



2024 年度 SP+ Fund 報告書 (General)

Project Report: SP+ Fund 2024 (General Program)

プロジェクトの基本情報 / Key Project Information	
課題名 (英語) Project name (in English)	Expanding the capabilities and therapeutic opportunities in antimicrobial peptide research
期間 / Period	From 2024/07/01 Until 2025/03/15
主な研究分野 Main research fields	Chemistry
活動内容 (該当するものに全て ✓してください。) Activities to be funded (check ✓ all applicable items)	<input type="checkbox"/> 研究ワークショップ、会議、ラウンドテーブル、シンポジウム等の 実施 / Research workshops, conferences, roundtables, symposiums, etc. <input checked="" type="checkbox"/> 共同研究や研究打合せにかかる渡航・招へい Travel/invitations for collaborative research or research meetings <input type="checkbox"/> その他 (具体的に) / Other (please specify) ()
区分 / Type of collaboration	<input checked="" type="checkbox"/> Bilateral ※本学と SP 校との 2 機関で実施するプロジェクト (Project conducted by Kyoto University and one SP institution) <input type="checkbox"/> Multilateral ※本学と SP 校に加え、さらに 1 機関以上 (Project conducted by Kyoto University, an SP institution, and one or more additional institutions)
実施場所 / Location of implementation	<input checked="" type="checkbox"/> 京都大学 / Kyoto University <input checked="" type="checkbox"/> その他 / Other location (University of Vienna)

申請者 (京都大学) / Applicant (Kyoto University)	
姓 / Family name	Futaki
名 / Given name	Shiroh
職名 / Position	Professor
所属部局 Faculty/dept. of affiliation	Institute for Chemical Research (ICR) and Graduate School of Pharmaceutical Sciences, Kyoto University (KU)

SP 校のプロジェクト代表者 / Representative from SP institution	
姓 / Family name	Muttenthaler
名 / Given name	Markus
職名 / Position	Associate Professor
所属大学 / Institution	<input type="checkbox"/> ボルドー大学 / University of Bordeaux <input checked="" type="checkbox"/> ウィーン大学 / University of Vienna

SP校のプロジェクト代表者／Representative from SP institution

	<input type="checkbox"/> チューリヒ大学／University of Zurich <input type="checkbox"/> ハンブルク大学／University of Hamburg <input type="checkbox"/> 国立台湾大学／National Taiwan University
所属部局 Faculty/dept. of affiliation	Faculty of Chemistry, Institute of Biological Chemistry (IBC)

その他のプロジェクト代表者 (Multi の場合) / Representative from other collaborating institution (in the case of multilateral projects) ※

姓／Family name	
名／Given name	
職名／Position	
所属大学／ Institution	<input type="checkbox"/> ボルドー大学／University of Bordeaux <input type="checkbox"/> ウィーン大学／University of Vienna <input type="checkbox"/> チューリヒ大学／University of Zurich <input type="checkbox"/> ハンブルク大学／University of Hamburg <input type="checkbox"/> 国立台湾大学／National Taiwan University <input type="checkbox"/> その他／Other （機関名／name of institution: ）
所属部局 Faculty/dept. of affiliation	

※4機関以上によるプロジェクトの場合は、必要に応じて欄を追加願います。

If the project involves four or more institutions, please insert additional fields as required.

プロジェクトの実施内容／Summary of the project

公開されている関連リンクや、フライヤー、プログラム、報告書、広報記事等の提出をもってして代えることも可能です。 This could be substituted by submitting publicly available relevant links, flyers, programs, reports, publicity articles, etc.

This project aimed to establish a new collaboration, capabilities, and knowledge transfer between the research groups of Prof. Shiroh Futaki from Kyoto University (KU) and Prof. Markus Muttenthaler from the University of Vienna (UNIVIE). The Futaki group has extensive experience investigating the molecular mechanism of antimicrobial peptides (AMPs) and harnessing cell-penetrating peptides to deliver biopharmaceuticals. The Muttenthaler group is well-versed in peptide drug discovery and medicinal chemistry, with recent breakthroughs in describing the presence and disease association of macroscopically visible bacterial biofilms in patients with ulcerative colitis (UC) and irritable bowel syndrome (IBS). This research collaboration also included to obtain new AMP-based delivery shuttles to facilitate intracellular (drug-)cargo delivery.

In addition to discussions via e-mail and Zoom, Prof. Shiroh Futaki, Assistant Prof. Yoshimasa Kawaguchi (ICR, KU) and Prof. Markus Muttenthaler and his team met and had discussions at the 37th European Peptide Symposium and the 14th International Peptide Symposium in Florence, Italy, in August 2024. Prof. Shiroh Futaki visited UNIVIE in December 2024. He also attended at the 13th Austrian Peptide Symposium held during his stay in Vienna to expand the research network to peptide scientists in Austria and Europe including those from UNIVIE.

Prof. Markus Muttenthaler and PhD student Monika Perisic visited Kyoto in February 2025. During these visits, the two teams discussed applicable research strategies, AMP designs, suitable assays, and strategic frameworks to continue the collaboration. First preliminary data were generated, including mutual AMP design, synthesis in the Muttenthaler lab, and cytotoxicity screening in the Futaki lab, resulting in five promising lead peptides. Importantly, the Futaki lab found that one of the lead peptides could be formulated with IgGs for efficient delivery into cells. Both groups have agreed to publish the data after patent issues for these peptides are resolved.

今後の展望／Prospects for future research collaboration

Although Prof. Shiroh Futaki will retire from his current position at the end of March 2025, Assistant Prof. Y will continue this collaborative project to further strengthen the relationship between both research groups. Prof. Muttenthaler also has a laboratory at the University of Queensland, Australia, and through the collaboration, networking with the researcher at the University of Queensland can also be expected.