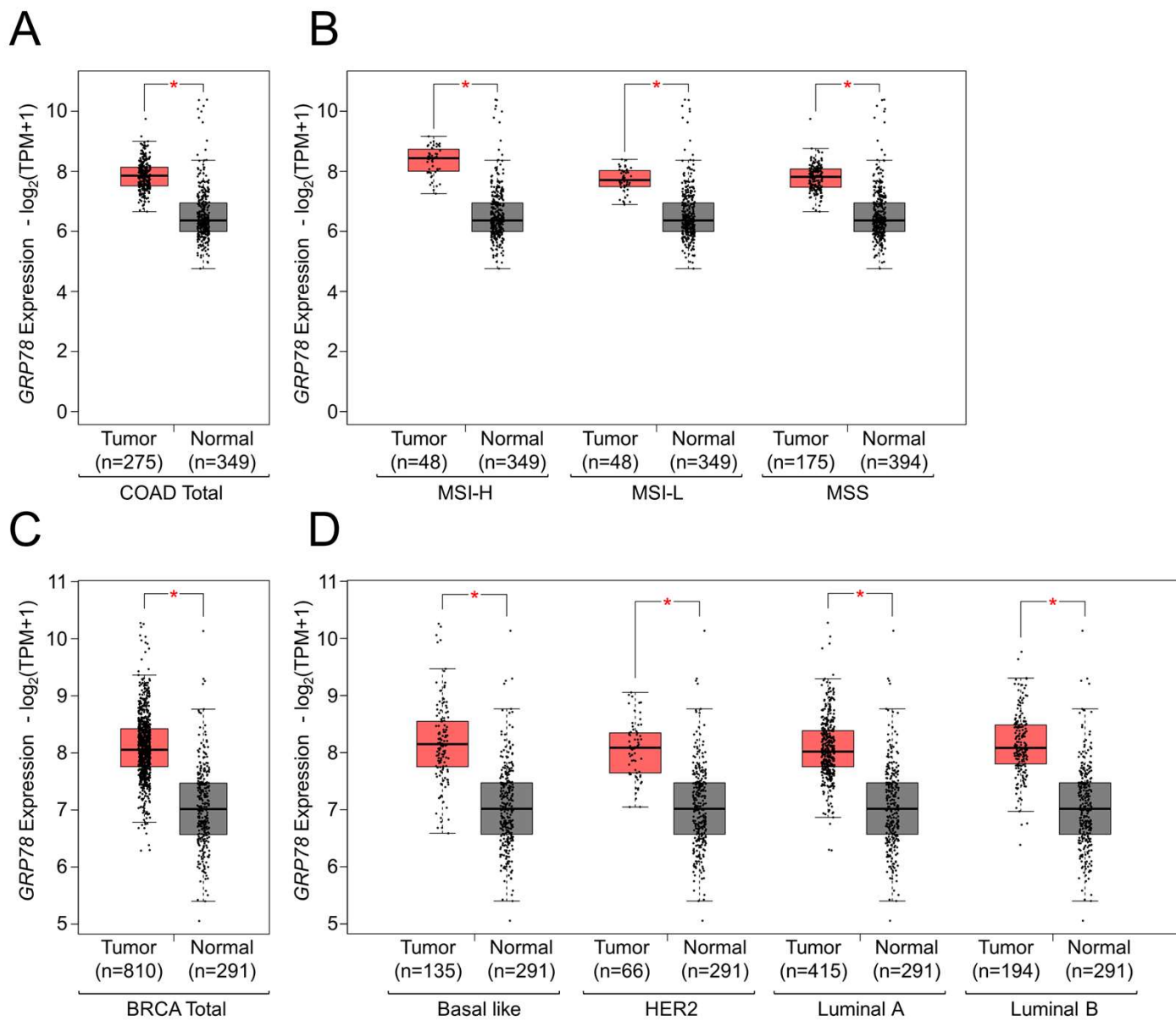
