

Host recognition mechanism of EHEC phage ECP52 and expanding its host range by phenotypically shuffled tail fiber proteins



RES-184

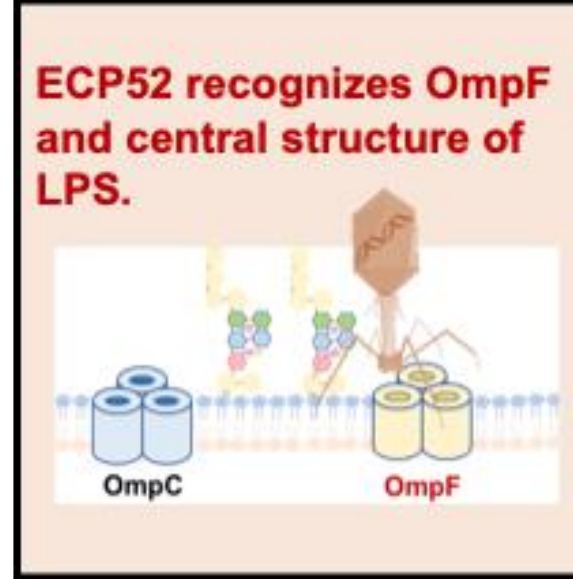
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1. Background

EHEC lytic phage ECP52 and PE37

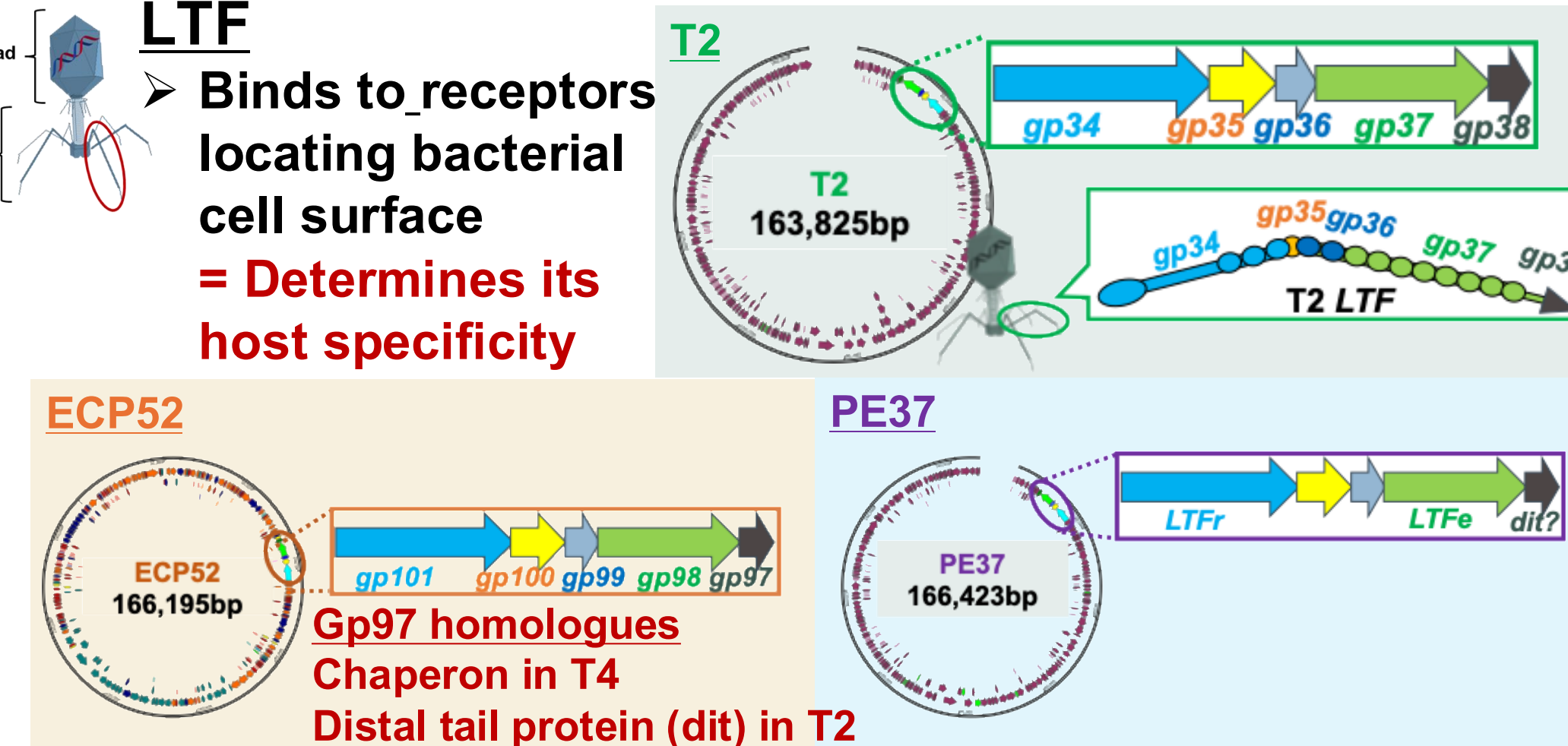
- T2 like phages
- Straboviridae family
- No lysogenic/pathogenic genes



