

Clean Health Safety NEWS

2018 **7**

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No.714

クリーン、ヘルス、セーフティで社会に
 **興研株式会社**

No. 714, July, 2018

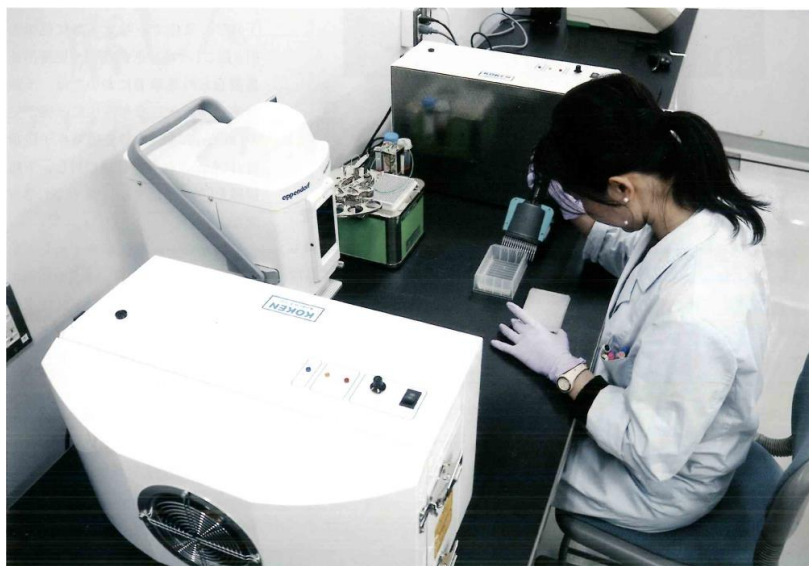
KOACH INFORMATION

“KOACH Enables Us to Obtain Reliable Data Efficiently.”

Kazusa DNA Research Institute

Since its establishment in 1994 as the world’s first institute that specializes in DNA research, Kazusa DNA Research Institute has been accumulating results of DNA research for years. To return the product of such achievements actively to society at large, it set up Genome Research Development Department which provides technical support services to other research organizations and conducts a joint research with them.

As the number of requests by external institutions for our technical support services was expected to increase, we tried to establish a new method to analyze a large amount of data at one time, but we encountered the problem that the necessary operations for our analysis could not be supported by the existing clean bench. To solve this problem, we introduced a novel air-clean system called “KOACH.” We are now able to provide highly accurate and reliable data efficiently to our customers in our commissioned business where mistakes are absolutely not allowed.



After the introduction of the KOACH a worker can perform analytical work more efficiently and accurately because he or she can work in an open, clean workspace.



Kazusa DNA Research Institute, Japan’s leading genetic research institute established by Chiba Prefecture.

Kazusa DNA Research Institute was opened in 1994 as a leading core facility in the Kazusa Academia Park, a science and industrial park established by Chiba Prefecture. It is a unique institute in Japan that is supported by a local government, not by a national government. Since its foundation, it has been producing many world-class results in the plant and human DNA researches in a very short period of time. It has received high evaluation for its DNA research not only in Japan but also throughout the world.

INTERVIEW

with Mr. Yoshinori HASEGAWA and Ms Natsumi AOI, respectively Leader and Technician of Genetic Analysis Team, Clinical Omics Analysis Group of Genome Project

“We would like to return know-how’s of DNA analysis to society at large.”

Mr. HASEGAWA: We, at Kazusa DNA Institute, have been accumulating an immense amount of genetic information that DNA, the blueprint of life, contains and related technologies. If we apply these know-how’s to application researches of plant breeding and new drugs, we may solve global social challenges facing humanity such as food shortages and intractable diseases in the future.

Ms AOI: If you try to start from scratch analyzing genetic information that has a potential to produce innovations in various fields, million dollars of capital investment may be required. Furthermore, samples are very expensive and they may cost several

million yen per one analysis. Not only that, to make full use of the facility and obtain accurate analytical data, you need to hire specialized professionals who have necessary technical know-how's.

In this regard, our institute has the latest equipment for genetic analysis, rich experiences cultivated for many years and specialized professionals who can utilize all of them. To contribute to society more than ever, we implemented a major reorganization in April this year to better respond to customer requests in the commissioned analysis and joint research from corporations and research organizations.

With a focus on our DNA sequencing technology that is the hallmark of Kazusa DNA Research Institute, our genetic analysis team is mainly engaged in joint- research and commissioned analysis with external organizations.



