

Shiseido Reveals Impact of Digital Fatigue on the Skin

- Shikuwasa extract cares for changes in skin condition due to Digital Fatigue -

Shiseido Company, Limited (“Shiseido”) has revealed that digital fatigue*¹ not only increases physical and mental fatigue but also changes skin conditions such as deterioration of skin barrier function, irregularity in corneocytes, and increased oxidative damage factor. It was also found that Shikuwasa extract enhances the expression of caspase-14, an important enzyme for skin barrier and moisturizing functions.

Shiseido has been conducting research on young skin and stress for more than 30 years, and studying the impacts of various stresses on the skin. This time, we focused on the lifestyles among today’s youth of so-called digital natives, such as Gen Z, and successfully evaluated the impacts of digital fatigue on the skin by applying a unique test system. Going forward, Shiseido will continue to promote approaches that help consumers achieve healthy and beautiful skin in their own way, aiming to realize our corporate mission, “BEAUTY INNOVATIONS FOR A BETTER WORLD”.

*¹ Stress and fatigue caused by the simultaneous processing of digital overload information from audiovisual sources.

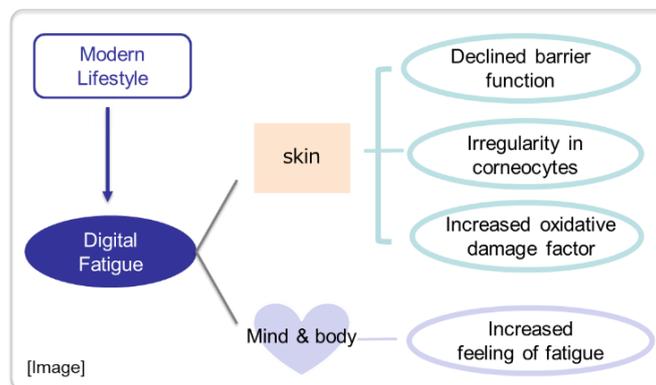


Figure 1: Impact of Digital Fatigue on the Skin (Image)

Research Background

Today’s youth of so-called digital natives, such as called Gen Z, were born into a high-tech, high-networked world and have never known a time without the internet. According to a study*², Gen Z in the US spend nine hours a day online. Digital technology enriches our lives; however, we have hypothesized that digital overload may cause stress and fatigue, and thus adversely affect the skin. Therefore, we conducted research focusing on digital fatigue.

*² Commonsense Media, 2018

Digital fatigue and skin condition

In this study, we reproduced a state of digital fatigue through dual tasks that required subjects to simultaneously process a high amount of audiovisual information, and observed the changes in skin condition. We asked the subjects to perform a digital fatigue task for a certain period of time and repeat

it over several days.

The results showed that after repetitive digital fatigue tasks, not only physical and mental fatigue increased (Figure 2), porphyrin, one of oxidative damage factors, also increased (Figure 3). In addition, the proportion of irregular corneocytes increased (Figure 4) and the skin barrier function also deteriorated (Figure 5). In other words, after digital fatigue, the skin barrier function may deteriorate and possibly result in causing rough skin.

Feeling of fatigue after the digital fatigue task

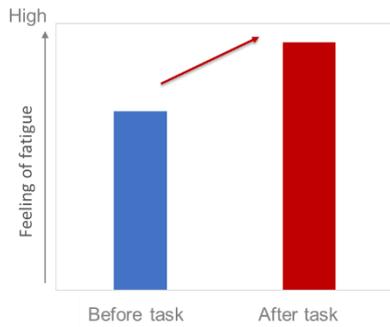


Figure 2: Increased feeling of fatigue after the digital fatigue task

Oxidative damage factor after the digital fatigue task

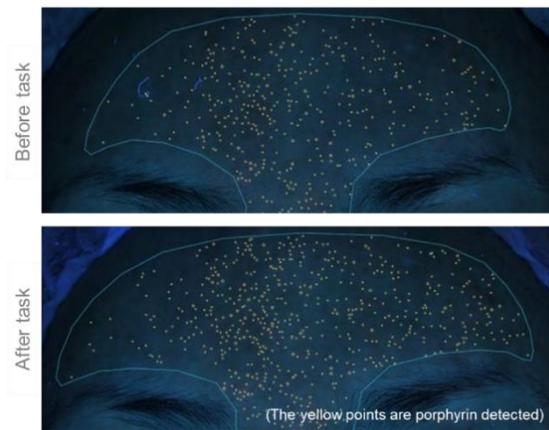


Figure 3: "Porphyrin", one of oxidative damage factors, increased after the digital fatigue task

