|  |  |  |
| --- | --- | --- |
| Wild-type | K267E | R332A |
| kex = 147 ± 41 s-1 | kex = 376 ± 89 s-1 | kex = 142 ± 28 s-1 |
| **F256** | **A249** | **V349** | **Q257** |
| **N266** | **I265** | **L359** | **G275** |
| **K267** | **L268** | **D362** | **A276** |
| **L270** | **L270** | **F363** | **R277** |
| **G275** | **I271** | **D376** | **L286** |
| **A276** | **S272** | **E388** | **T312** |
| **I297** | **G275** | **N399** | **Y319** |
| **D311** | **D281** | **N404** | **K326** |
| **Y313** | **L286** | **L406** | **N330** |
| **K315** | **K296** | **N412** | **F333** |
| **Y319** | **D310** | **L413** | **K344** |
| **K354** | **Y313** | **E434** | **V349** |
| **S356** | **Y319** | **V438** | **L359** |
| **Y387** | **E329** | **R445** | **D376** |
| **E409** | **N330** |  | **M394** |
| **L413** | **F333** |  | **D403** |
| **I429** | **E335** |  | **N412** |
|  | **R343** |  | **L413** |

**Supplementary File 1.** Residues fit to a global *k*ex in 1H-15N CPMG relaxation dispersion analysis of WT, K267E, and R332A *Geo*Rec2. A very small number of other resonances displaying curved CPMG profiles could not be globally fit and were excluded from this list. In all samples (*i.e.* WT, K267E, and R332A), the global fit was found to be the best statistical model.

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