Host Strain	ECP52	PE37
EHEC No.166	X	O
EHEC No.196	O	O
<i>E. coli</i> BW25113	O	X
<i>E. coli</i> BL21	O	X

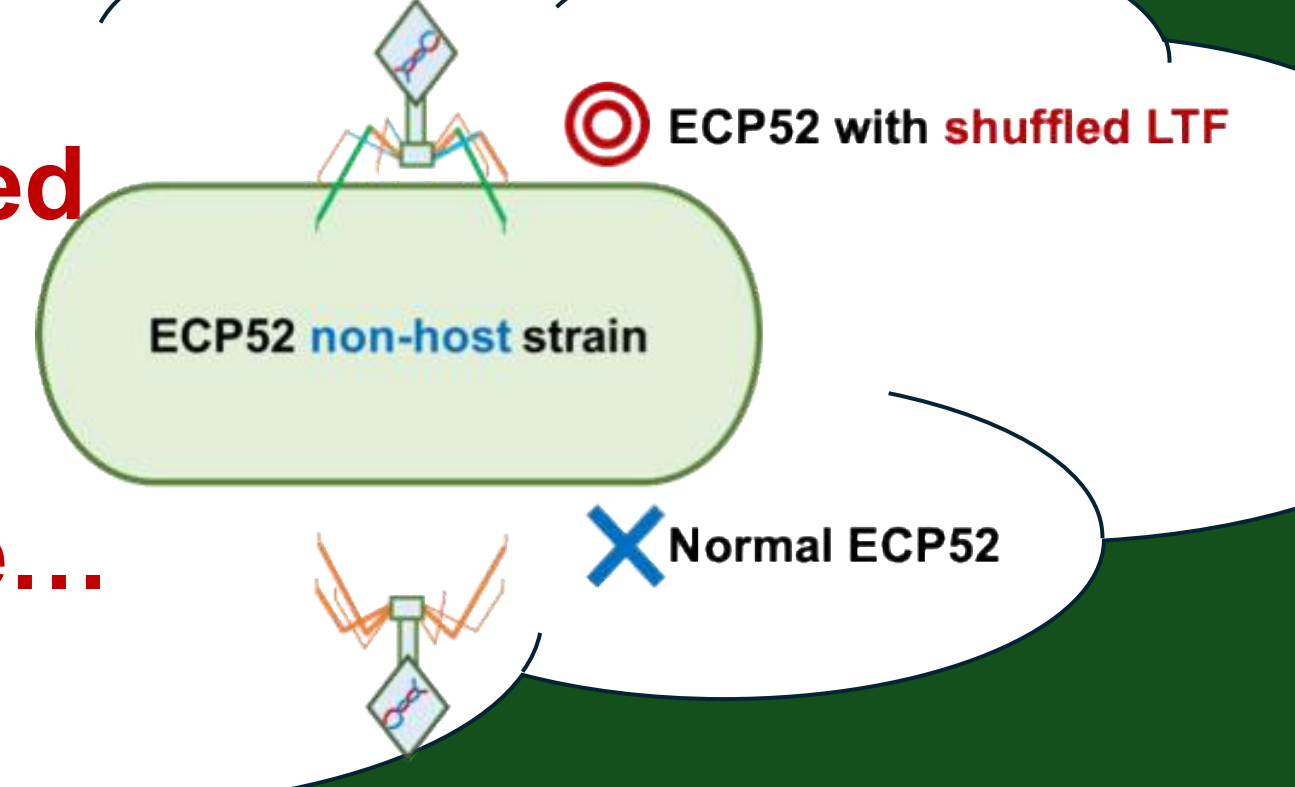
Difference in LTFs of ECP52 and PE37 may cause different attachments and host ranges.

