

# 再構成型無細胞タンパク質合成系 (PUREflex®) を用いた タンパク質の脂質修飾による機能性リポソムの創生

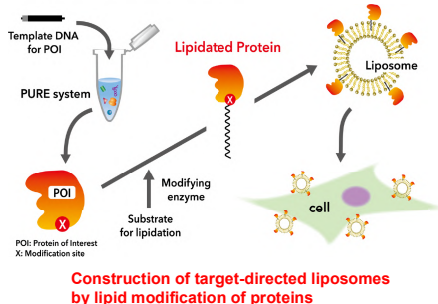
Construction of target-directed liposomes by lipid modification of proteins based on a reconstituted cell-free protein synthesis system



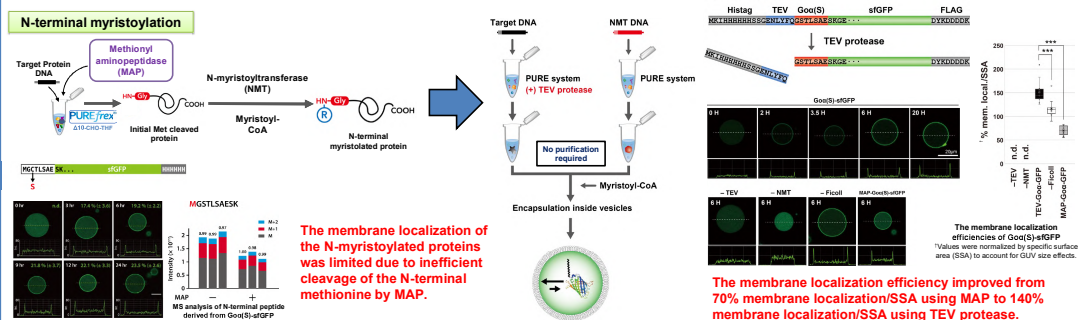
○松本 令奈<sup>1</sup>, 丹羽 達也<sup>2</sup>, 嶋根 康弘<sup>3</sup>, 久野 香<sup>3</sup>, 車 愈激<sup>3</sup>, 金森 崇<sup>1</sup>  
(<sup>1</sup>ジーンフロンティア株式会社, <sup>2</sup>東京科学大・総合研究院・細胞制御工学研究センター, <sup>3</sup>海洋研究開発機構・超先鋭研究開発プログラム)

○Rena Matsumoto<sup>1</sup>, Tatsuya Niwa<sup>2</sup>, Yasuhiro Shimane<sup>3</sup>, Kaori Kuno<sup>3</sup>, Yutetsu Kuruma<sup>3</sup> and Takashi Kanamori<sup>1</sup>  
(<sup>1</sup>GeneFrontier Corp., <sup>2</sup>Cell Biology Center, IIR, Science Tokyo, <sup>3</sup>X-star, JAMSTEC)

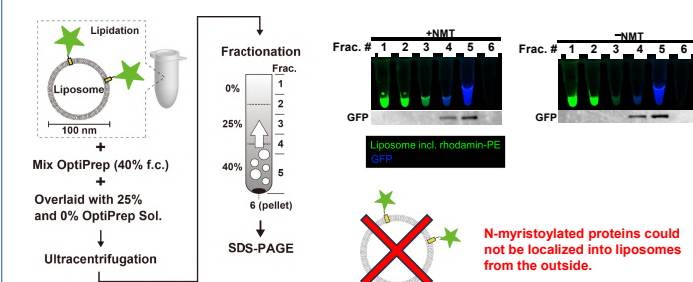
## Purpose of this research



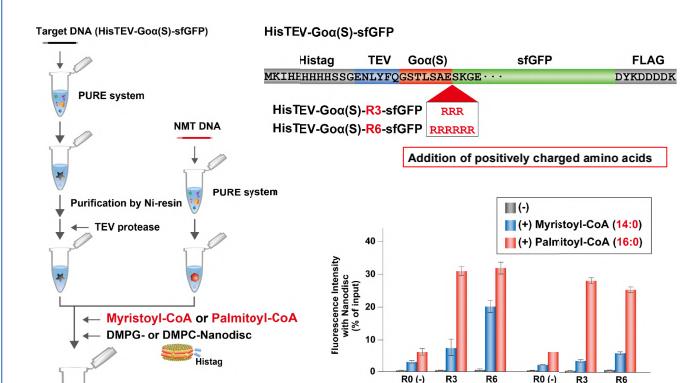
## 1. Synthesis of N-terminal acylated proteins using PUREflex



