



Tokyo Tech



Fastide

April 1, 2021

Press Release

Tokyo Institute of Technology

Fastide, Inc.

## **Fastide, Inc. Established to Commercialize Results of Middle Molecule Drug Discovery Using AI Technology and Artificial Nucleic Acid Synthesis Technology**

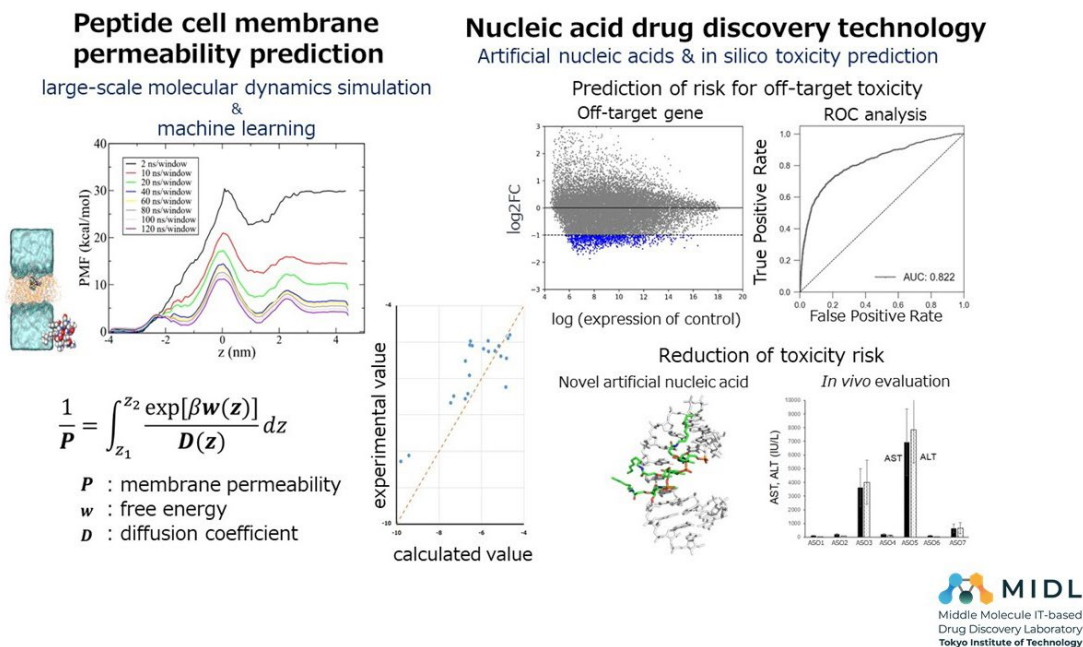
—Developing support projects for peptide drug discovery and nucleic acid drug discovery—

Professor Yutaka Akiyama of the School of Computing, Professor Kohji Seio of the School of Life Science and Technology, and others at Tokyo Institute of Technology (Tokyo Tech) have established Fastide, Inc. (Representative: Shinichiro Fujiie, Kawasaki City) as part of their aim to bring their research results on **middle molecule drug discovery**<sup>[Note 1]</sup> to society. Tokyo Tech and Fastide, Inc. are cooperating with Kawasaki City through the Program for Building Regional Innovation Ecosystems to promote integrated research of AI drug discovery and chemical synthesis technologies and are committed to creating innovative technologies and practical applications.

### **[Background and Project Results]**

In September 2017, Tokyo Tech established the Middle Molecule IT-based Drug Discovery Laboratory (MIDL) with the aim of creating innovative technologies in middle molecule drug discovery such as peptide drugs and nucleic acid drugs, which are expected to be useful in next-generation drug discovery, in collaboration with Kawasaki City and the “Program for Building Regional Innovation Ecosystems under the Project for Developing Innovation Systems (Theme: Program to Industrialize an Innovative Middle Molecule Drug Discovery Flow through Fusion of Computational Drug Design and Chemical Synthesis Technology)” (hereinafter referred to as “this program”) of the Ministry of Education, Culture, Sports, Science and Technology (MEXT). This program is proceeding with two commercialization projects: the **development of IT drug discovery technologies for peptide drug discovery**<sup>[Note 2]</sup> led by Professor Yutaka Akiyama, and the **development of artificial nucleic acids for nucleic acid drug discovery**<sup>[Note 3]</sup> led by Professor Kohji Seio. After more than three years of work, the former developed a pharmacokinetic prediction system specializing in peptide drug discovery using technologies such as large-scale molecular simulation and machine learning, and the latter established a new synthesis method for nucleic acid libraries. In addition to work such as examining business strategies and intellectual property strategies, and the building of human networks, this program was given a “**Comprehensive Evaluation S**” rating<sup>[Note 4]</sup>, which is the highest evaluation in the interim evaluations by Ministry

of Education, Culture, Sports, Science and Technology (MEXT).



**Figure: Tokyo Tech Middle Molecule Drug Discovery Technologies**

#### [Establishment of the New Company]

Fastide, Inc. was established in April 2021 to carry out a project supporting middle molecule drug discovery by faculty members who are participating in MIDL with the aim of contributing to the promotion of science and technology and strengthening international competitiveness in response to requests from industries, regions, etc., that require fast practical application and commercialization of research results by further advancing these results.

