

PRESS RELEASESeptember 7th, 2020**Cooperation between Chiyoda Corporation and Shionogi Pharma
in the Development of Continuous Manufacturing Technology for APIs and Intermediates**

Chiyoda Corporation (Headquartered in Yokohama City, Kanagawa) and Shionogi Pharma Co., Ltd. (Headquartered in Settsu City, Osaka) are pleased to announce that we have agreed to cooperate in the development and study of the technology for Continuous Manufacturing (“CM”) of APIs*¹ and intermediates.

In general, batch operation(*) has been adopted in pharmaceutical manufacturing, but in recent years, CM process commonly adopted in other industries such as chemical, petro-chemical, and food, has been attracting attention as a new technology for medical and pharmaceutical industries. CM is expected to realize shortened R&D cycles, cost reduction, quality and safety improvement, and high reaction efficiency which contributes to reducing carbon footprint.

*A form of production in which multiple products are alternately produced by consolidating the production volume of each type of product

Chiyoda Corporation, in expanding its new business field, has positioned life science as one of the fields in its growth strategy, and has been enhancing the development of CM technology for pharmaceuticals with its expertise obtained through EPC*² services for pharmaceutical manufacturing facilities that require advanced management, as well as its knowledge including AI on overall control and various reactions indispensable for the construction of CM processes established in the fields of energy and chemistry.

Shionogi Pharma has positioned the development of CM technology for APIs and intermediates as one of the growth strategies for the CDMO*³ business, and has been developing various alliances to enhance technology development, such as joint research with the University of Tokyo, module equipment development with equipment manufacturers, system development with instrumentation manufacturers, and research on flow synthesis with chemical companies. Shionogi Pharma has begun discussions with Yokogawa Electric Corporation (Headquartered in Musashino City, Tokyo) and Fujimoto Chemical Co., Ltd. (Headquartered in Osaka City, Osaka), concerning a business alliance for the development of the said technology and for manufacturing development using the said technology respectively.

We are expecting to further accelerate the development of CM technology by combining the knowledge of both companies. Shionogi Pharma and Chiyoda Corporation will contribute to improving efficiency of drug development and achieving SDGs (Sustainable Development Goals) through the challenge of innovative technology development to benefit patients and customers. By applying proprietary technologies to conventional drug development and manufacturing methods, we will further contribute to the provision of high-value-added solution services and the needs of drug development.

<Reference>

About Chiyoda Corporation

Since its founding in 1948, Chiyoda Corporation has embarked on numerous projects worldwide, ranging from the design, procurement, and construction of plants (EPC) in the fields of energy such as oil and gas, chemistry, the environment, and life sciences.

About Shionogi Pharma

Shionogi Pharma launched its business on April 1, 2019 with the mission of becoming a "Technology development and manufacturing companies" trusted by customers. In addition to the development of manufacturing methods for bulk drug substances and formulation development, as well as commercial production, it has established a system to provide "full-range services" including support for analytical method development and facility design using pharmaceutical engineering technology.

About Yokogawa Electric Corporation

Since its establishment in 1915, Yokogawa Electric Corporation (YOKOGAWA) has been contributing to the creation of new value and sustainable growth by helping customers visualize and optimize issues in their overall business activities based on its deep knowledge of plant control and operation technology (Operational Technology — OT), IT, and the industry.

About Fujimoto Chemical Co., Ltd.

Since its establishment in 1953, Fujimoto Chemical Co., Ltd. has been engaged in the production and sales of bulk pharmaceuticals and intermediates. With trading company functions, a research, production and quality assurance system for bulk pharmaceuticals and intermediates, chemical synthesis plants, and highly pharmacologically active manufacturing facilities, Fujimoto Chemical Co., Ltd. provides contract manufacturing services as a contract manufacturing company based on development proposals with high technological capabilities.

*1 API : Active Pharmaceutical Ingredients

*2 EPC : Engineering, Procurement and Construction

*3 CDMO : Contract Development Manufacturing Organization

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