S1 Table. Fluctuation results of double mutants containing a null mutation of genes in the Rad52 pathway and *mms21-CH.*

Genotype	uGCR rate*	dGCR rate*	Ratio #
Wild type**	2.27×10^{-9} (1) [$1.30 \times 10^{-9} - 4.78 \times 10^{-9}$]	1.97×10^{-8} (8.7) [$1.61 \times 10^{-8} - 4.32 \times 10^{-8}$]	8.7
*mms21-CH**	2.08×10^{-8} (9.1) [$0.00 \times 10^{-8} - 18.2 \times 10^{-8}$]	4.2×10^{-6} (1850) [$2.4 \times 10^{-6} - 22.2 \times 10^{-6}$]	202
*rad52Δ**	1.67×10^{-8} (7.4) [$0.99 \times 10^{-8} - 2.74 \times 10^{-8}$]	1.09×10^{-8} (4.8) [$0.29 \times 10^{-8} - 7.08 \times 10^{-8}$]	0.7
rad52Δ mms21-CH	1.66×10^{-7} (73) [$2.62 \times 10^{-8} - 5.64 \times 10^{-7}$] {HZY3310/3311}	1.20×10^{-7} (53) [$4.98 \times 10^{-8} - 3.84 \times 10^{-7}$] {HZY3019/3020}	0.7
*rad59Δ**	5.85×10^{-9} (2.6) [$0.57 \times 10^{-9} - 24.7 \times 10^{-9}$]	6.94×10^{-8} (31) [$5.17 \times 10^{-8} - 9.12 \times 10^{-8}$]	12
rad59Δ mms21-CH	3.66×10^{-7} (161) [$1.56 \times 10^{-7} - 8.82 \times 10^{-7}$] {HZY3362/3363}	2.71×10^{-6} (1194) [$1.16 \times 10^{-6} - 7.30 \times 10^{-6}$] {HZY3166/3167}	7.4
rad51Δ	6.19×10^{-9} (2.7) [$2.17 \times 10^{-9} - 2.99 \times 10^{-8}$] {HZY3264}	2.31×10^{-8} (10)** [$1.20 \times 10^{-8} - 4.35 \times 10^{-8}$]	3.7
rad51Δ mms21-CH	2.17×10^{-8} (9.6) [$4.06 \times 10^{-9} - 4.90 \times 10^{-8}$] {HZY3265/3266}	1.91×10^{-7} (84) [$1.02 \times 10^{-7} - 5.00 \times 10^{-7}$] {HZY3257/3258,JLY380}	8.8
rad55Δ	5.62×10^{-8} (25) [$4.02 \times 10^{-8} - 6.46 \times 10^{-8}$] {HZY3369}	2.95×10^{-8} (13) [$4.28 \times 10^{-9} - 2.29 \times 10^{-7}$] {HZY3021/3368}	0.5
rad55Δ mms21-CH	2.23×10^{-8} (9.8) [$1.15 \times 10^{-8} - 7.86 \times 10^{-8}$] {HZY3245/3246}	1.41×10^{-7} (62) [$6.74 \times 10^{-8} - 2.23 \times 10^{-7}$] {HZY3025/3026}	6.3
rad54Δ	1.4×10^{-8} (6.2) [$4.17 \times 10^{-9} - 1.74 \times 10^{-8}$] {HZY3269/3270,JLY406}	2.16×10^{-8} (9.5) [$1.11 \times 10^{-8} - 1.03 \times 10^{-7}$] {HZY3299/3306}	6.1
rad54Δ mms21-CH	1.18×10^{-7} (52) [$4.27 \times 10^{-8} - 1.15 \times 10^{-6}$] {HZY3271/3272}	3.0×10^{-8} (13) [$8.71 \times 10^{-9} - 9.26 \times 10^{-8}$] {HZY3300/3301}	0.3
rdh54Δ	3.72×10^{-9} (1.6) [$2.26 \times 10^{-9} - 7.75 \times 10^{-9}$] {HZY3277,JLY382}	7.85×10^{-8} (35) [$4.36 \times 10^{-8} - 1.27 \times 10^{-7}$] {HZY3274/JLY442}	21
rdh54Δ mms21-CH	5.05×10^{-8} (22) [$7.32 \times 10^{-8} - 1.88 \times 10^{-8}$] {HZY3280/3281}	4.26×10^{-6} (1877) [$2.98 \times 10^{-6} - 6.56 \times 10^{-6}$] {HZY3275/3276,JLY444}	84
*mre11Δ**	5.75×10^{-7} (253) [$2.82 \times 10^{-7} - 19.2 \times 10^{-7}$]	1.52×10^{-6} (670) [$0.95 \times 10^{-6} - 2.77 \times 10^{-6}$]	2.6
mre11Δ mms21-CH	1.39×10^{-6} (612) [$1.13 \times 10^{-6} - 1.58 \times 10^{-6}$]	6.66×10^{-6} (2934) [$3.28 \times 10^{-6} - 1.49 \times 10^{-5}$]	4.8

	{HZY2480/2481}	{HZY2476/2477/2516}	
Genotype	uGCR rate*	dGCR rate*	Ratio #
mre11-H125N	2.78×10^{-7} (122) [1.80×10^{-7} – 4.01×10^{-7}] {HZY2771/2772}	6.23×10^{-7} (274) [5.24×10^{-7} – 9.75×10^{-7}] {HZY2763/2764}	2.2
mre11-H125N mms21-CH	6.35×10^{-7} (280) [2.73×10^{-7} – 1.43×10^{-6}] {JLY929/930}	4.17×10^{-6} (1837) [2.86×10^{-6} – 5.28×10^{-6}] {JLY973/974/975}	6.6
*sae2Δ***	4.23×10^{-8} (19) [2.92×10^{-8} – 5.32×10^{-8}]	1.65×10^{-7} (73) [1.09×10^{-7} – 2.09×10^{-7}]	3.9
sae2Δ mms21-CH	6.61×10^{-7} (291) [2.66×10^{-7} – 1.03×10^{-6}] {HZY2599/2600}	6.03×10^{-6} (2656) [3.33×10^{-6} – 8.81×10^{-6}] {HZY2591/2592}	9.1

* Rate of accumulating Can 5-FOA progeny. Number in the parenthesis is the fold increase relative to wild-type uGCR strain.
** Rates taken from (Putnam et al., 2009; 2010; Albuquerque et al., 2013).
# The dGCR rate divided by the uGCR rate.
Square brackets represent the upper and lower limits of the 95% confidence intervals of the median.
Strains used to calculate the GCR rate from this study are as indicated in curly braces.