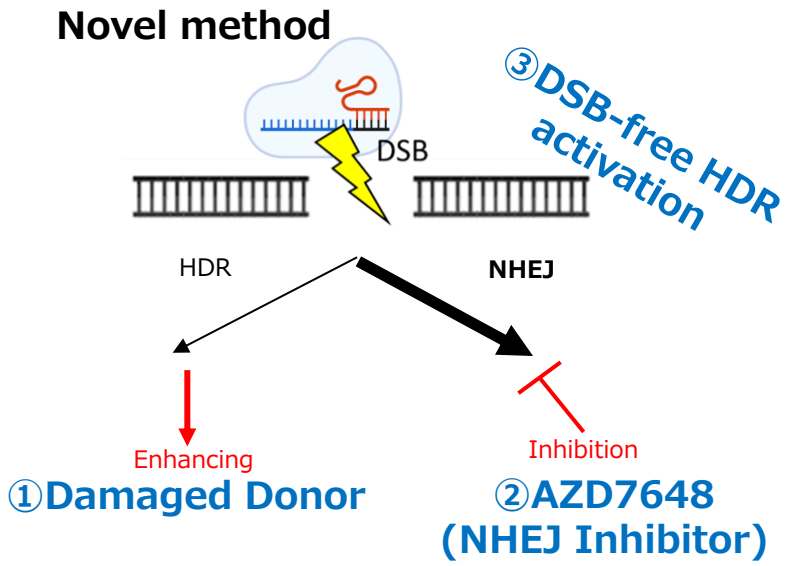
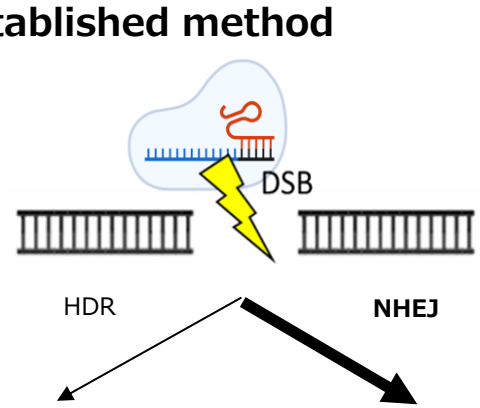
Boosting HDR for Smarter Genome Control

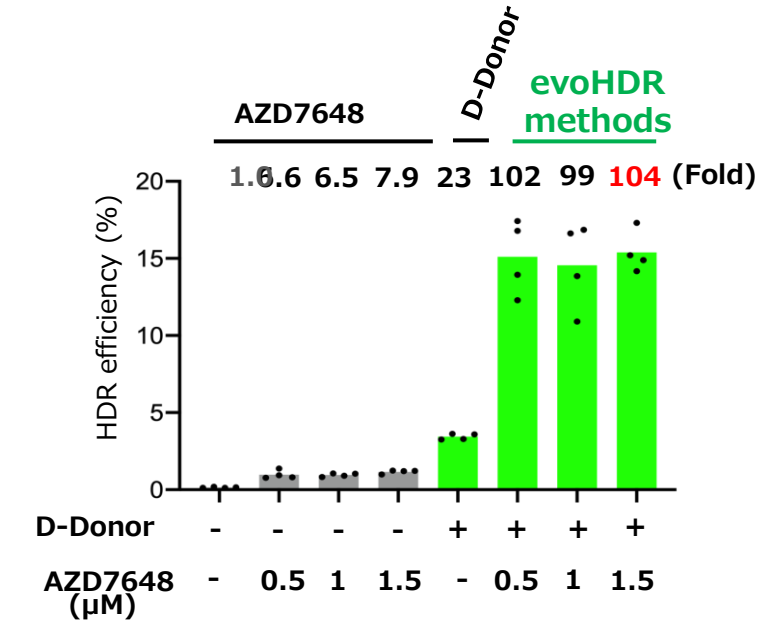
HDR (homology-directed repair) often suffers from low efficiency, even in proliferating cells, making it a technical challenge. This technology establishes a novel method to enhance HDR efficiency by combining specific enzyme inhibitors with modifications to donor DNA. Compared to conventional methods, it offers higher editing precision and reproducibility, making it a promising candidate as a research reagent. It is particularly suited for the construction of high-efficiency knock-in systems and functional gene analysis, and we propose it as a versatile technology applicable to various cell-based experimental systems.

