## SUPPLEMENTARY MATERIAL

**Table 1.** Synthetic oligonucleotides used in the experiments

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|---|---|
| dsDNA (strand exchange): | |
| Homol_51 | 3′ TGCCGATGTGATCTTCCTGTCATACCGGATAGACGCGAGACGACTTCGGTC 5′ |
| Compl_61 | 5′ TAACTACGGCTACACTAGAAGGACAGTATGGCCTATCTGCGCTCTGCTGAAGCCAGTTACC 3′ |
| dsDNA (spontaneous branch migration): | |
| Homol_52 | 3′ GTCTCGCGTCTATCCGGTATGACAGGAAGATCACATCGGCATCAATCCGGTG 5′ |
| Compl_72 | 5′ CCGAAGGTAACTGGCTTCAGCAGAGCGCAGATAGGCCATACTGTCCTTCTAGTGTAGCCGTAGTTAGGCCAC 3′ |
| ssDNAs (strand exchange): | |
| Homolog | 5′ GTGGCCTAACTACGGCTACACTAGAAGGACAGTATGGCCTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |
| Subst ≈2 | 5′ GTGGCCTAACTACGGCTACACTAGAAGGACAGTATGATCTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |
| Subst ≈4 | 5′ GTGGCCTAACTACGGCTACACTAGAAGGACAGTATTTGGTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |
| Subst ≈10 | 5′ GTGGCCTAACTACGGCTACACTAGAAGGACAGGCATTAGACGCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |
| Deletion -1 | 5′ GTGGCCTAACTACGGCTACACTAGAAGGACAGTATGG_CTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |
| Deletion -2 | 5′ GTGGCCTAACTACGGCTACACTAGAAGGACAGTATG__CTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |
| Deletion -3 | 5′ GTGGCCTAACTACGGCTACACTAGAAGGACAGTATG___TATCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |
| Deletion -4 | 5′ GTGGCCTAACTACGGCTACACTAGAAGGACAGTAT____TATCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |
| Insertion +1 | 5′ GTGGCCTAACTACGGCTACACTAGAAGGACAGTATGGACCTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |
| Insertion +2 | 5′ GTGGCCTAACTACGGCTACACTAGAAGGACAGTATGGAACCTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |
| Insertion +3 | 5′ GTGGCCTAACTACGGCTACACTAGAAGGACAGTATGGATACCTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |
| Insertion +4 | 5′ GTGGCCTAACTACGGCTACACTAGAAGGACAGTATGGACGTCCTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |
| ssDNAs (unwinding assays): | |
| 116 | 5′ TGCTACAGAGTTCTTGAAGTGGTGGCCTAACTACGGCTACACTAGAAGGACAGTATTTGGTATCTGCGCTCTGCTGAA GCCAGTTACCTTCGGAAAAAGAGTTGGTAGCTCTTGAT 3′ |
| 94 | 5′ TCTTGAAGTGGTGGCCTAACTACGGCTACACTAGAAGGACAGTATTTGGTATCTGCGCTCTGCTGAAGCCAGTTACCT TCGGAAAAAGAGTTGG 3′ |
| 72 | 5′ GTGGCCTAACTACGGCTACACTAGAAGGACAGTATTTGGTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |
| 72_4Sub | 5′ GTGGCCTAGCTACGGCTGCACTAGAATGACAGTATGTGGTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |
| 72_4Ins | 5′ GTGGCCTAATCTACGGCTACCACTAGAAGAGACAGTATTGTGGTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |
| 94_Ins72 | 5′ TGCTACAGAGCCTTCTTGAAGTGGTGGCCTAACTACGGCTACACTAGAAGGACAGTATTTGGTATCTGCGCTCTGCTG AAGCCTGAGTTACCTTCG 3′ |
| 72_3′50 | 5′ GCTACAGCGTACAAGGTCAAGGAGAAGGACAGTATTTGGTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGG 3′ |

The upper two rows show the ssDNAs used to create the dsDNAs for the strand exchange assays and the spontaneous branch migration assays, respectively. The middle part shows the ssDNAs, which have been used in both types of experiments. The lower part shows the sequences of oligonucleotides that have been employed in the topological pairing assays with pUC18 as a closed circular DNA. Heterologous regions are underlined.