

**Table S1: Summary of measured effective and theoretical diffusion coefficients.**

	<b>Measured Diff Coeff.</b> $D_{effective} \left[ \frac{\mu m^2}{s} \right]$	<b>Theoretical Diff. Coeff.</b> $D_{theoretical} \left[ \frac{\mu m^2}{s} \right]$	<b>References</b>
RAD54	14	14.6	Hamster ovary cell (Essers 2002)
PCNA	13	18.3	Hamster ovary cell (Essers et al. 2005)
RAD52	8	14.6	Hamster ovary cell (Essers 2002)
RAD51	7	17.5	Hamster ovary cell (Essers 2002)
NBS1	3	14.6	Human U2OS (Lukas et al. 2004)
MDC1	2	11.7	Human U2OS (Lukas et al. 2004)
Ku70	0.35	15.2	HeLa cells and B cells (Rodgers et al. 2002)
Ku86	0.35	14.7	HeLa cells and B cells (Rodgers et al. 2002)
<b>WRN</b>	<b>1.6</b>	<b>12.3</b>	<b>U2OS This study</b>
<b>BLM</b>	<b>1.34</b>	<b>13.4</b>	<b>U2OS This study</b>

The theoretical diffusion coefficients have been corrected for shape factors but for some proteins there is still a significant difference between the theoretical and the measured diffusion coefficients.

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Rodgers W, Jordan SJ, Capra JD. Transient association of Ku with nuclear substrates characterized using fluorescence photobleaching. J Immunol. 2002 Mar 1; 168(5):2348-55. PMID 11859125