evoHDR Method as a Versatile Platform for High-Efficiency Knock-in and Gene Targeting

Chemically Modified Donor DNA + Modulation of Endogenous DNA Repair Activity = evoHDR Method [Patent pending]







Driving HDR Forward to Maximize Recombination Efficiency

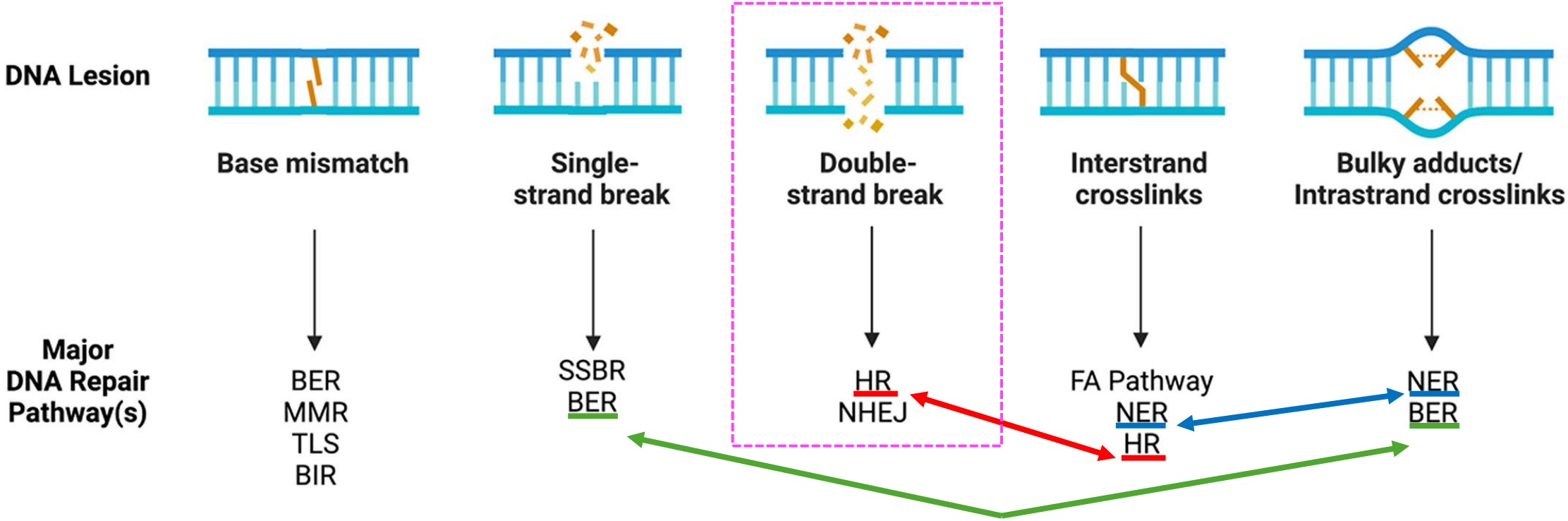
① Use of damaged donor DNA
② Use of the NHEJ inhibitor [AZD7648]
③ HDR Enhancement without Double-Strand Break(DSB)

HDR efficiency is extremely low, due to the predominance of the NHEJ-based DNA repair pathway.

A synergistic effect between the damaged donor and the inhibitor has been demonstrated.

A powerful reagent kit enabling over 100-fold improvement in precise genome editing.

DSB-Free HDR Activation of HDR



HDR Enhancement via SSBR Pathways?

T. L. Clarke *et al.*, *Molecular Oncology*. **2022**, 16 , 3352–3379

Interestingly, the synergistic effect shown in the previous slide was also observed in reactions using nickase, contrary to expectations.