Prior to the establishment of this company, a commercialization support group was formed comprised of the business producer and the business co-producer of this program, faculty members, and university research administrators (URA) of the Tokyo Tech Office of Research and Innovation to involve the entire organization in the commercialization.

Through strategic partnerships and business developments with pharmaceutical companies in Japan and other countries, and bio-venture companies, Tokyo Tech and Fastide, Inc. will promote innovative R&D and social application of results in order to promote science and technology in Japan and strengthen international competitiveness.

#### [Overview of Fastide, Inc.]

Company Name
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Fastide, Inc.
<u>Date Established</u> April 1, 2021
<u>Location</u> Kawasaki City, Kanagawa Prefecture
<u>Capital</u> 5,000,000 yen
<u>CEO</u> Shinichiro Fujie (Biography) Graduated from the Department of Agricultural Chemistry, Faculty of Agriculture, Kyushu University in 1998. Completed the master's program at the Division of Bioresource and Bioenvironmental Sciences, Graduate School, Kyushu University, and joined Shionogi Co., Ltd. in 2000. Held various positions in the API R&D Laboratory, Manufacturing Strategy Planning Division, and Corporate Strategy Planning Department. Dispatched to PeptiStar Inc. (as Executive Officer) in 2017. Became Director of PeptiStar (and resigned from Shionogi) in 2019 (current position).
<u>Business Overview</u> R&D, manufacturing, and trading of middle-molecule pharmaceuticals (nucleic acid drugs and peptide drugs) and their derivatives. Computer systems design and sales, R&D consulting and investigation, etc. related to middle-molecule drug discovery are also including.
<u>Related Faculty Members</u> Development of middle molecule drug discovery methods using large-scale computation and machine learning <ul style="list-style-type: none"> <li>• Yutaka Akiyama (Professor, School of Computing; Director, Fastide, Inc.)</li> <li>• Masahito Ohue (Assistant Professor, School of Computing; Advisor, Fastide, Inc.)</li> </ul> Development and application of new chemical synthesis methods for nucleic acid and prediction of toxicity by calculation <ul style="list-style-type: none"> <li>• Kohji Seio (Professor, School of Life Science and Technology; Director, Fastide, Inc.)</li> <li>• Yoshiaki Masaki (Assistant Professor, School of Life Science and Technology; Advisor, Fastide, Inc.)</li> </ul>

**[Notes]**

Note 1: **Middle molecule drug discovery**

The process up to the development of drugs using middle molecules with a molecular weight of

several hundreds to several thousands and intermediate properties between a small molecule drug (tens to several hundreds) and an antibody drug (about 150,000). The market for small molecule drug discovery is saturated, and the problem with antibody drugs is that there are limited antigens while development and production costs are high. Therefore, middle molecule drug discovery, and peptide drugs and nucleic acid drugs in particular, is attracting much attention in regard to next-generation drug discovery.

**Note 2: The development of IT drug discovery technologies for peptide drug discovery**

Takashi Tajimi, Naoki Wakui, Keisuke Yanagisawa, Yasushi Yoshikawa, Masahito Ohue, Yutaka Akiyama, "Computational prediction of plasma protein binding of cyclic peptides from small molecule experimental data using sparse modeling techniques", BMC Bioinformatics, 19(Suppl 19):527, 2018. [doi:10.1186/s12859-018-2529-z](https://doi.org/10.1186/s12859-018-2529-z)

**Note 3: The development of artificial nucleic acids for nucleic acid drug discovery**

Yoshiaki Masaki, Yusuke Iriyama, Hiroyuki Nakajima, Yusuke Kuroda, Tatsuro Kanaki, Satoshi Furukawa, Mitsuo Sekine, Kohji Seio, "Application of 2'-O-(2-N-Methylcarbamoyl)ethyl Nucleotides in RNase H-Dependent Antisense Oligonucleotides", Nucleic Acid Therapeutics, 28(5):307-311, 2018. [doi:10.1089/nat.2018.0738](https://doi.org/10.1089/nat.2018.0738)

**Note 4: “Comprehensive Evaluation S” rating**

MEXT “FY2019 Interim Evaluation Results of the Program for Building Regional Innovation Ecosystems” (a report in Japanese)

[https://www.mext.go.jp/a\\_menu/kagaku/chiiki/program/1413865\\_00001.html](https://www.mext.go.jp/a_menu/kagaku/chiiki/program/1413865_00001.html)

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## **About Tokyo Institute of Technology**

Tokyo Tech stands at the forefront of research and higher education as the leading university for science and technology in Japan. Tokyo Tech researchers excel in fields ranging from materials science to biology, computer science, and physics. Founded in 1881, Tokyo Tech hosts over 10,000 undergraduate and graduate students per year, who develop into scientific leaders and some of the most sought-after engineers in industry. Embodying the Japanese philosophy of “monotsukuri,” meaning “technical ingenuity and innovation,” the Tokyo Tech community strives to contribute to society through high-impact research.

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