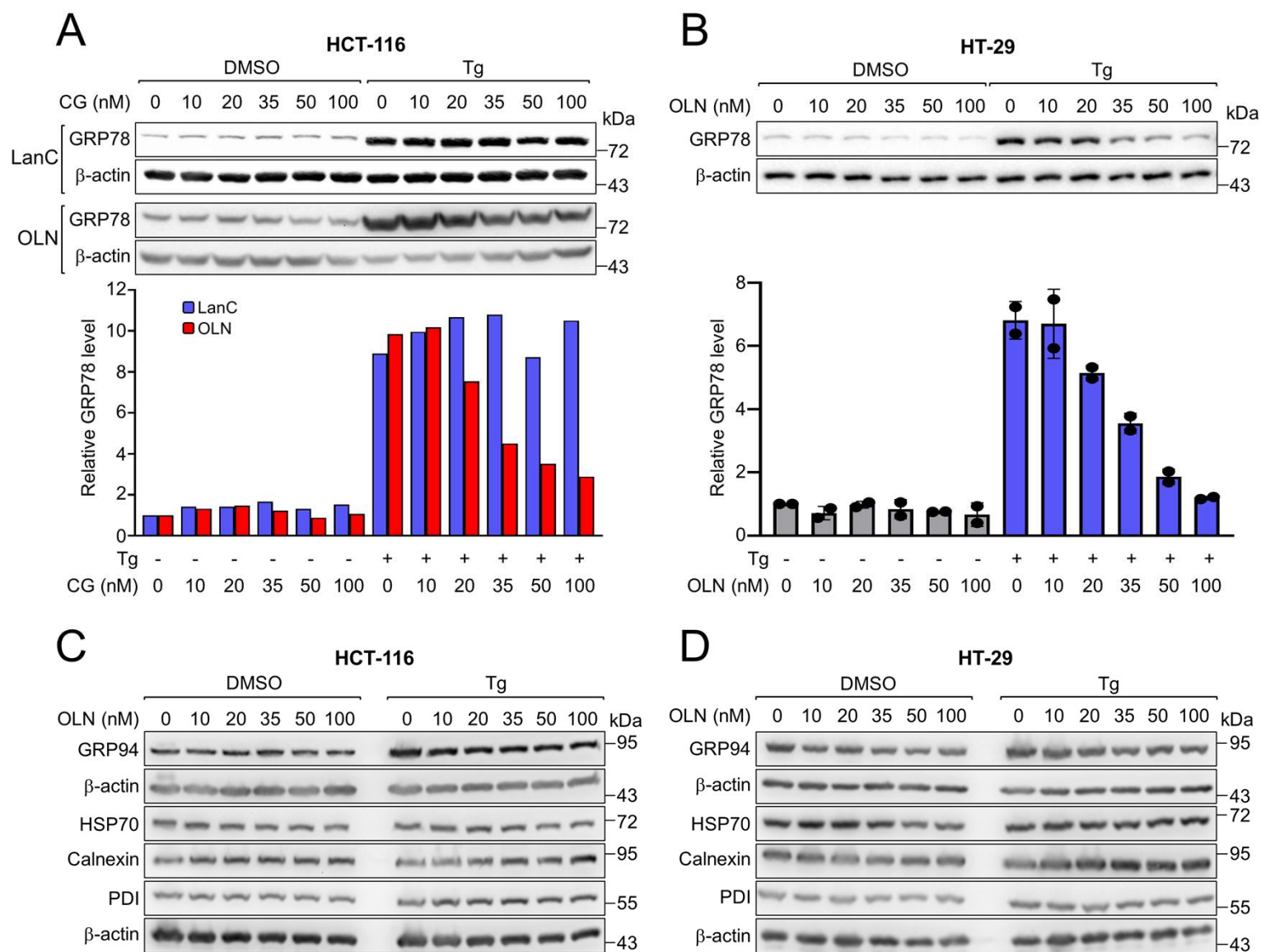


