



January 29, 2021
FunPep Co., Ltd.

**Announcement of Newly Developed Antibody-inducing Peptide Compound:
FPP005 - Antibody-inducing peptide targeting IL-23 protein**

FunPep, Co., Ltd. ("FunPep") has been conducting exploratory research on antibody-inducing peptides against interleukin 23 protein (IL-23). We are pleased to announce that we have determined a new developmental compound "FPP005" (development code) and have started preclinical studies to prepare for the start of clinical trials.

In collaboration with the Osaka University Graduate School of Medicine, FunPep has been conducting exploratory research on antibody-inducing peptides for various diseases, taking advantage of our proprietary drug discovery platform technology for the new modality which is antibody-inducing peptides. To date, we have created FPP003 (target protein: IL-17A), which is currently undergoing clinical trials overseas, and FPP004 (target protein: IgE), which is in the preclinical stage. Our development pipeline has been further strengthened with the start of preclinical studies for FPP005.

Antibody-inducing peptides are peptide vaccines that exhibit therapeutic effects by inducing antibody production in the patient's body.

Unlike antibody drugs that are manufactured at biopharmaceutical facilities, antibody-inducing peptides can be produced by chemical synthesis, which reduces manufacturing costs. Additionally, after administration, immune cells continuously produce antibodies for a certain period of time in the patient's body, thereby extending the interval between drug administrations. With these characteristics, we hope to develop antibody-inducing peptides as an alternative to expensive antibody drugs to reduce medical costs, thereby contributing to solving the growing healthcare financial problems in developed countries and reducing the burden on patients.

The target protein of FPP005, IL-23, plays an important role in the pathogenesis of various inflammatory diseases, and the development of anti-IL-23 antibody drugs continues for a wide range of diseases such as psoriasis, psoriatic arthritis, Crohn's disease, and ulcerative colitis. FunPep will continue develop FPP005 for a wide range of inflammatory diseases, including psoriasis, with an aim to ultimately contribute to a better society and economic environment for patients.

Research and development for antibody-inducing peptides targeting IL-23 has received support from the New Energy and Industrial Technology Development Organization's "Collaboration with Research Institute" program and was done in collaboration with translational research institution, Osaka University.

<Reference Material>

◆ R&D Pipeline

<Products in Development>

| Type | Product | Indication | Region | Discovery | Preclinical | Clinical Trials | | | Licensee etc. |
|---------------------------|----------------------------|---|-----------|-----------------------|-------------|-----------------|----------|-----------|---|
| | | | | | | Phase I | Phase II | Phase III | |
| Functional peptide | SR-0379 | Skin ulcers | Japan | Phase III Preparation | | | | | Shionogi (Global license) |
| Antibody-inducing peptide | FPP003 (Target: IL-17A) | Psoriasis | Australia | Phase I/IIa Ongoing | | | | | Sumitomo Dainippon (Option for N. America) |
| | | Ankylosing spondylitis | — | Preclinical | | | | | |
| | FPP004 (Target: IgE) | Pollinosis (Seasonal allergy rhinitis) | — | Preclinical | | | | | TBD |
| | FPP005 (Target: IL-23) | Psoriasis | — | Preclinical | | | | | TBD |

<Research Themes>

| Type | 対象疾患 | 提携企業 |
|---------------------------|------------------------------------|--|
| Antibody-inducing peptide | Neuropsychiatric disorders | Sumitomo Dainippon (Research agreement on neuropsychiatric disorders) |
| | Pain | |
| | High blood pressure | |
| | Allergies | Shionogi (Collaborative research on pain) |
| | Thrombosis | MEDIPAL HOLDINGS (R&D support) |
| | Familial adenomatosis of the colon | |
| | Others | |
| Prophylactic vaccines | COVID-19 | AnGes (Collaborative research) |

Antibody-inducing Peptides

On the strength of AJP001, a functional peptide that is the result of research conducted at the Osaka University Graduate School of Medicine, FunPep is advancing research and development of "antibody-inducing peptides," therapeutic vaccines for chronic diseases such as inflammatory and allergic diseases.

In order to induce antibody production in vivo, it is necessary for B cells to recognize target proteins (antigens) and for B cells to be activated by stimulation from helper T cells. However, antibodies are not produced against self-antigens (e.g., self-proteins), which are the target proteins of chronic diseases, because helper T cells are not activated. For this reason, antibody-inducing peptides are designed to induce antibody production against target self-proteins by binding the "epitope" portion (B cell epitope) recognized by B cells to the "carrier" portion containing the T cell epitope recognized by helper T cells.

The strengths of our antibody-inducing peptides are: (1) the use of our proprietary functional peptide "AJP001" as the "carrier"^(Note) and (2) the technological know-how to design and select the "epitope" according to the characteristics of the target protein (physicochemical properties, steric structure, and biological functions). FunPep calls these two strengths together the "STEP UP (Search Technology of EPitope for Unique Peptide vaccine)" drug discovery platform.

(Note) Generally, biological substances are used as "carriers," but since these carriers contain not only T-cell epitopes but also B-cell epitopes, antibodies against the carriers are also produced. Therefore, repeated administration of the carrier may result in stronger immune induction against the carrier

and weaker immune induction against the target protein. On the other hand, when AJP001 is used as a carrier, antibodies against AJP001 are not produced, so antibody production can be induced specifically for the target protein.

※ “Antibody-inducing peptides” is a registered trademark of FunPep.

◆ STEP UP Drug Discovery Platform

