

Core researcher

Koichi Tanaka

General Manager, Koichi Tanaka Laboratory of Advanced Science and Technology, Shimadzu Corporation

Co-core researchers

- Taka-aki Sato
Director, Life Science Laboratory, Shimadzu Corporation
- Gozoh Tsujimoto
Professor, Graduate School of Pharmaceutical Sciences, Kyoto University
- Hachiro Sugimoto
Visiting Professor, Graduate School of Pharmaceutical Sciences, Kyoto University

Operational support institution

Japan Science and Technology Agency (JST)



Development of the next generation mass spectrometry system, and contribution toward drug discovery and diagnostics

Development of Next Generation Mass Spectrometry System Accelerates Early Diagnosis of Diseases and New Drug Discovery

Identifying the cause of disease from a drop of blood and realizing a longevous, healthy society

Mass spectrometry (MS) is the method of weighing the mass of molecules and analyzing their content. As this method is used to measure the base quantity of compounds produced by living organisms in nature and human beings, it is widely applied in various fields of science and technology. Amongst its applications, its contributions to medicine and pharmaceuticals have been most spotlighted in recent years.

About 60 to 70% of the human body is made of water, and more than half of the remaining materials is complicated protein structures. When we fall ill, it is expected that some changes have occurred in these proteins. The mass of one protein is 1/100 million of 1/100 million of a milligram, virtually invisible to our eyes. If a few hundred thousand proteins could be quantified selectively at high sensitivity, this would contribute significantly to the early diagnosis of diseases, new treatment methods, and development of new drugs.

In this project, we aim to jointly develop the world's best performance next generation mass spectrometry system through cooperation between industry, academia, and government. We will carry out research enabling innovative diagnosis and new drug development for diseases such as cancer and Alzheimer's disease even from the proteins contained in one drop of blood.

Profile

Born on August 3, 1959. From Toyama Prefecture

Interests

Strolling in nature, taking pictures

Interdisciplinary research - to be encouraged especially as this is a new area of research, and great for fostering young researchers

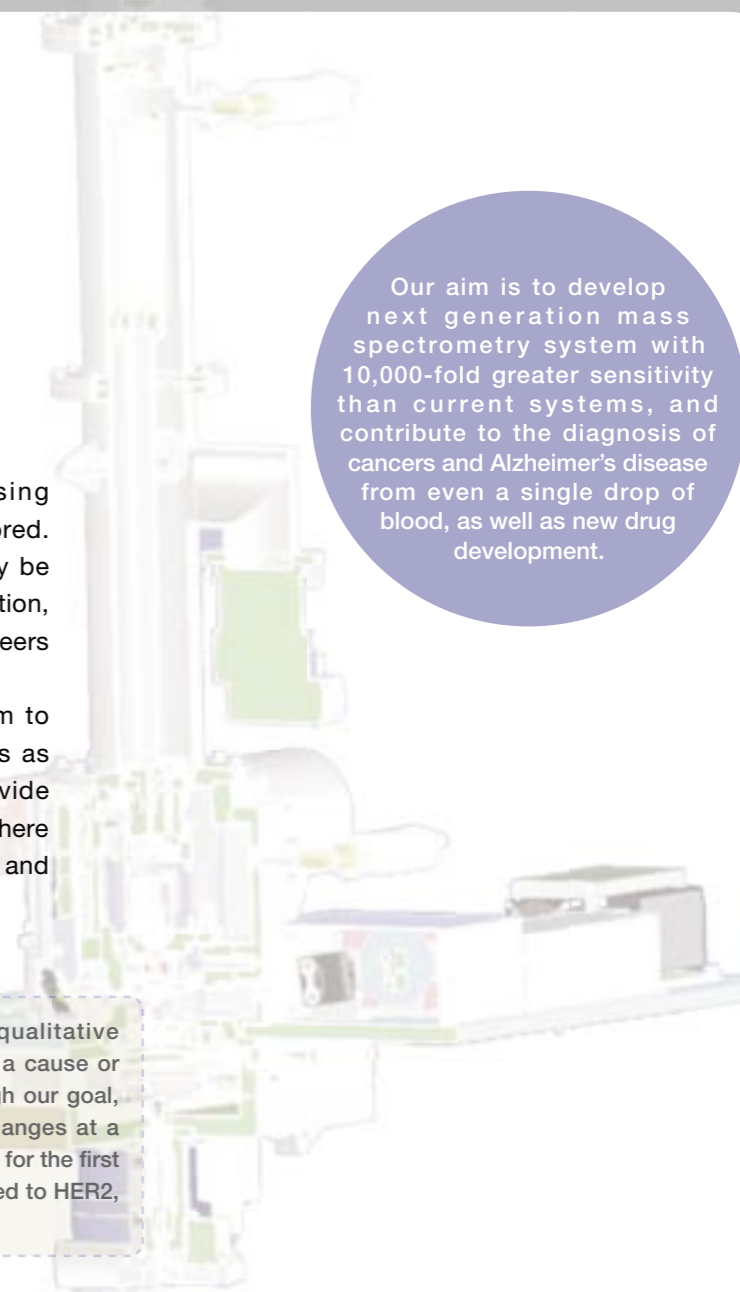
Mass spectrometry is a young and promising science, and there remains much to be explored. Moreover, it is a new scientific field which can only be established through mutual understanding, cooperation, and sharing of ideas between researchers and engineers from various fields of specialty.

