News Release
Kao Corporation

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FOR IMMEDIATE RELEASE

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Skin Surface Lipids-RNA Monitoring Technology

Establishment of a Technique to Stably Store and Transport RNA Collected from Sebum at Ordinary Temperature Joint Development of a Mail-in Testing Service with Healthcare Systems

Kao Corporation has established a technique to stably store and transport Skin Surface Lipids-RNA (SSL-RNA) at ordinary temperature in a further development of "Skin Surface Lipids-RNA Monitoring"[*1] to grasp various conditions of the body and skin by analyzing the SSL-RNA collected from sebum. This will expand the situations in which Skin Surface Lipids-RNA Monitoring can be utilized, as SSL-RNA can be collected anywhere, including one's home.

Utilizing this technique, in cooperation with Healthcare Systems Co., Ltd., Kao has been developing a mail-in testing service that will enable consumers to assess their health at home, and conducting tests for implementing and providing the service within 2022.

*1: Kao News Release dated June 10, 2019: https://www.kao.com/global/en/news/rd/2019/20190610-002/
Kao's original non-invasive analytical method for monitoring RNA – Discovery of the presence of human RNA in sebum
Inoue, T., Kuwano, T., Uehara, Y., Yano, M., Oya, N., Takada, N., Tanaka, S., Ueda, Y., Hachiya, A., Takahashi, Y., Ota, N., Murase, T. Non-invasive human skin transcriptome analysis using mRNA in skin surface lipids. Commun. Biol. 5, 215 (2022). https://doi.org/10.1038/s42003-022-03154-w

■Background

Kao discovered the presence of human ribonucleic acid (RNA) in sebum, and developed an original analysis method called "Skin Surface Lipids-RNA Monitoring" to enable the global analysis of this RNA. It has been shown that the method can grasp various conditions of the body and skin. While collecting SSL-RNA has the advantages of being simple and causing no damage to the skin, the collected SSL-RNA is degraded by the degrading enzyme that is also present on the skin surface and may be collected in the sebum, if left unattended at ordinary temperature. It is therefore necessary to suppress the enzyme and degradation of SSL-RNA in order to obtain stable analysis results, and so conventionally the RNA had been stored at ultra-low temperatures immediately after collection. However, this restricted the locations and opportunities for sample collection.

By making it possible to store and transport the collected SSL-RNA at ordinary temperature, SSL-RNA can be collected anywhere including the home, and information that utilizes Skin Surface Lipids-RNA Monitoring can be provided to many consumers. Kao therefore established a technique for storing and stabilizing the SSL-RNA against the RNA-degrading enzyme (RNase) that is present

on the human skin.

■Establishment of SSL-RNA storage and stabilization technique

RNase is known to be a hydrolase which requires water in order to function. Therefore, Kao selected guanidine hydrochloride, which denatures the three-dimensional structure of the RNase, and a desiccant which absorbs moisture in a short period as activity inhibitors, and verified their usefulness in RNA derived from human keratinocytes stored at ordinary temperature.

Sebum was collected with oil blotting film from the faces of 6 adults (5 males and 1 female), and stored under three conditions: −80℃ (storage at ultra-low temperature), 37℃ with the storage and stabilization agent (guanidine hydrochloride and a desiccant), and 37℃ without the storage and stabilization agent, for 3 days after adding the specified amount of RNA derived from human keratinocytes. Quantitative evaluation of the RNA survival rate revealed that the RNA level dropped nearly to the detectable limit without the storage and stabilization agent at 37℃ in comparison with storage at −80℃, and that the RNA level was maintained at a level almost equivalent to storage at −80℃ when the agent was added. Based on these results, it was shown that RNA could be stored at ordinary temperature with stability close to that when stored at −80℃ by using guanidine hydrochloride and a desiccant (Figure 1).

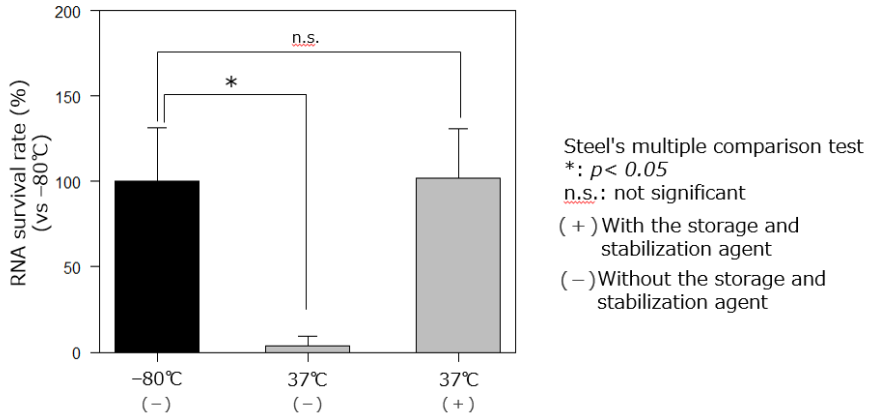

Figure 1: Comparison of RNA survival rate by the presence of the storage and stabilization agent

■Verification of SSL-RNA storage and stabilization technique

Applying the above technique, Kao developed a container that can be used to store SSL-RNA at ordinary temperature after collecting SSL-RNA. Kao's researchers conducted tests on sebum collection at home and transport at ordinary temperature by using this container, assuming actual service with the participation of 150 male and female adults (76 males and 74 females). As a consequence, SSL-RNA was successfully analyzed in all of these cases[*2]. These results showed the possibility of storing and transporting SSL-RNA at ordinary temperature and obtaining stable analysis results.

*2: Analysis with a next-generation sequencer

■Launch of the joint development of a mail-in testing service with Healthcare Systems

Kao has launched the joint development of a mail-in testing service that utilizes this Skin Surface Lipids-RNA Monitoring Technology with Healthcare Systems, a venture business started at Nagoya

University which develops and distributes mail-in testing kits with the aim of preventing future disease and maintaining health. Tests toward implementation are already being conducted, with the goal of starting to provide the mail-in testing service that allows consumers to assess their health at home from Healthcare Systems within 2022.

Reference

Healthcare Systems Co., Ltd.

Headquarters: 1-14-18 Shirakane, Showa-ku, Nagoya, Aichi 466-0058

Businesses: Mail-in testing, research and development of biomarkers, clinical studies and commissioned studies on functional food products

[URL] https://hc-sys.jp (Japanese)

About Kao

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