Epsilon Molecular Engineering ®

PRESS RELEASE

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Epsilon Molecular Engineering, Inc.

EME entered into a comprehensive collaboration agreement with Kao for Multiple Infectious Diseases with Utilizing *PharmaLogical*™ VHH.

Epsilon Molecular Engineering, Inc. (HQ: Saitama, Japan; President & CEO: Naoto Nemoto; "EME") entered into a comprehensive collaboration agreement with Kao Corporation (HQ: Tokyo, Japan; President & CEO: Yoshihiro Hasebe; "Kao") for multiple infectious disease targets. The purpose of this collaboration is a social implementation of new generation VHH antibody (*1) such as obtaining and utilizing functional VHH antibody for various usages of multiple infectious disease fields.

In this comprehensive collaboration agreement, EME and Kao will utilize *PharmaLogical*™ Library(*2) and cDNA display（*3）, and obtain and engineer *PharmaLogical*™ VHH antibody for creating candidates to a targeted market.

Under the term of this agreement, EME receives an undisclosed upfront payment this year and milestone payment in meeting the criteria.

＊1 VHH：Variable Domain of Heavy Chain of Heavy Chain Antibody found in camelids. Superior stability and easily molecularly designed than conventional IgG.

＊2 *PharmaLogical*™ Library *：* EME's proprietary humanized synthetic VHH library which structurally designed based on unique characteristic of VHH that recognition for epitope that conventional IgG unable to recognize.

＊3 cDNA display： Most stable and diverse genotype-phenotype coupling using cell-free translation system, enabling $10^{13\text{-}14}$ repertories of VHHs to be screened at once

【Key Features of *PharmaLogical*™ Library】

- Design based on crystal structure analysis data of VHH antibody

  A humanized VHH library designed based on the structural characteristics resulting from the crystal structure analysis data of the human sequence and VHH that have already been clinically applied to the antibody framework part (FR). The three CDRs (Complementarity Determining Regions) that form the antigen recognition site are designed based on the structural property information obtained from the alpaca-derived VHH, and are known to contribute most to antigen binding. By randomizing the CDR3s, large diversity is demonstrated.

- Design to minimize the frequency on occurrence of amino acids that cause heterogeneity in formulation

Amino acids that are susceptible to modification and that can cause major structural changes, such as cysteine and proline residues, cause heterogeneity in the formulation process. By designing a CDR that minimizes the frequency of appearance of these amino acids, it can be expected to minimize the problems that arise in the drug discovery process

- Innovative VHH screening method by combining *PharmaLogical*™ Library with cDNA display

  The combination of *PharmaLogical*™ Library which has a diverse library size of $10^{13\text{-}14}$ (10 trillion to 100 trillion), and a screening system based on the cDNA display technology enables an innovative VHH screening.

Epsilon Molecular Engineering

EME is a biotech and pharmaceutical company specialized in VHH that has been developing as an innovative modality and drugs based on evolutionary molecular engineering since 2016. Taking advantage of our unique screening technology and molecular design method, we are engaged in research and development of diagnostic agents and reagents for regenerative medicine as well as drug development. With the corporate mission of "creating future biomolecules," we aim to contribute to a wide range of society and people's lives.

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