

**Supplementary Table 1. Primers for bacterial engineering of *E. coli* mutant strain with  $\alpha$ MAN expression.**

---

|                              |         |   |
|------------------------------|---------|---|
| att $\lambda$ - $\alpha$ MAN | Forward | CACCACCACCACCACCCTAAATACTAACTTGAGCGAAAC   |
|                              | Reverse | GTACCGTTTTCTTTTTTCATGGTATATCTCCTTCTTAAAGT |
| $\alpha$ MAN-att $\lambda$   | Forward | TAAGAAGGAGATATACCATGAAAAAGAAAACGGTACATAT  |
|                              | Reverse | GTGGTGGTGGTGGTGTGATTTTTCTCCTTAATCAACAAA   |
| $\alpha$ MAN-cx              | Forward | TCGTTTTTAATACAGCTGGACA                    |
|                              | Reverse | TGATTTTCAGCTGGCACTTCTTG                   |
| MG1655att $\lambda$          | Forward | CACCCGGAGCGGCAGGGACATAT                   |
|                              | Reverse | CTGCTACGACCCGGATGCGCCAA                   |

---