Long tail fibers (LTF) in T2-like phages

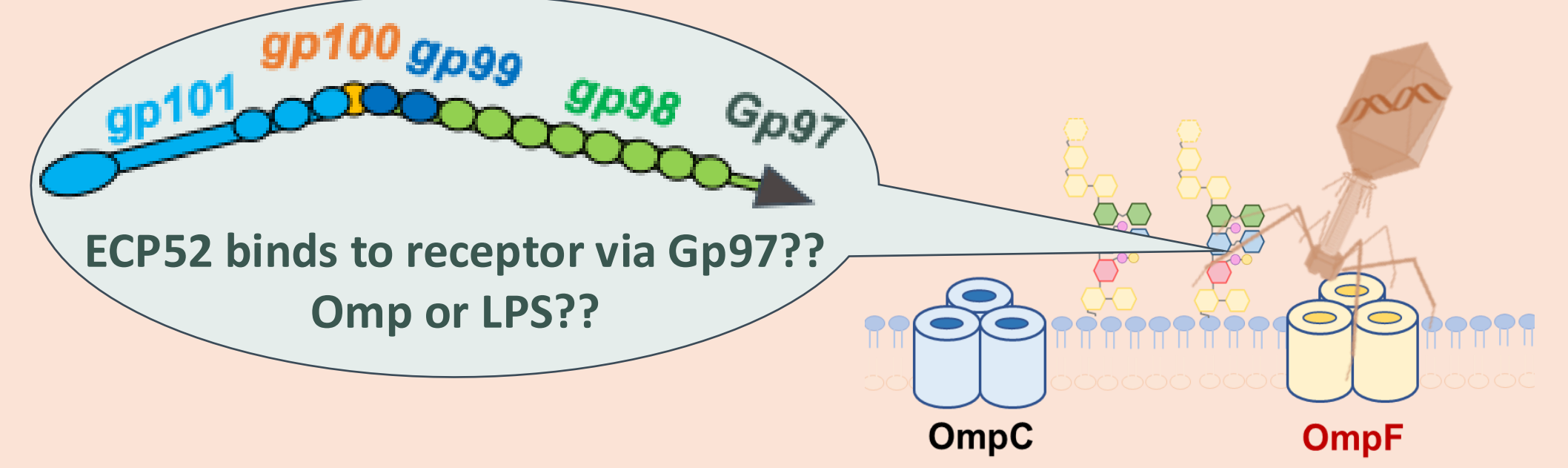


	LTFr (root)			LTFe (edge)			LTFd (dit)		
	AA	Ident.	Cover	AA	Ident.	Cover	AA	Ident.	Cover
ECP52	1289	—	—	1105	—	—	257	—	—
T2	1290	92%	100%	1341	34%	88%	262	46%	100%
PE37	1290	99%	100%	1104	94%	100%	259	64%	100%

Different LTFs shuffled in a single phage particle, may be able to expand host range...