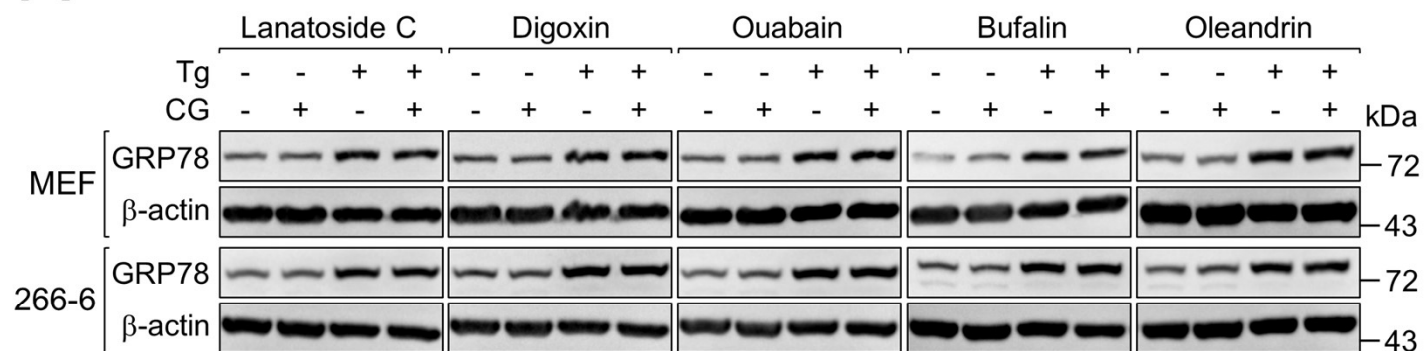


**Figure S1**

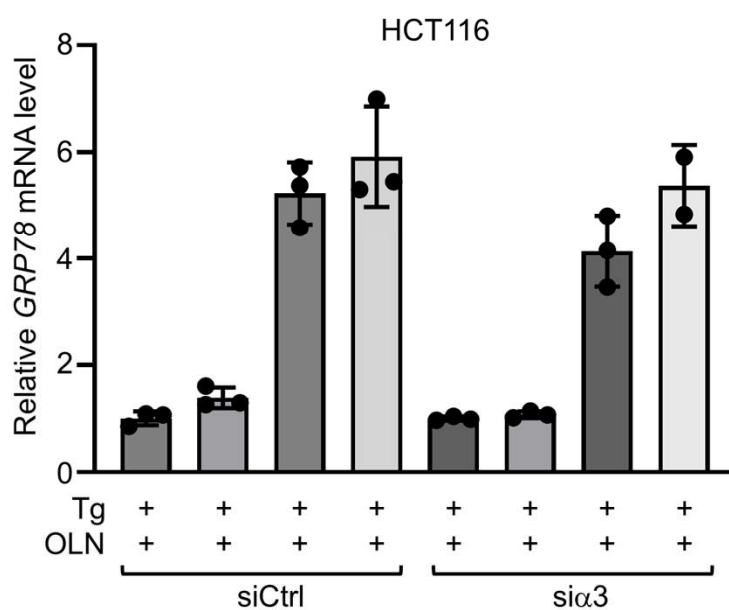


**Figure S2**

