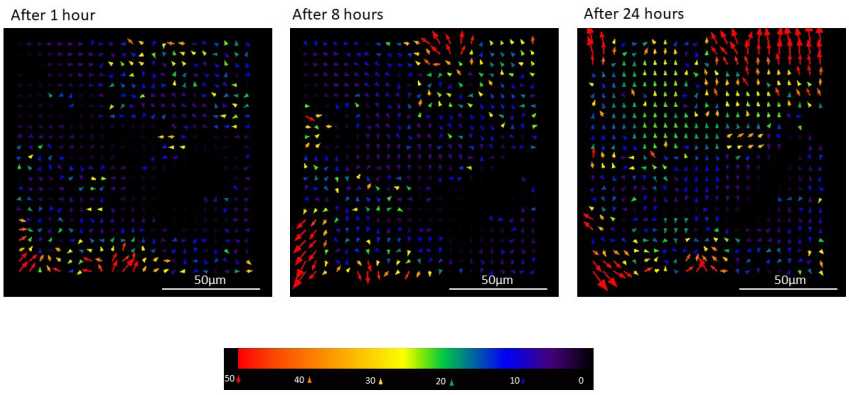


Figure 1 : *Evaluation of skin movement over time. Coloured vectors are linked to skin and beads movements. Arrows show movement direction, colour and length show beads displacement.*

Serum



Various readouts are extracted from this study :

- Fluorescent beads position images at different times
- Analytical and vector images of beads displacement (***Figure 1***)
- Graphic conclusion on tensor effect of the product

Here, we demonstrate the impact of a cosmetic product on **skin tension**. Indeed, as we can see on ***Figure 1***, by applying the serum we induce **beads movements**, whereas on the control (with no product) there is practically no beads displacements.
By studying beads position over time, we can determine (i) the **capacity of product's contractibility**, and (ii) the **time necessary to obtain an effect**.
This method is ideal to study a **real tension effect on skin**, with a visual effect and a quantitative result according applications times.

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