

Table S2. Calculated initial molecule number for repair factors in the model with references.

Species	Starting Quantity (No. of Molecules)	Reference
Ku70/80	400000	[1]
DNA-PKcs	100000	[2]
LiIV-XRCC4	30000	[3,4]
PARP-1	1200000	[5-7]

1. Anderson CW, Carter TH (1996) The DNA-activated protein kinase -- DNA-PK. *Curr Top Microbiol Immunol* 217: 91-111.
2. Anderson CW, Lees-Miller SP (1992) The nuclear serine/threonine protein kinase DNA-PK. *Critical reviews in eukaryotic gene expression* 2: 283.
3. Leppard JB, Dong Z, Mackey ZB, Tomkinson AE (2003) Physical and Functional Interaction between DNA Ligase III and Poly(ADP-Ribose) Polymerase 1 in DNA Single-Strand Break Repair. *Molecular and Cellular Biology* 23: 5919-5927.
4. Windhofer F, Wu W, Iliakis G (2007) Low levels of DNA ligases III and IV sufficient for effective NHEJ. *Journal of Cellular Physiology* 213: 475-483.
5. D'Amours D, Desnoyers S, D'Silva I, Poirier GG (1999) Poly(ADP-ribosyl)ation reactions in the regulation of nuclear functions. *Biochem J* 342: 249-268.
6. Ludwig A, Behnke B, Holtlund J, Hilz H (1988) Immunoquantitation and size determination of intrinsic poly(ADP-ribose) polymerase from acid precipitates. An analysis of the in vivo status in mammalian species and in lower eukaryotes. *Journal of Biological Chemistry* 263: 6993-6999.
7. Yamanaka H, Penning CA, Willis EH, Wasson DB, Carson DA (1988) Characterization of human poly(ADP-ribose) polymerase with autoantibodies. *Journal of Biological Chemistry* 263: 3879-3883.