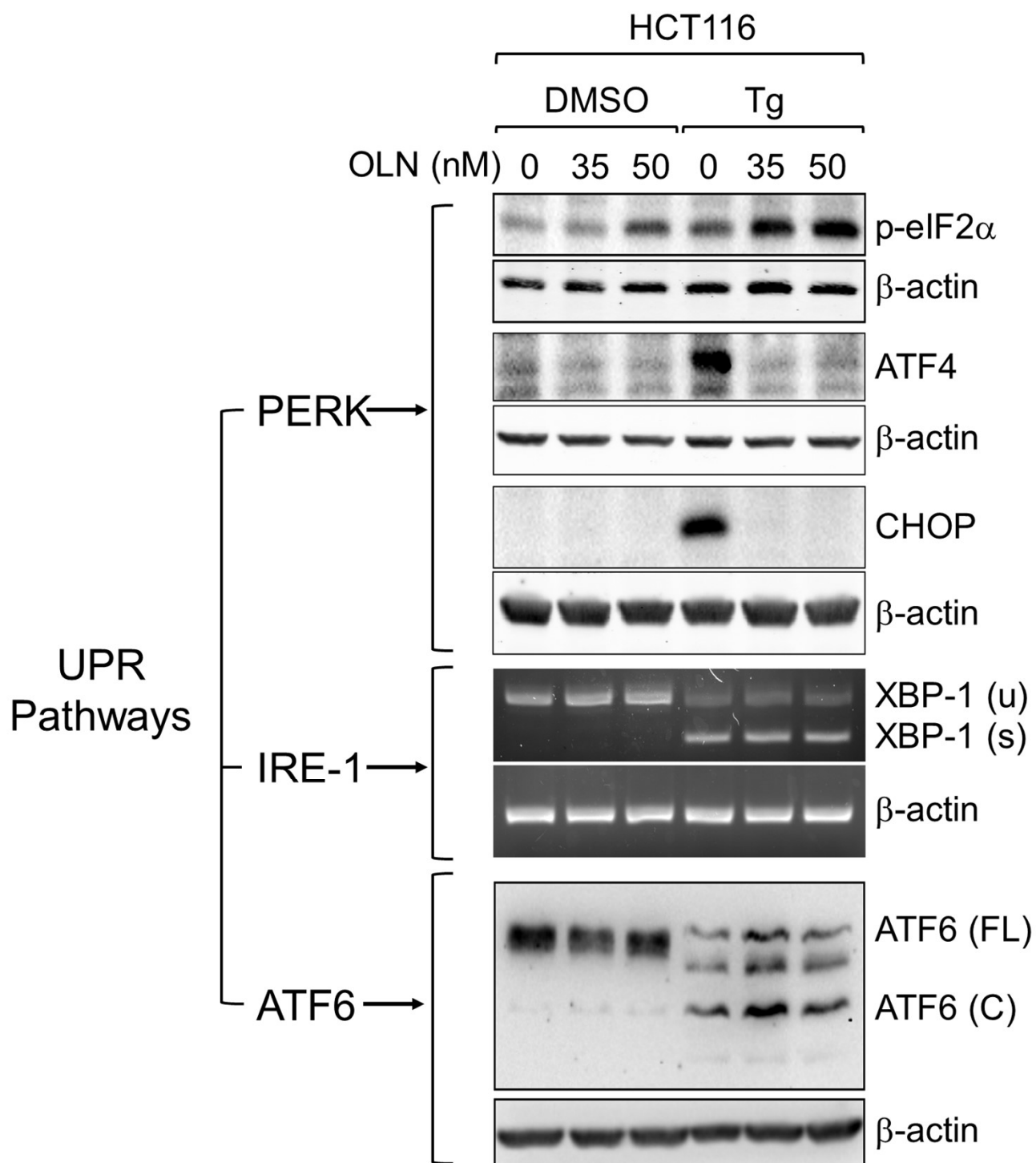
**A**



**B**

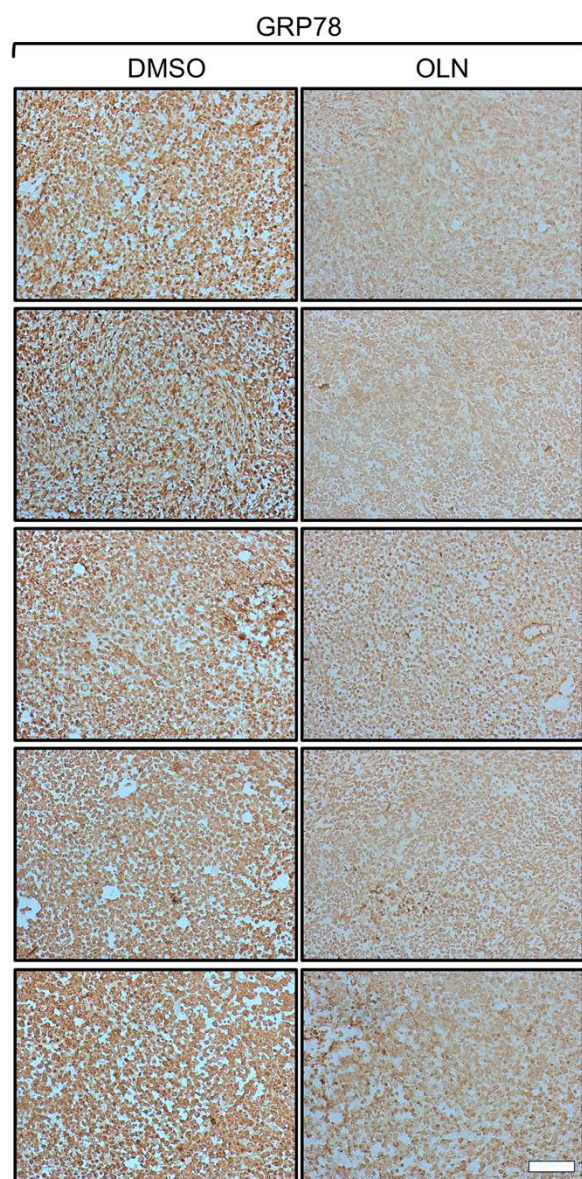


**Figure S3**

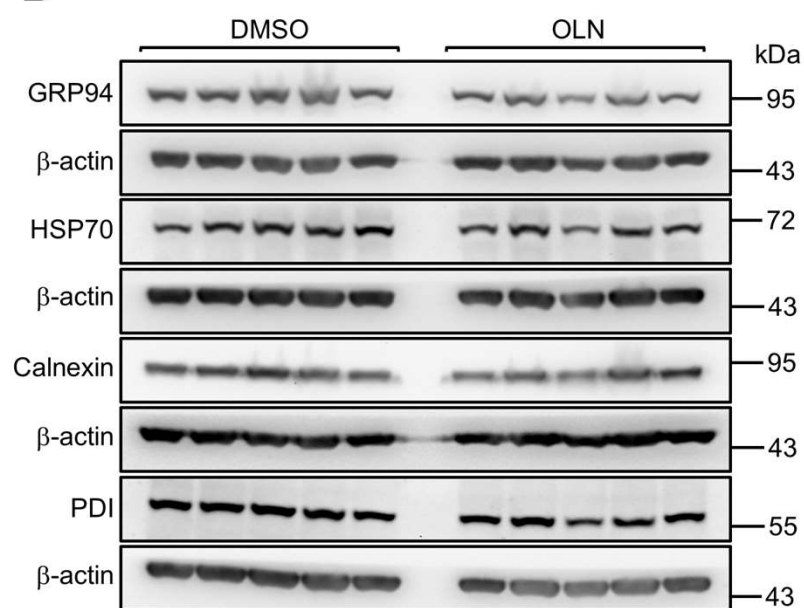