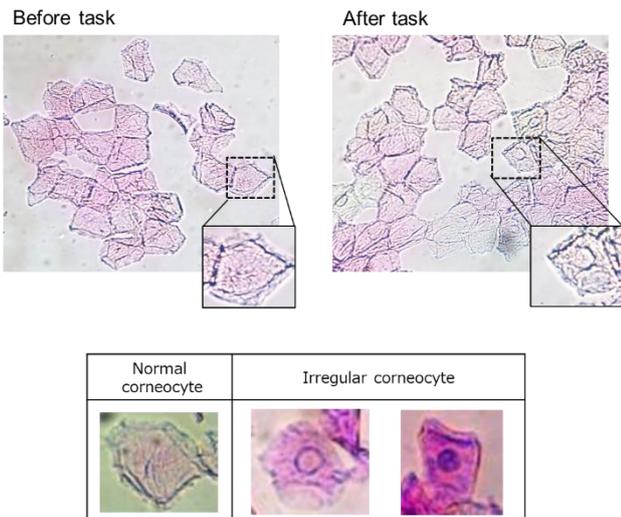
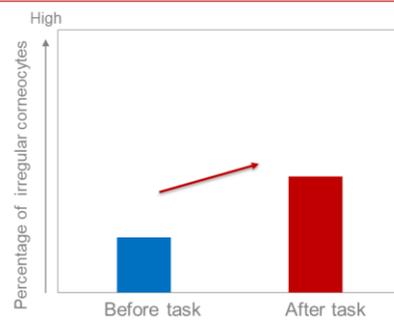


Figure 4: Proportion of irregular corneocytes increased after the digital fatigue task

The state of corneocytes after the digital fatigue task



Skin barrier function after the digital fatigue task

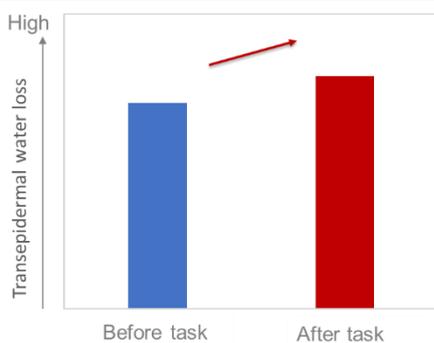


Figure 5: Deterioration of skin barrier function after the digital fatigue task

Search for active ingredients for digital fatigue

In order to address the changes in skin condition caused by digital fatigue, we searched for active ingredients that enhance the expression of caspase-14, an enzyme that is essential for skin barrier and moisturizing functions. Caspase-14 plays important roles in maturation of corneocytes, which are responsible for the barrier function and water-holding capacity, as well as assisting in the production of Natural Moisturizing Factor (NMF), which is deeply involved in water-holding capacity in corneocytes. We found that Shikuwasa extract has the effect of enhancing the expression of caspase-14, which could suggest that Shikuwasa extract can protect skin from changes in skin condition caused by digital fatigue, and lead to healthy and beautiful skin.

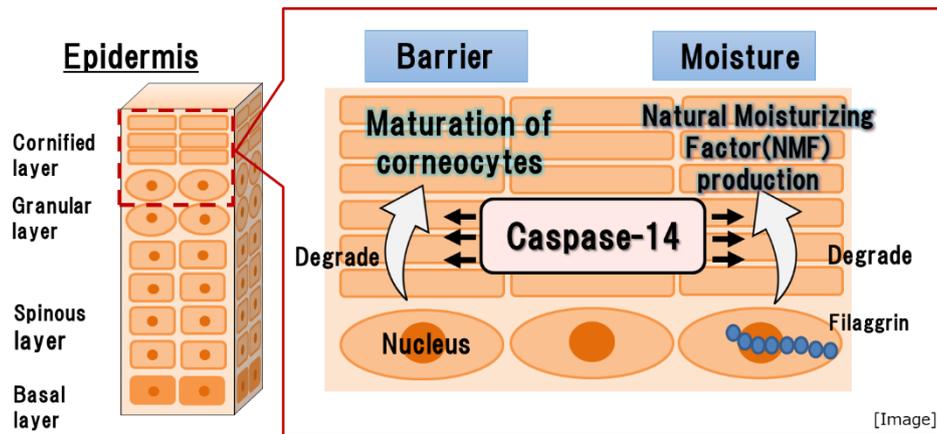


Figure 6: The various functions of enzyme caspase-14 (Image)



Figure 7: Shikuwasa

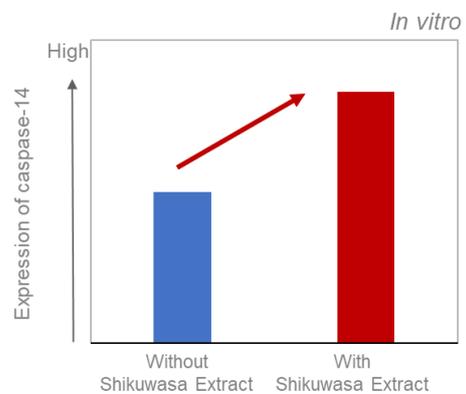


Figure 8: Expression of caspase-14 enhanced by Shikuwasa extract

Going forward, Shiseido will continue to promote research closely aligned with consumers' lifestyles and aim to help them achieve healthy and beautiful skin in their own way.