Mr. Yoshinori HASEGAWA, Leader of Genetic Analysis Team, Clinical Omics Analysis Group of Genome Project

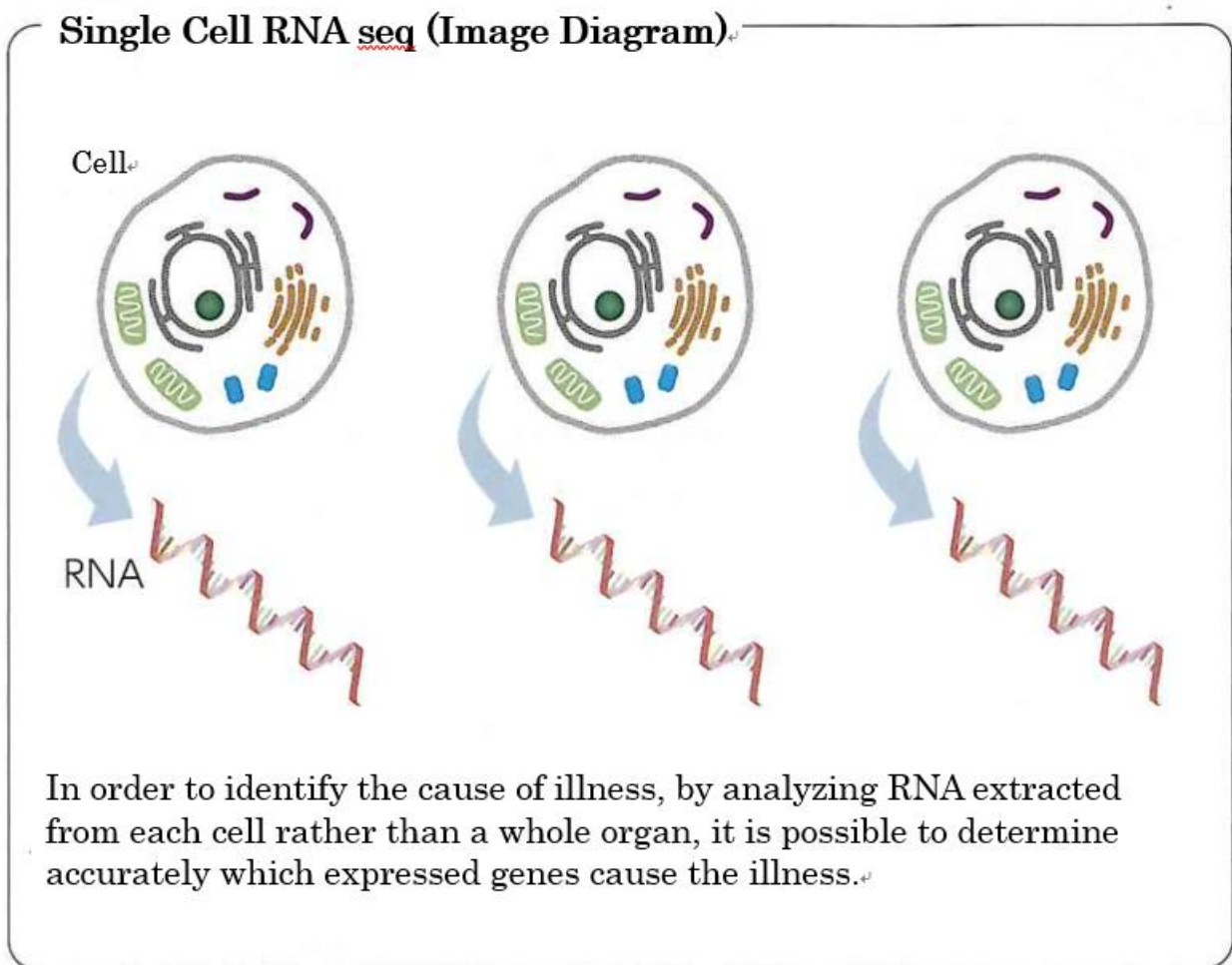


Ms Natsumi AOI, Technician of Genetic Analysis Team, Clinical Omics Analysis Group of Genome Project

“Improvement of our analytical technology requires us to form a cleaner environment.”

Mr. HASEGAWA: As we are conducting an optimum analysis to meet each request for particular specifications from clients, in order to respond to the increasing demand to analyze gene expression information more accurately we can provide “single cell RNA seq” services. For example, if you want to find out how a cell becomes cancerous after the mutations of the gene that controls that cell, you can use “single cell RNA seq” to identify the cause of the cancer more accurately because it can investigate each RNA of an organ cell, an expressed gene, instead of a whole organ.

Unlike DNA, RNA is very fragile and can be destroyed easily by even RNA-splitting enzymes deriving from airborne bacteria or particles. Therefore, when analyzing RNA in a small volume, you need to pay special attention to the working environment by purifying it using a clean bench.



“It was difficult to operate a multi-channel pipette in a clean bench condition.”