Through this research and development, we aim to promote integration of different academic areas as well as creating new ones. We also hope to provide good research environments for young researchers where they can overcome failures they meet along the way and continue their challenge to make new discoveries.

Our aim is to develop next generation mass spectrometry system with 10,000-fold greater sensitivity than current systems, and contribute to the diagnosis of cancers and Alzheimer's disease from even a single drop of blood, as well as new drug development.

Latest topics (e.g. research outcome)

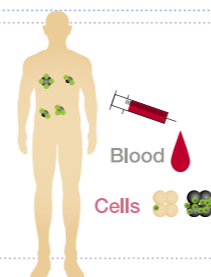
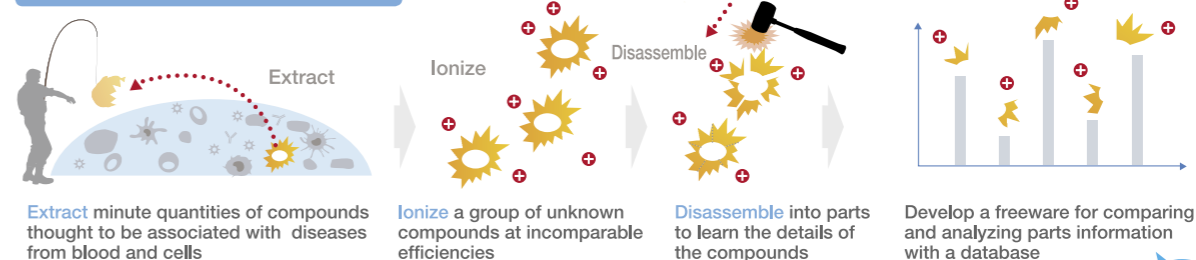
It is well known that quantitative and/or qualitative changes in protein in the body can be either a cause or a consequence of disease. Although still halfway through our goal, we have developed a method that can detect such changes at a maximum 1000-fold sensitivity. The method has detected, for the first time in the world, the variations in the sugar chain attached to HER2, a type of protein related to breast cancer.



FIRST PROGRAM

Research enabling innovative diagnosis and new drug development from proteins contained in one drop of blood.

Role of Shimadzu Corporation



Role of Kyoto University

Extract compounds related to cancers and Alzheimer's disease from blood and cells, identify causes of diseases and results using the above method, and link this to early discovery of disease and development of treatments

Develop next generation mass spectrometry system by industry-academia-government collaboration

Academia

Industry