<table>
<tr><td>Technology/ Title</td><td colspan="3">FLIPr-Mediated Antigen Targeting to Dendritic Cells: A Promising Strategy for Vaccine Development</td></tr>
<tr><td>Subtitle</td><td colspan="3">Utilizing FLIPr to deliver antigen to Fcγ receptors on antigen-presenting cells for enhanced immune responses and memory T cell generation</td></tr>
<tr><td rowspan="2">Technology Type</td><td>☑Biotechnology</td><td colspan="2">□Device/Diagnostics</td></tr>
<tr><td>□Pharmaceutical</td><td colspan="2">□Others:_____</td></tr>
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<tr><td>Link</td><td colspan="3">http://</td></tr>
<tr><td>Technology Description</td><td colspan="3">Vaccine development faces a significant challenge in efficiently targeting antigens to dendritic cells (DCs) within the body, enabling cross-presentation and the generation of memory immune responses. Fcγ receptors (FcγRs) are present on various immune cell types, including DCs, making the targeting of antigens to DCs through FcγRs an appealing strategy in vaccine development. Targeted antigen delivery system (TADS) utilizes the formyl peptide receptor-like 1 inhibitory protein (FLIPr), a protein secreted by Staphylococcus aureus that binds to FcγRs, as a mean to deliver antigens to DCs. We demonstrate that FLIPr effectively delivers antigens to DCs, inducing robust immune responses without the need for additional adjuvants. When antigens are fused with FLIPr, efficient antigen presentation occurs on both MHC class II and class I, inducing CD4 and CD8 T cell responses and leading to the generation of memory T cell responses. Additionally, intranasal administration of the antigen-FLIPr fusion protein induces simultaneous systemic and mucosal immune responses in mice. In summary, employing FLIPr as an antigen delivery vector holds significant promise for the development of cancer immunotherapies and vaccines against infectious diseases.</td></tr>
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Intellectual Property	United States Granted (US11266728B2) China Granted (CN110691613B) Taiwan Granted (I660742) Europe Publication (EP3565606A4)
Key Publications	1. Chiang CY, Wu CC, Chen YJ, Liu SJ, Leng CH, Chen HW. 2019. Delivery of Antigen to CD8(+) Dendritic Cells by Fusing Antigen With Formyl Peptide Receptor-Like 1 Inhibitor Protein Induces Antitumor Immunity. ***Front Immunol* 10: 1839**. 2. Hsieh MS, Hsu CW, Tu LL, Chai KM, Yu LL, Wu CC, Chen MY, Chiang CY, Liu SJ, Liao CL, Chen HW. 2021. Intranasal Vaccination With Recombinant Antigen-FLIPr Fusion Protein Alone Induces Long-Lasting Systemic Antibody Responses and Broad T Cell Responses. ***Front Immunol* 12: 751883**. 3. Wu CC, Chiang CY, Liu SJ, Chen HW. 2021. A Novel Recombinant Fcgamma Receptor-Targeted Survivin Combines with Chemotherapy for Efficient Cancer Treatment. ***Biomedicines* 9:806**. 4. Hsieh MS, Hsu CW, Liao HC, Lin CL, Chiang CY, Chen MY, Liu SJ, Liao CL, Chen HW. 2024. SARS-CoV-2 spike-FLIPr fusion protein plus lipidated FLIPr protects against various SARS-CoV-2 variants in hamsters. ***J Virol* 98:e0154623**.
Business Opportunity	Technology transfer Co-development

FLIPr is known to bind to FcγRs. Therefore, FLIPr can direct the antigen-FLIPr fusion protein to Fcγ receptors, enhancing antigen uptake by APCs and facilitating antigen processing and presentation. This, in turn, promotes antigen-specific immune responses.