Ms AOI: When you analyze RNA in a whole tissue as is that consists of 1,000 cells, you need to operate a pipette only once. However, if you analyze a 1,000-cell tissue with single cell RNA sequencing, which analyzes each and single cell, theoretically you are required to perform a pipette operation 1,000 times. To avoid this, a multi-channel pipette, which enables many cells to be dispensed at one time, must be used.

This is an extremely delicate work to dispense cell samples into a well plate which contains 384 wells from the corresponding number of channels in a very small volume of 1μ liter per each well. Furthermore, pipette operation is not easy because of the limited movement of hands through the viewing glass of the clean bench and a very small amount of filled samples in the wells of the plate may dry due to the strong airflow blowing from the top. In order to meet the increasing demand for commissioned work and analyses, it was obvious that the existing clean bench would not be able to support it.



It was extremely difficult to perform a delicate work through the viewing glass of the clean bench to dispense cell samples into 384 wells on a plate from the corresponding number of channels of a multi-channel pipette.

Drying of cell samples caused by the strong airflow blowing from the top was a big problem, too.

“KOACH does not harm workability and can improve analytical accuracy.”

Mr. HASEGAWA: In the meantime a laboratory equipment trading company introduced to us “KOACH” that can form a clean working space without harming workability. To tell the truth, we had already known its presence before it was introduced to us.

We always keep looking for new technologies which may be applied to our research. The KOACH, which had received the Prime Minister’s Award in the 6th Monodzukuri Nippon Grand Awards in 2015 as a new innovation to form a clean environment in an

open space, was very impressive and remained in our memory.

After the investigation we found out that many DNA research institutes which had introduced the KOACH obtained very good analytical results. Consequently, we borrowed a demonstration model to verify whether or not it can meet our requirements when we try to apply a new analysis method.

Ms AOI: As a result of our experiment with the borrowed equipment for our new analysis method, our first impression of the demo model was that workability was excellent because the workspace was not encircled by walls.

The purified airflow travels horizontally at a very low speed, so slow that workers inside do not feel air pressure. Unlike the conventional clean bench, there was no single case of trouble that a small amount of samples dried during the work.

Mr. HASEGAWA: We could reduce the number of unanalyzed samples significantly after the introduction of the KOACH while in the conventional clean bench we experienced the failure rate of about 10%. This was because (1) human errors do not happen any more due to the fact that workability was improved in an open work environment, (2) no contamination happens due to the fact that a level of cleanliness was improved and (3) drying of samples were suppressed. As a result of these factors, we think that we have achieved the improvement of our analytical accuracy.

The KOACH, which does not harm workability due to its open structure, does not hinder a delicate manual movement to dispense cell samples into 384 micro wells on a plate. Also, the purified airflow travels horizontally at a very low speed, so slow that it does not cause filled samples to dry.



“Easy relocation is a big advantage of the KOACH besides improvement of analytical accuracy.”

Ms AOI: Unlike the clean bench, portability of the equipment was thought to be a big advantage of the KOACH. As we expected the number of analyses to increase and more clients would request for our analytical services, we believed that there would be more cases where we had to conduct more than one analytical work that should be normally avoided in the same laboratory.

If contamination generated by one analytical work may give an impact on another analysis, it is advisable to conduct these works in different rooms. However, in case of the clean bench, which is stationary and not easy to relocate, the only alternative was to shift the working hours. In contrast, the KOACH is portable and can form a clean environment in a short time. Thus, as long as a room is available, you can conduct an analytical work anytime and anywhere.

Since the introduction of the KOACH, we are able to schedule analytical work efficiently.

“We have established a system to provide accurate data even if we receive a large number of requests for analysis.”

Mr. HASEGAWA: Considering that our clients leave their precious samples to us with their strong expectations of “Kazusa can be relied upon 100%,” it is absolutely not allowed to cause contamination to them by negligence on the part of Kazusa. Also, if we cannot provide accurate analytical results continuously, we may jeopardize our standing as a professional organization for DNA analysis. To this end, the KOACH, an open clean zone creator, which does not harm workability is an essential factor to keep our reputation.

Now that we have obtained ISO Class 1 clean environment at our laboratory, with more confidence than ever, Kazusa DNA Research Institute is now in a better position to provide analytical results to customers and we believe that we have realized to increase expectations and trust of our customers.

Profile of Kazusa DNA Research Institute

Name: Kazusa DNA Research Institute

Place: Kisarazu City, Chiba Prefecture, Japan

Established: October 26, 1994

Director: Michio OISHI

Number of Staff: 125 (as of April 1, 2017)

Basic Assets: 4.818 Billion Yen



[Main Line of Business]

- Analytical research on structure, function and information of DNA and biological polymer
- Accumulation and provision of analytical research data
- Research to apply analytical research results to medical, environmental and food fields
- Application of research results to industry and technological assistance
- Cultivation of human resources and dissemination/awareness activities
- Research interchange and cooperation with domestic and overseas research organizations