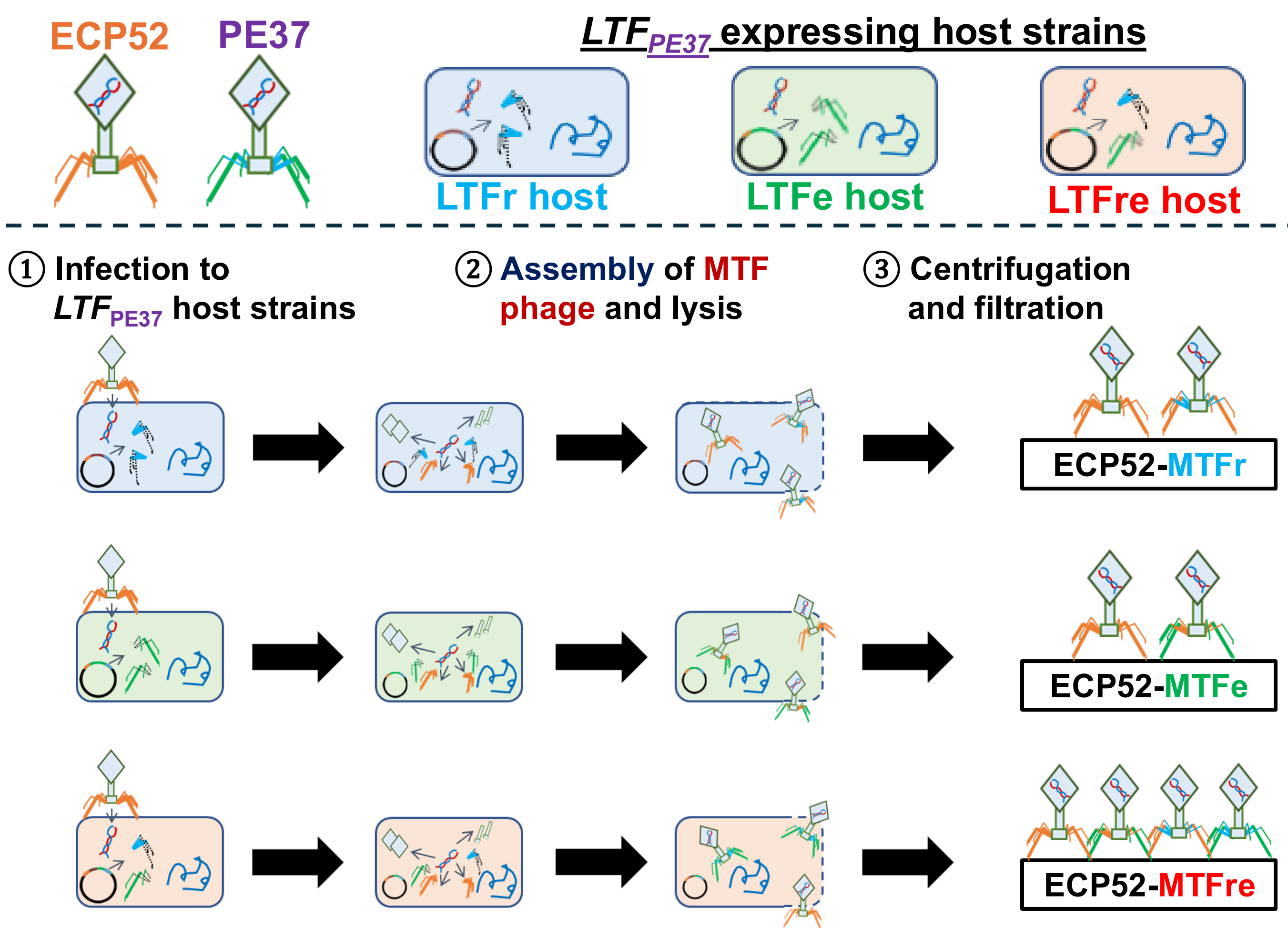


To clarify receptor binding of Gp97

