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Yamato Logistics Co., Ltd.
Sysmex Corporation

Sysmex and Yamato Logistics to Commence GDP-Compliant Transport of Reagents for Gene Testing at the Ultra-Low Temperature Range of Minus 70 Degrees Celsius or Below
- Also Commencing Experiments for Ultra-Low Temperature Transport Without Using Dry Ice -

Yamato Logistics Co., Ltd. (HQ: Chuo-ku, Tokyo, Japan; President: Yasuharu Kosuge), a member of Yamato Holdings Co., Ltd., and Sysmex Corporation (HQ: Chuo-ku, Kobe, Japan; Chairman and CEO: Hisashi Ietsugu) announced today the commencement of a logistic service optimal for the transport of reagents for gene testing[1] from February 2021.

In anticipation of further progress in personalized healthcare,[2] Yamato Logistics and Sysmex have jointly conducted demonstration experiments with the aim of offering logistic services for reagents that will be used for gene testing. The services will accommodate temperature ranges from “refrigerated” to “ultra-low” on a commercial basis. Assuming transport in a specially designed carrier box by a truck with consolidated cargo, the experiments by the two companies were designed to verify whether GDP[3] on quality management was complied with and if there were cost concerns. This is the first commercial service in Japan for transporting such reagents in consolidated cargo at the ultra-low temperature range of minus 70 degrees Celsius or below.

Going forward, the two companies are planning to demonstrate the potential of the minus 120 degrees Celsius "ultra-low temperature ice"[4] for extended transport at the ultra-low temperature range without dry ice.

1. Background

Personalized healthcare is expected to enhance the quality of healthcare and add to valid treatment options while controlling medical expenditures, as it will allow patients to access cutting-edge medical technologies both safely and efficiently. As such, efforts are underway to advance its research and develop the necessary infrastructure.

For over 15 years, Yamato Logistics has addressed logistics challenges in the distribution of medical devices and pharmaceutical products by offering solutions to an array of issues throughout the entire process from procurement, distributive processing, traceability, to delivery, which is made possible by the use of functions and networks both within and outside the Yamato Group. In anticipation of the accelerated development of personalized healthcare, Yamato Logistics has been looking into the optimal logistic service in the ultra-low temperature range, which is one of the challenges that need to be overcome.

A leading company of instruments and reagents for clinical testing, Sysmex is contributing its services to the social implementation of personalized healthcare by stably providing medical professionals with one of its critical components: reagents for gene testing. Until now, to satisfy the advanced quality requirements during transport, a dedicated truck has been required regardless of quantity, and the associated high transport cost has posed an issue. Furthermore, this mode of transport requires dry ice for cold storage throughout the transport process, which uses CO_2 generated from oil refining. To reduce the environmental burden and deal with tight demand in the summertime, Sysmex has long been seeking ways to improve this.

With the aim of solving these challenges, Yamato Logistics and Sysmex have jointly conducted experiments to demonstrate transport logistics of reagents for gene testing through the Yamato Group's network.

To resolve these issues, the two companies have decided to work on the development of optimal logistics for genetic testing reagents.

2. Specifications of the Demonstration Experiments

Duration: From November 2020 to January 2021

Transport conditions: Transport at three temperature ranges of "ultra-low (minus 65 degrees Celsius or below)," "frozen (minus 20 degrees Celsius or blow)," and "low (between 2 and 8 degrees Celsius)"

Transport route: From Sysmex Technopark East Site[5] in Kobe, Hyogo, to the final destination of the cargo in Kawasaki, Kanagawa