**Figure S4**

A



B



C

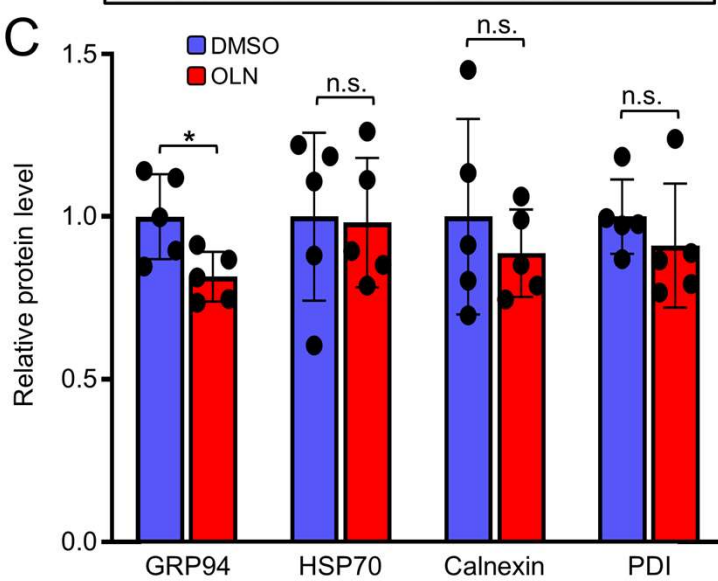
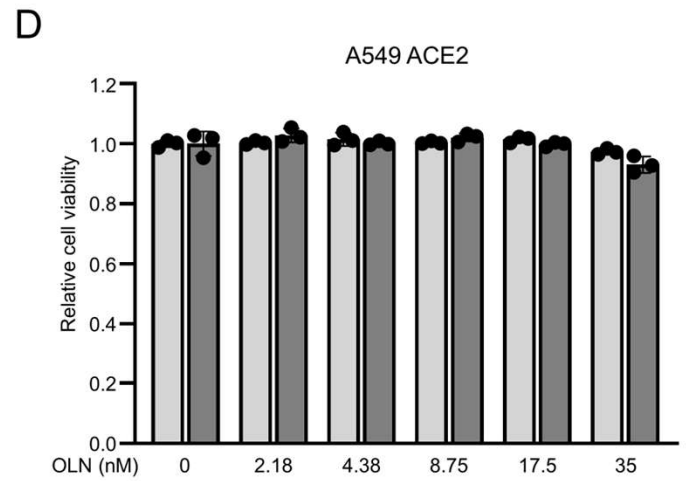