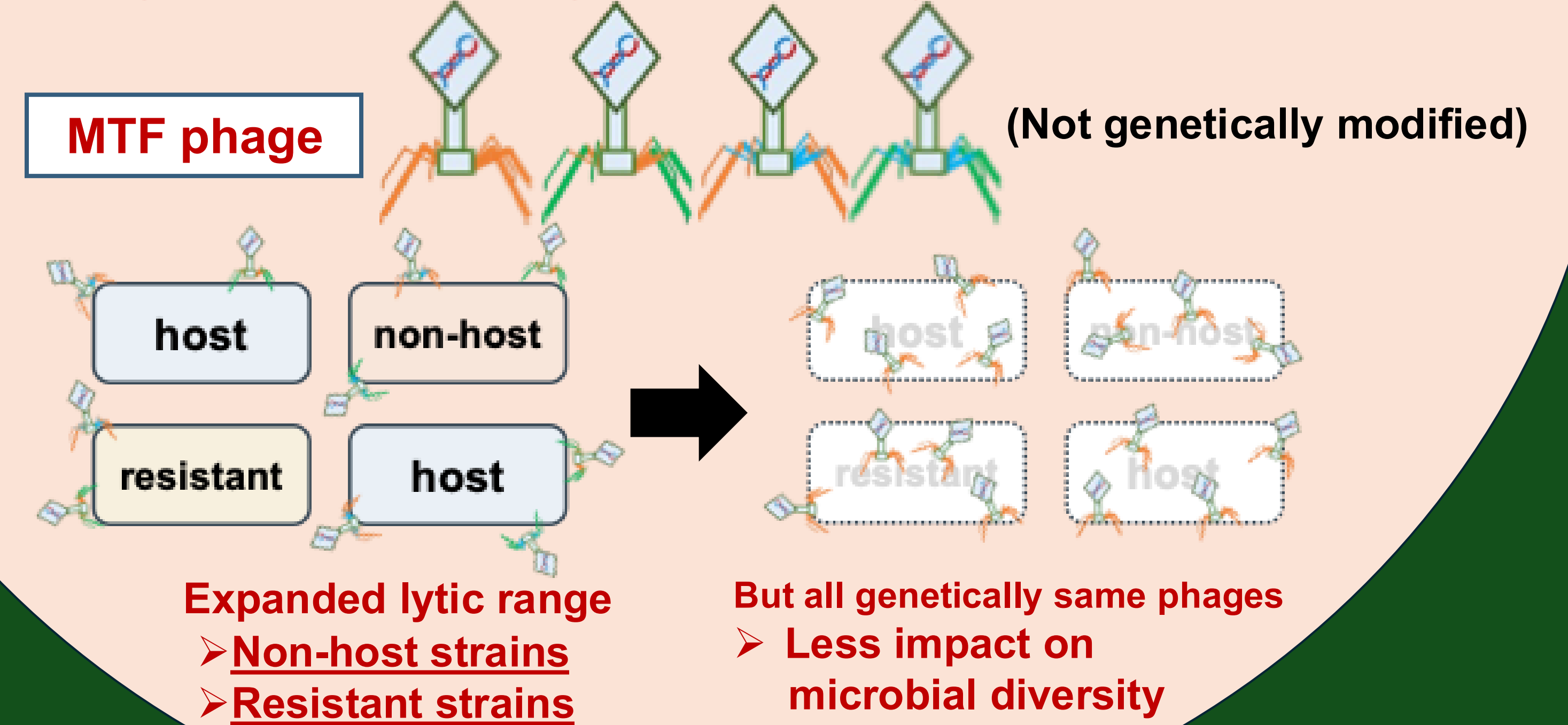


Aim of this study

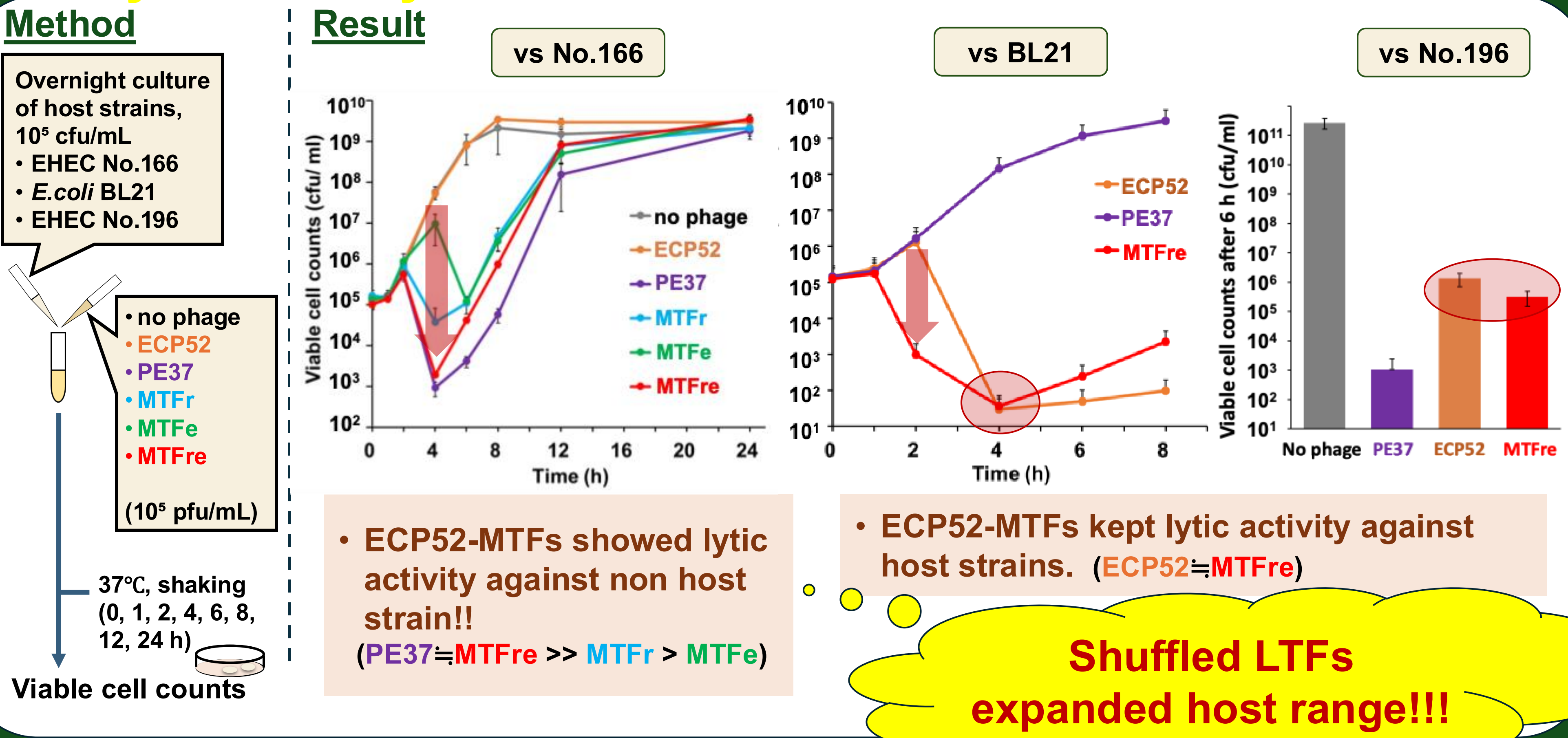
2. How to construct MTF phages



To control EHEC with multi-tail-fiber (MTF) phage containing randomly shuffled LTF

