

**CUSTOMER TESTIMONIAL**

# Powering cutting-edge gene research

Using next-generation sequencing technologies to investigate chronic diseases at Yamaguchi University Institute of Gene Research



PURELAB® Quest enables investigation into chronic diseases

# Genetics research



Scientists at the Institute of Gene Research at Yamaguchi University are using next-generation sequencing technologies to investigate chronic diseases - such as cancer, dementia, and cardiovascular disease. They are also carrying out comprehensive genomic

analyses on more than 1,000 samples each year sent from other laboratories from across Japan. The team relies on high-quality ultrapure water for the success of these sensitive techniques.



With its ultra-high throughput, scale and speed, next-generation sequencing technologies have revolutionized biological research. These advances have made it possible for scientists to perform comprehensive genetic analyses and study biological systems at an unprecedented level of detail. For example, they can now sequence an entire genome within one day - compared with over a decade to complete the human genome project - or

use transcriptomics (RNA-seq) to capture information about all the RNA molecules within a sample.

Researchers can apply these comprehensive genomics analyses to uncover new insights into the mechanisms underlying a disease and identify new targets for drug development. Some examples of recent studies carried out by the team at the Institute of Gene Research include:

**Performing whole-exome<sup>1</sup> sequencing to identify a novel genetic mutation involved in breast cancer - which led them on to uncover that it may contribute to tumour development by boosting the activity of the oestrogen receptor gene.<sup>2</sup>**

**Using transcriptomics to identify changes in gene activity in the brain of mice receiving a placental extract - to explore its potential value as a dementia treatment.<sup>3</sup>**

### Ultrapure water is key for experimental success

The researchers at the Institute of Gene Research rely on high-quality ultrapure water to carry out various techniques including:

- Preparing growth media for cell culture
- Diluting DNA and RNA after extraction from cells or tissues
- Whole-genome and whole-exome sequencing
- RNA-seq analysis

Previously, the team had experienced problems with the quality of water generated from a Millipore laboratory water purification system. This had impacted on the integrity of their results - particularly on experiments involving the examination of very small amounts of RNA extracted from cell and tissue samples.

*"We observed RNase contamination in water from an old Millipore system, leading to RNA degradation in our samples," explains Professor Yoichi Mizukami, a researcher in the team. "This causes various problems for the pathway analysis of gene expression."*

### A consistent supply of high-quality ultrapure water

An ELGA PURELAB<sup>®</sup> Quest laboratory water purification system was recently installed in the laboratory, providing the researchers with a reliable and convenient supply of ultrapure water (18.2 MΩ). Since its arrival,

the team has achieved consistent and reliable results in all their experiments. *"The water quality is very satisfactory - we have experienced no problems such as RNA*

*degradation or contamination of our cell cultures," says Yoichi. "The system also doesn't take up much space and we found it very easy to use."*

### Key features of the PURELAB<sup>®</sup> Quest:

- Generates high-quality ultrapure, pure and ro water directly from the tap
- Competitively priced with a low running cost
- Multiple water quality sensors & inbuilt periodic recirculation to constantly monitor & guarantee water purity
- Compact design for minimal lab space
- Simple plug and plug installation
- Fast flow rate for quicker reagent preparation
- Easy to use and maintain
- Uses reclaimed materials for minimal environmental footprint

### Molecular biologists recommend the PURELAB<sup>®</sup> Quest

*"The water produced by the ELGA PURELAB<sup>®</sup> Quest is of very high-quality and the cost-performance of the machine is excellent," he says. "We can recommend it for all types of molecular biology analyses that require*

*ultrapure water - such as cell culture, RNA, DNA and protein analysis."*

**Professor Yoichi Mizukami, Institute of Gene Research, Yamaguchi University**



<sup>1</sup>Whole-exome sequencing focuses only on the protein-coding regions of the genome (~22,000 genes).

<sup>2</sup>Watanabe K. et al. A novel somatic mutation of SIN3A detected in breast cancer by whole-exome sequencing enhances cell proliferation through ERα expression. Scientific Reports 2018; 8:16000.

<sup>3</sup>Yamauchi, A. et al. Porcine placental extract facilitates memory and learning in aged mice. Food Science & Nutrition 2019; 7:2995-3005.

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