Profile Status: Published

Technology Offer

A Japanese biotech company is seeking an EU partner for collaborative research on drug discovery

Summary

Strong of its two platform technologies based on in silico drug screening technology for small molecules and a new modality for therapeutic peptide, the Japanese biotech company would like to enter into a collaborative research with EU pharmaceutical companies operating in drug research. The agreement could take the shape of a licensing one, financial one or research cooperation one.

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Details

Description

The Japanese company has developed two platform technologies: an in silico drug screening technology for small molecules (#1) and a new modality for therapeutic peptide (#2).

Technology #1 is being powered up by artificial intelligence (AI) introduction. The company is mainly focusing on protein-protein interactions (PPIs) as therapeutic targets because PPIs are expected to be a “treasure-trove” for drug discovery. The majority of all PPIs (- 650,000) still remain to be challenged.

The company will provide hit small molecules with sub-micromolar activities (obtained by technology #1) or lead peptides with binding affinities of less than 10 nanomolar (obtained by technology #2) within 6 to 7 months for very challenging PPI targets. In addition, it will precisely predict activities of PPI-targeted small molecules by AI-introduced technology #1.

The envisioned partnership would be with a pharmaceutical company engaged in advanced drug discovery research. Through a financial, license, or research cooperation agreement the partnership would be mutually beneficial.

The EU pharmaceutical company will benefit from the use of the Japanese companies’ platform technologies by improving its drug discovery and tackling targets that were unsuccessful with high-throughput screening (HTS) and prior in-silico screening.

The Japanese company would use the sponsorship / financial support from the partnering

company to improve its research operations (e.g. based on evaluations by the partner company) and in doing so improve the activity / safety / pharmacokinetic levels of their small molecules and peptides.

Advantages and Innovations

The company developed technology provides a most effective alternative compared to usual high-throughput screening (HTS).

The company platform technologies main innovations can be described as follows:

#1: In silico drug screening technology for small molecules
1.1. This makes it possible to propose highly active (sub-micromolar binding affinity or inhibitory activity) hit candidates (typically 100 – 300 compounds) by taking a balance of enthalpy and entropy of free binding energy into account for challenging targets including PPIs.
1.2. The technology can identify active compounds at a very high hit rate e.g. a very high likelihood of identifying a small molecule being active (ordinarily 10 – 20%, most recently achieved over 45%, for PPI targets) from commercially available chemical libraries.
1.3. It can predict precise activities (8-class divided) of small molecule PPI inhibitors by use of artificial intelligence, which includes deep learning by atom-level and 3D-structure-based approach and produces good prediction accuracy of over 70%.

#2: A new modality for therapeutic peptide (helix-loop-helix peptide)
2.1. It can be used to identify hit / lead peptides by dual approaches, rational design, or screening from phage-displayed or yeast-displayed random peptide libraries.
2.2. It makes it possible to possess triple binding sites (N-helix, loop and C-helix) which provide various types of special properties such as maintained plasma level (by binding to albumin / immunoglobulin), Blood-Brain Barrier (BBB) penetration (by binding to transfer in receptor / glucose transporter GLUT-1), enhanced efficacy (by binding to two target molecules, ex. human epidermal growth factor receptors HER2/HER3), and cell membrane permeability (by binding to internalization-related membrane protein).
2.3. It can bind to not only structured proteins but also unstructured proteins and enable to regulate significant functions of linear type proteins / peptides.

Stage of Development

Project already started

IPR Status

Secret Know-how,Copyright

Profile Origin

Private (in-house) research

Keywords

Technology

03004007	Pharmaceutics
06001003	Cytology, Cancerology, Oncology
06001014	Neurology, Brain Research
06001015	Pharmaceutical Products / Drugs

06002009	Molecular design

Market

04001003	Medical genetic engineering applications
05007002	Pharmaceuticals/fine chemicals

NACE

C.21.2.0	Manufacture of pharmaceutical preparations

Network Contact

Issuing Partner

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Open for EOI : Yes

Dissemination

Relevant Sector Groups

Bio Chem Tech
Healthcare

Restrict Dissemination to Specific Countries

Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, UnitedKingdom,

Client

Type and Size of Organisation Behind the Profile

Industry SME <= 10

Year Established

2001

Turnover

<1M

Already Engaged in Trans-National Cooperation

Yes

Experience Comments

The company had collaborative research agreements with French and Korean companies.

Languages Spoken

English

Client Country

Japan

Partner Sought

Type and Role of Partner Sought

The Japanese company is seeking EU pharmaceutical companies in the following situations:
1. They have specific drug target proteins of strong interest but no active molecules.
2. They conducted HTS for specific drug target proteins but did not succeed in hit identification.
3. They find it difficult to conduct HTS for various reasons.
4. They need to change scaffolds of small compounds for various reasons (safety, Drug Metabolism and PharmacoKinetics DMPK, etc.).
5. They have strong interests in intracellular PPI targets, Central Nervous System (CNS) targets, unstructured protein targets, and other highly challenging drug targets.
6. They have many compounds that have been designed for specific targets but not synthesized nor assessed yet (need to know priority order for synthesis to save time and resources for lead generation / optimization).

The Japanese company will bring the best solution (in silico screening of small molecule, activity prediction by AI, rational design of helix-loop-helix peptide, or random screening of helix-loop-helix peptide) for the problems listed above.

The company can prepare small molecule and peptide samples through purchasing, outsourcing or in-house production, but does not have enough functions for assessment. Therefore, it would prefer as partners pharmaceutical industries that actively conduct various evaluations of molecules proposed the company.

Type and Size of Partner Sought

SME 11-50,>500 MNE,251-500,SME 51-250,>500

Type of Partnership Considered

License agreement
Financial agreement
Research cooperation agreement