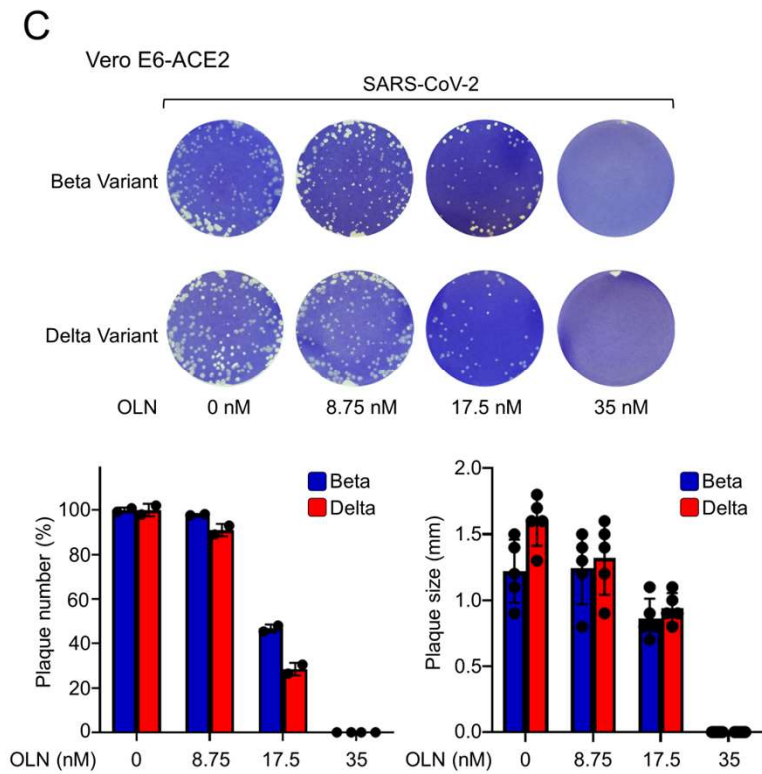
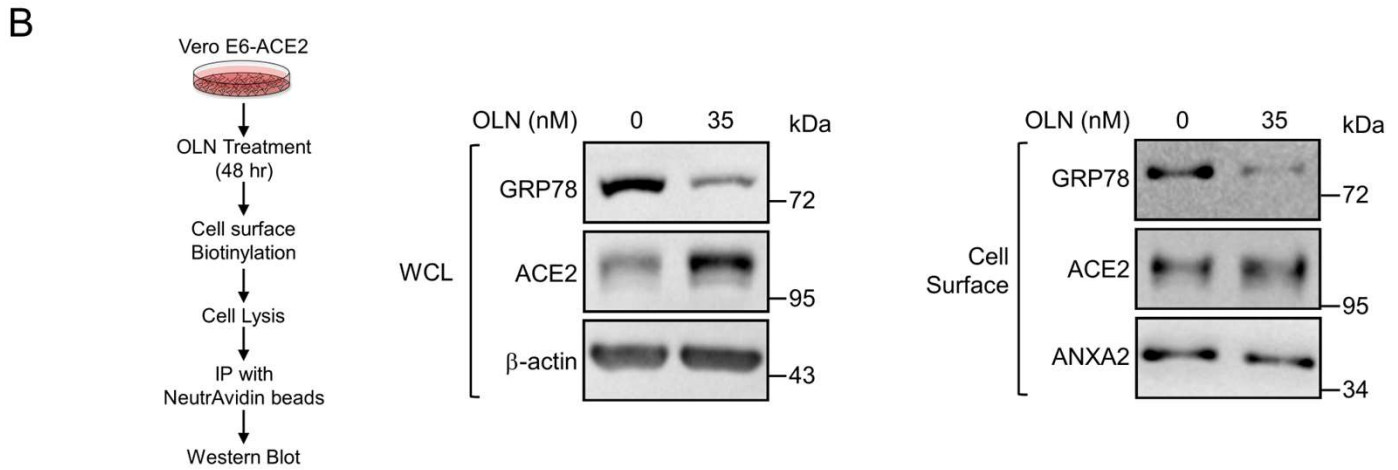
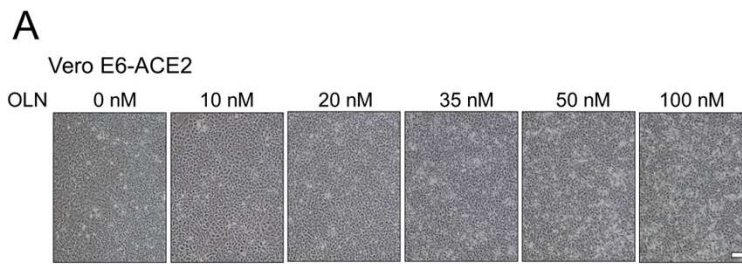


