Liposomes in skin creams don’t work

Who wouldn’t want healthy, glowing skin with no wrinkles? Probably not many, and that’s why a lot of people are willing to pay a little extra for creams with liposomes, which are said to transport the numerous rejuvenating and moisturising substances deep into the skin.

But these liposomes are a waste of money. They don’t do what they’re supposed to do. They fall to pieces as soon as they come into contact with the skin’s surface, so their active substances don’t reach the areas they are supposed to act on.

“Our studies show that liposomes break into pieces the moment they hit the skin’s surface, or very soon after that. Liposomes cannot be transported into deeper layers,” says Professor Luis A. Bagatolli, who conducted the new study at the Department of Biochemistry and Molecular Biology at the University of Southern Denmark.

The findings have just been published in the Journal of Investigative Dermatology.

The skin is an effective armoured shield

The researchers have only examined whether the liposomes are capable of transporting the substances through the surface of the skin. They did not study the effect of the substances contained in the liposomes. So it is conceivable that the substances can penetrate into the desired areas all by themselves.

But this is not very likely, considering that the liposomes were originally developed to pave the way for the substances. The human skin is designed to protect the organism against harmful substances in the environment.

”The skin’s task is to block extraneous substances, which is why it will generally reject anything that tries to penetrate it. So it’s no easy task for the beauty industry to find methods of transporting rejuvenating and moisturising substances deep into the skin. We have now shown that liposomes cannot do the job, despite some rather persistent advertising claims,” says Bagatolli.

Popular method is useless

Scientists have long discussed the effectiveness of liposomes as a transporter of active substances into the human body. Over the years, the issue has been studied intensely by numerous research teams. Some have even concluded that liposomes are effective, while others have argued that they’re not.

However, these studies have not been particularly reliable as the findings have been riddled with great uncertainty.
Up to now, the issue has been examined by dyeing the liposomes and then measuring how deep into the skin the colours could be traced. The liposome could e.g. be dyed red on the outside and green on the inside. Then, after taking microscope photos of the area beneath the skin, the scientists could then conclude that the liposome had managed to reach the depth where they had observed the red and the green colours together.

"But finding the red and the green colours in the same place does not mean that the liposome is intact," says Bagatolli.

“It could also be that the liposome had fallen to pieces and that the two colours found their own way in through the skin and then merged again. With the conventional technology, all you can really see is that the red and the green colours are in the same location.”

**Special microscope records movements**

The Danish team wanted to figure out exactly what it meant when the red and green colours appeared in the same place under the skin. So they set out to investigate the issue in a new way:

Rather than keeping track of where the red and green colours ended up, they decided to look at how the dyes travel through the skin.

If the red and the green colours travel together, it indicates that the liposome is intact on its journey through the skin. If they travel in opposite directions, it indicates that the liposomes have fallen to pieces and have lost their contents before reaching their target.

For this purpose, the researchers used the ‘Raster Imaging Correlation Spectroscopy' (RICS) technique, which enables them to trace the individual movements of the colours from the point of contact with the skin’s surface until they start calming down under the skin.

According to Bagatolli, this is the first time that liposomes’ ability to penetrate our skin is studied in this way.

“We discovered that the two colours moved in opposite directions. So they do not travel hand in hand, which reveals that the liposome does not remain intact. It breaks and its contents are spread out as soon as – or soon after – the liposome makes contact with the skin’s surface.”

The study also showed that all traces of intact liposomes disappear at a depth of four micrometres below the skin’s surface.

Read the Danish version of this article at videnskab.dk [9]

Many skin creams are enriched with tiny particles known as liposomes, which are said to be able to transport the numerous substances in the cream deep into the skin, smoothing and firming up the skin. But now this turn out not to be true. (Photo: Colourbox) [10]

Fact box

Liposomes are synthetic microscopic vesicles with an external, fully enclosed double lipid membrane of phospholipids.
Liposomes are not active themselves, but are believed to function in creams as carriers of various encapsulated active substances that otherwise could not penetrate the skin's fatty layers.

Liposomes are particularly common in moisturisers and wrinkle creams.

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Luis A. Bagatolli


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February 20, 2013 - 06:29
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