## FUJIFILM

## Fujifilm and Utilization of Carbon Dioxide Institute sign a joint research agreement to develop technology toward decarbonized society -Develop mass-production technology of hydrogen-oxidizing bacteria that uses carbon dioxide for producing amino acid

**TOKYO, December 26, 2022** --- FUJIFILM Corporation (President and CEO, Representative Director: Teiichi Goto) and Utilization of Carbon Dioxide Institute Co., Ltd. (CEO/CSO: Hideaki Yukawa, UCDI) have signed a joint research agreement on December 23 to develop technology for mass-producing hydrogen-oxidizing bacteria that uses carbon dioxide for producing organic matter. Through this research, the Companies will develop technology to efficiently produce alanine, a type of amino acid with mass fermentation of UCDI® Hydrogen Bacteria, unique hydrogen-oxidizing bacteria created by UCDI. Fujifilm and UCDI will establish this technology and implement it in society at an early stage.

Hydrogen-oxidizing bacteria is a type of bacteria that uses carbon dioxide as a source of nutrition and propagates at a rapid rate to generate organic matters. Since hydrogen-oxidizing bacteria facilitates a carbon-negative manufacturing process for organic matters, it is attracting high expectations as one of the effective means of achieving a decarbonized society, an urgent issue for the international community. However, for practical use of hydrogen-oxidizing bacteria, a production technology that enable stable mass fermentation and highly efficient production of organic matter are required. UCDI® Hydrogen Bacteria, a type of hydrogen-oxidizing bacteria, boasts advanced proliferative ability with the doubling time about one hour\* and can produce a variety of organic matters for specific purposes, such as amino acids and alcohol using UCDI's genetic modification technology. Currently, UCDI holds many patents for producing various organic matters using UCDI® Hydrogen Bacteria which grows on carbon dioxide as a substrate.

Fujifilm has applied its production technology, which has been evolved through its use in photographic films, to the manufacturing of biopharmaceuticals, involving microbial fermentation and cell culture, to substantially improve production efficiency. Fujifilm has also merged production technology with biotechnology to develop a next-generation continuous production system, capable of integrated production of biopharmaceutical substance process from culture to purification. This reflects Fujifilm's active efforts to develop and practically apply technologies for producing high-quality biopharmaceuticals at high efficiency.

In the latest move, Fujifilm and UCDI start joint research on the development of mass-production technology for UCDI® Hydrogen Bacteria using the technologies of both companies. The specific subject of the research is UCDI® Hydrogen Bacteria producing alanine which is expected to grow as it is used in a wide range of products, including food, feed, cosmetics, and cell culture media. By combining Fujifilm's production technology and UCDI's hydrogen-oxidizing bacteria production technology, the Companies aim to achieve stable mass fermentation of UCDI® hydrogen bacteria and develop mass production technology of alanine.

\* One gram of hydrogen-oxidizing bacteria proliferates into 16 tons in 24 hours. Hydrogen-oxidizing bacteria also contains many animal proteins. UCDI® Hydrogen Bacteria has the crude protein content of 83.8%, which is much higher than that of fishmeal or typical microbes (50~60%). Crude protein content quantifies nitrogen in proteins as well as amino acids, amine, ammonia and others.

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