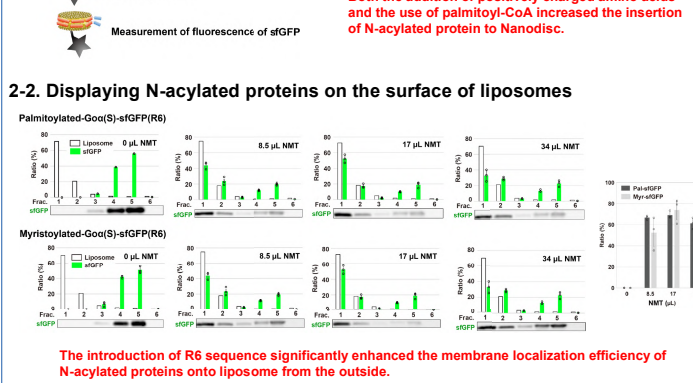
## 2. Displaying N-acylated proteins on the surface of liposomes



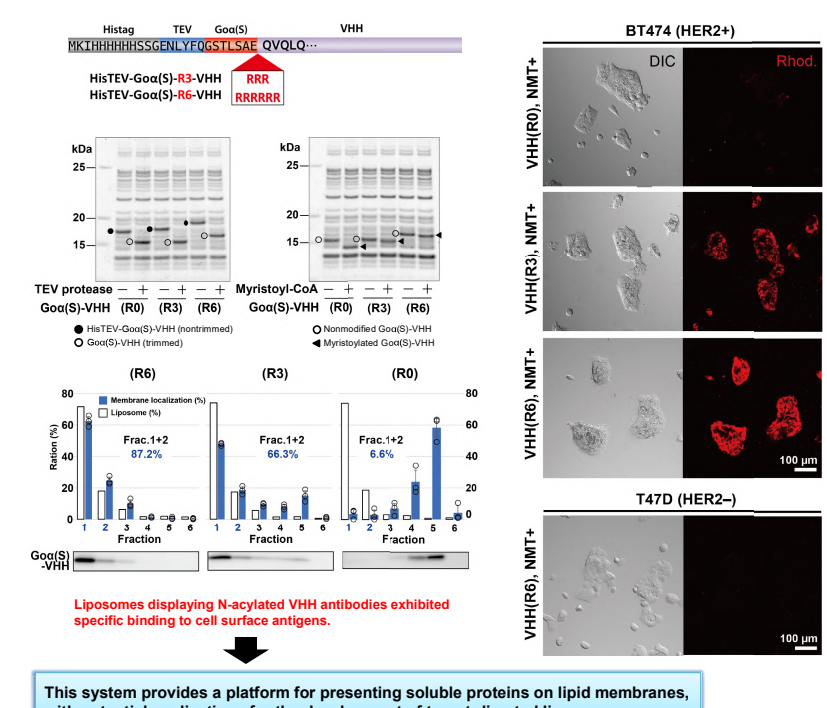
### 2-1. Improvement of the membrane localization efficiency of N-acylated protein



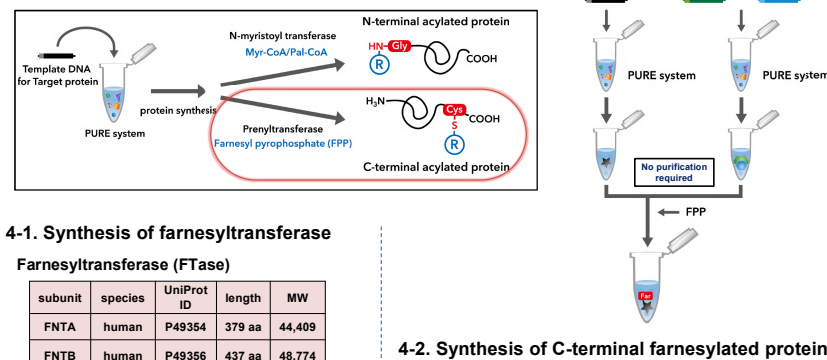
### 2-2. Displaying N-acylated proteins on the surface of liposomes



## 3. Targeting of liposomes displaying membrane-anchored VHH antibodies to cell surface antigens



## 4. C-terminal prenylation using PUREflex



## <Conclusion>

- Both the addition of positively charged residues and the use of palmitoyl-CoA increased the localization of N-acylated protein to lipid membrane from outside.
- Liposomes displaying N-acylated VHH antibodies exhibited specific binding to cell surface antigens. → Target-directed liposomes were developed.
- Synthesis of a protein with a farnesylated C-terminus using PUREflex was achieved. Membrane localization of C-terminal farnesylated proteins will be investigated in future work.

(1) Matsumoto et al. (2023) ACS Synth. Biol. 12 (7), 1935-1942  
(2) Matsumoto et al. (2025) ACS Synth. Biol. 14 (7), 2729-2738