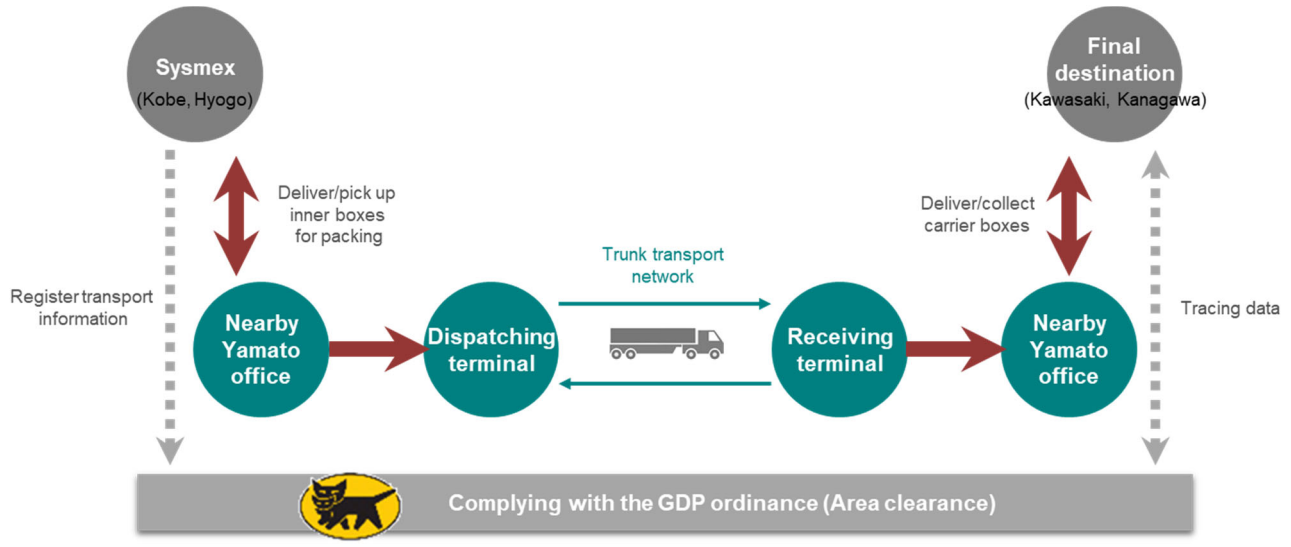
Assessment/verification:

1) Operations: Assessment of compliance with GDP transport/quality requirements

2) Price range: Comparison of prices versus the current cost based on the findings of the demonstration experiments

In addition to the above, with the realization of transport without using dry ice in mind, the refrigeration ability of "ultra-low temperature ice" of minus 120 degrees Celsius, which could replace dry ice, was tested under an ambient temperature of 30 degrees Celsius.

[Transport Flow Schematic Drawing]



Supplementary notes:

1. Advance preparation: Deliver the inner box for packing to Sysmex
2. Bring a special carrier box (outer box) to Sysmex and pick up the inner box.
3. Place the inner box for packing that contains reagents for gene testing in the special carrier box and commence tracing.
4. Ensure area clearance[6] in compliance with GDP.
5. Deliver to the final destination, check tracing data, and collect and manage the special carrier box.

3. Verification Results

1) Operations: Assessment of compliance with GDP transport/quality requirements

For each temperature range, it was confirmed that the quality of the reagents was appropriately maintained through the use of special carrier boxes even during transport in consolidated cargo from the Technopark East Site to the final destination. We were able to do away with dry ice in the “frozen” temperature range, and reduce the amount of dry ice used by around 50% for transport in the “ultra-low” temperature range. Additionally, we confirmed that the quality of the reagents was maintained at minus 70 degrees Celsius or below in the "ultra-low" temperature range.

2) Price range: Comparison of prices versus the current cost based on the findings of the demonstration experiments

With Yamato Logistics providing suitable materials where appropriate, collecting the materials, and keeping them under control, we are able to reduce the overall costs incurred every time the service is used, including the materials cost and the high cost for the special transport service.

Furthermore, we were able to maintain a constant temperature range for both "frozen" and "ultra-low" transport in the verification of the refrigeration ability of "ultra-low temperature ice" of minus 120 degrees

Celsius, thus successfully determining the potential of transport without dry ice. (For the ultra-low temperature range [minus 65 degrees Celsius or below], tests were done to see if the range was maintained for 24 hours.)

4. Results and Future Developments

Now that we have successfully established know-how on high-quality, low-cost logistic services in multiple temperature ranges, we will commence the full-scale transport of reagents for gene testing from February 2021.

Going forward, the two companies will continue advancing the cold chain that meets social needs by, for example, realizing extended transport without using dry ice for enhanced eco-friendliness in every temperature range and rolling out relevant know-how to pharmaceutical products, which require more strict temperature control, while at the same time making the system more economical and efficient.

[1] Indicating *in vitro* diagnostic products used for gene testing.

[2] Treatment and prevention methods that are tailored to individual patients and their clinical conditions to enhance effectiveness and minimize side effects.

[3] Good Distribution Practices: A basic scheme for assuring the quality of pharmaceuticals in the distributive process, from shipment from a manufacturing plant to delivery to medical institutions.

[4] With the Ultra Deep Freezer (developed by ADD Co., Ltd., Numazu, Shizuoka, Japan), fresh water is quickly frozen to minus 120 degrees Celsius to produce an eco-friendly substitute for dry ice in the form of "ultra-low temperature ice."

[5] Sysmex's site responsible for the development/production of biologically derived substances and production of *in vitro* diagnostic products using such substances.

[6] A state of transport by a truck for consolidated cargo where certain cargo is completely separated from other cargo by using special materials, etc.

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