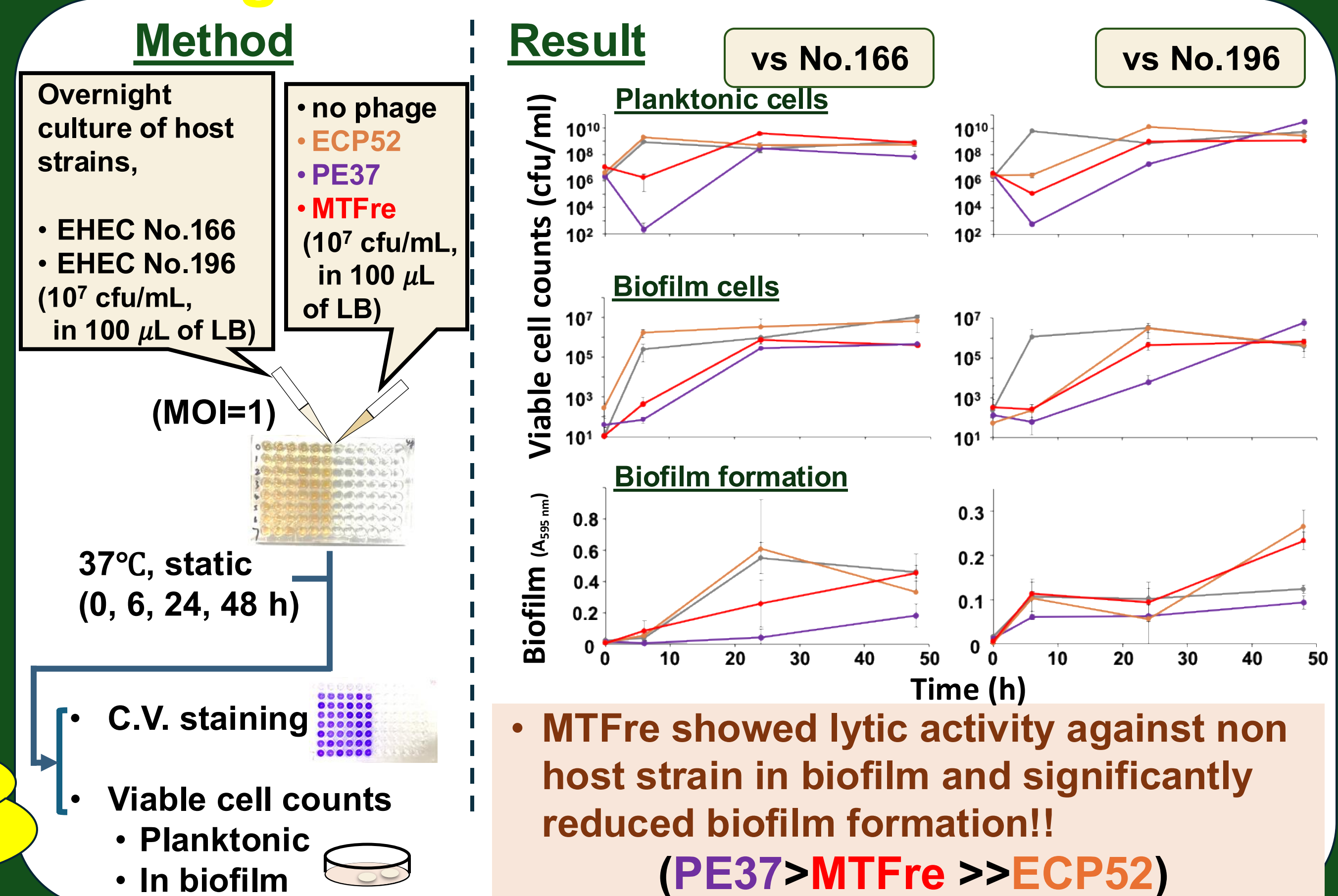


3. Lytic activity in broth

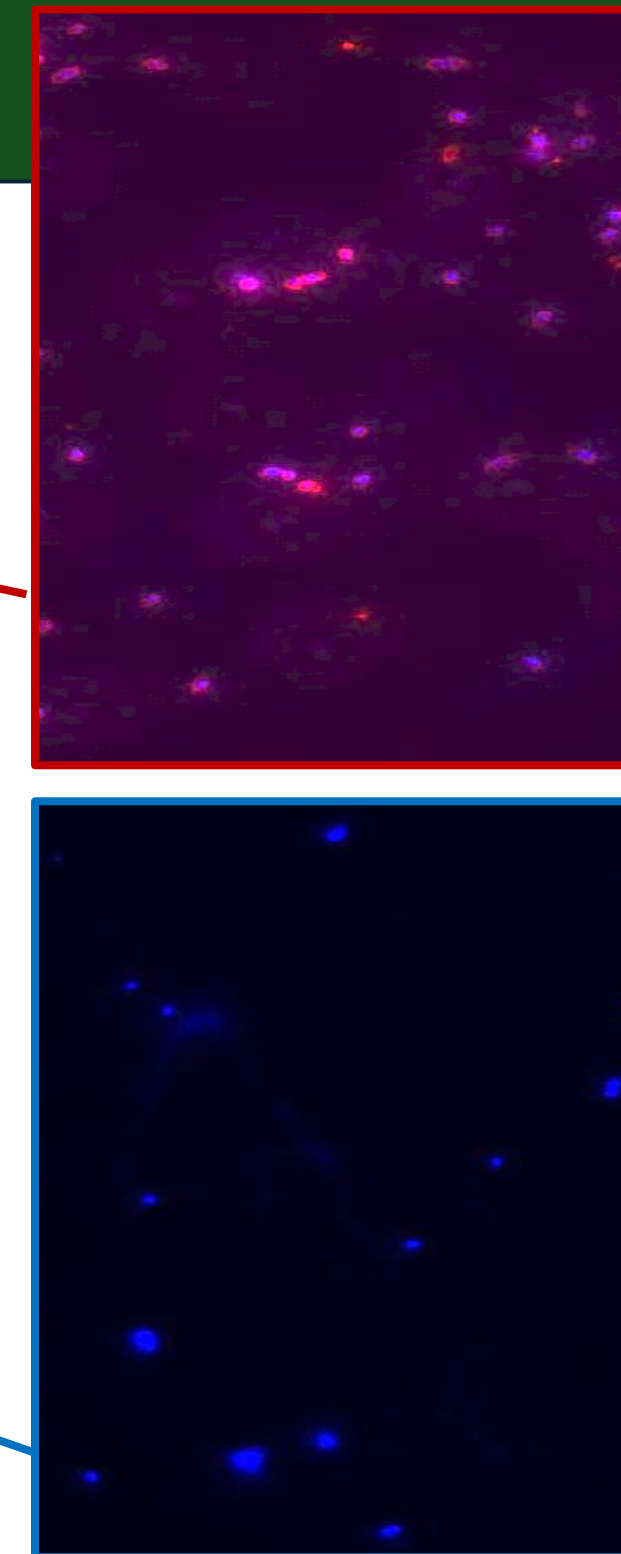
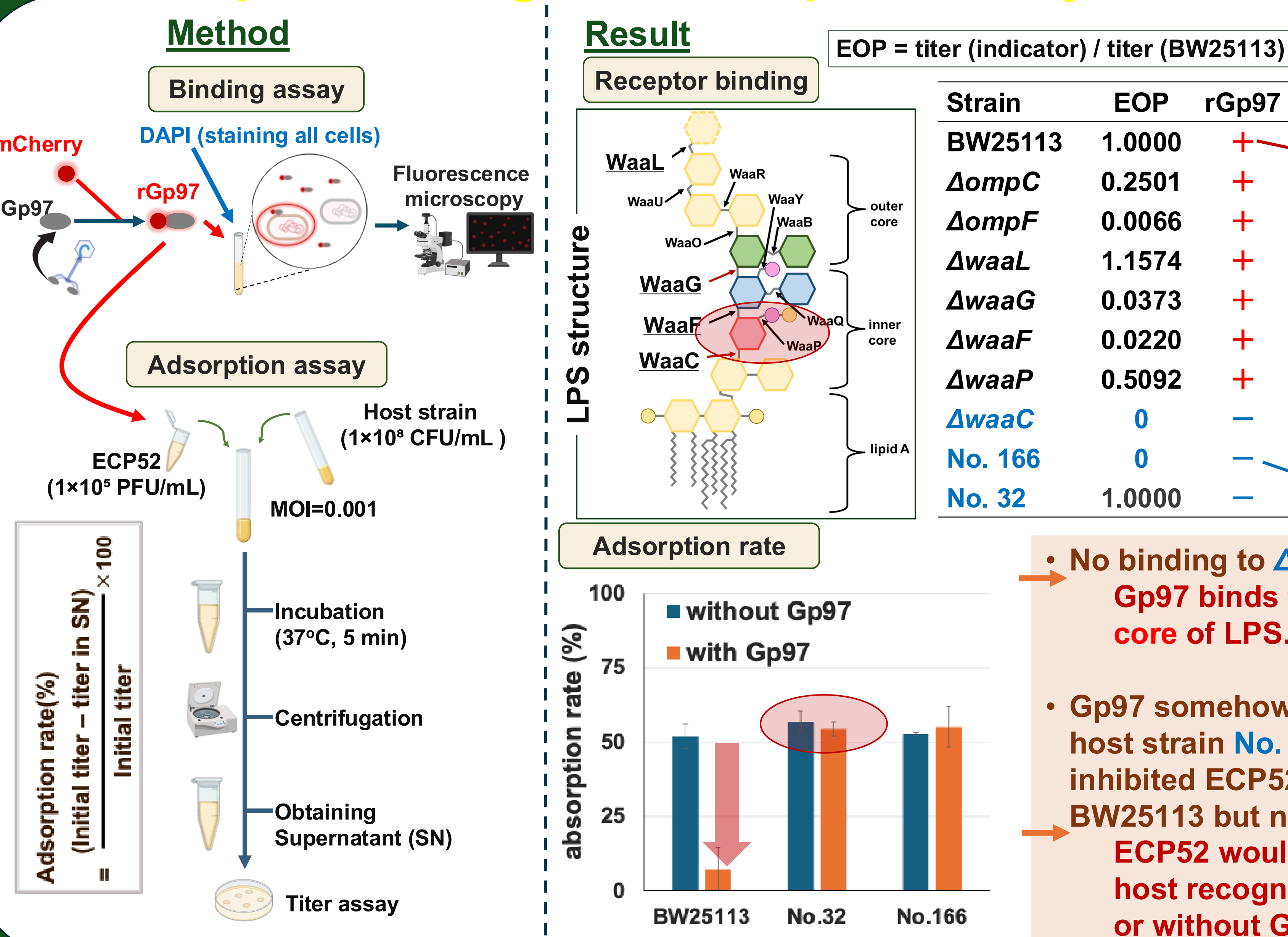


Shuffled LTFs expanded host range!!!

4. Against biofilm formation



5. Receptor binding and adsorption assay



Conclusion

- ECP52 would use at least two different host recognition systems with or without Gp97 (dit protein, LTFd), which can be used for MTF phage construction!!
- ECP52-MTFs were successfully constructed and showed expanded host range!!
- Not only edge structure of LTF but root structure also affected host recognition.

More variety in MTF phage mix...