Figure S5



**Figure S6**

|            |                                                              |     |
|------------|--------------------------------------------------------------|-----|
| Wuhan      | DYNYKLPDDFTGCVIAWNSNNLDSKVGGNYNLYRFLRKSNLKPFERDISTEIYQAGSTP  | 479 |
| Delta      | DYNYKLPDDFTGCVIAWNSNNLDSKVGGNYNRYRFLRKSNLKPFERDISTEIYQAGSKP  | 477 |
| HK.3       | DYNYKLPDDFTGCVIAWNSNKLDSKPSGNYNLYRFLRKSKLKPFERDISTEIYQAGNKP  | 475 |
| XBB.1.5.66 | DYNYKLPDDFTGCVIAWNSNKLDSKPSGNYNLYRFLRKSKLKPFERDISTEIYQAGNKP  | 476 |
| JN.1.11.1  | DYNYKLPDDFTGCVIAWNSNKLDSKHSNGYDYWYRSLRKSKLKPFERDISTEIYOAGNKP | 475 |
|            | *****:***** .***:* ** :***:*****..*                          |     |
|            |                                                              |     |
| Wuhan      | CNGVEGFNCYFPLQSYGFQPTNGVGYPYRVVLSFELLHAPATVCGPKKSTNLVKNKCV   | 539 |
| Delta      | CNGVEGFNCYFPLQSYGFQPTNGVGYPYRVVLSFELLHAPATVCGPKKSTNLVKNKCV   | 537 |
| HK.3       | CNGVAGPNCYSPLQSYGFRPTYGVGHQPYRVVLSFELLHAPATVCGPKKSTNLVKNKCV  | 535 |
| XBB.1.5.66 | CNGVAGPNCYSPLQSYGFRPTYGVGHQPYRVLVLSFELLHAPATVCGPKKSTNLVKNKCV | 536 |
| JN.1.11.1  | CKG-KGPNCYFPLQSYGFRPTYGVGHQPYRVVLSFELLHAPATVCGPKKSTNLVKNKCV  | 534 |
|            | *:* * *** *****:** ***:*****:*****                           |     |

**Figure S7**