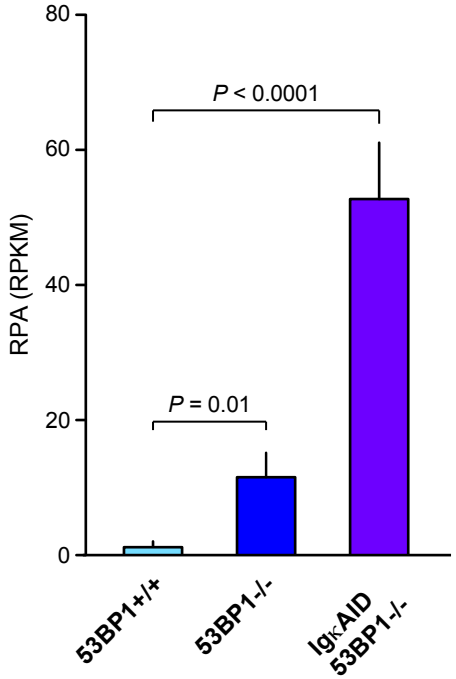
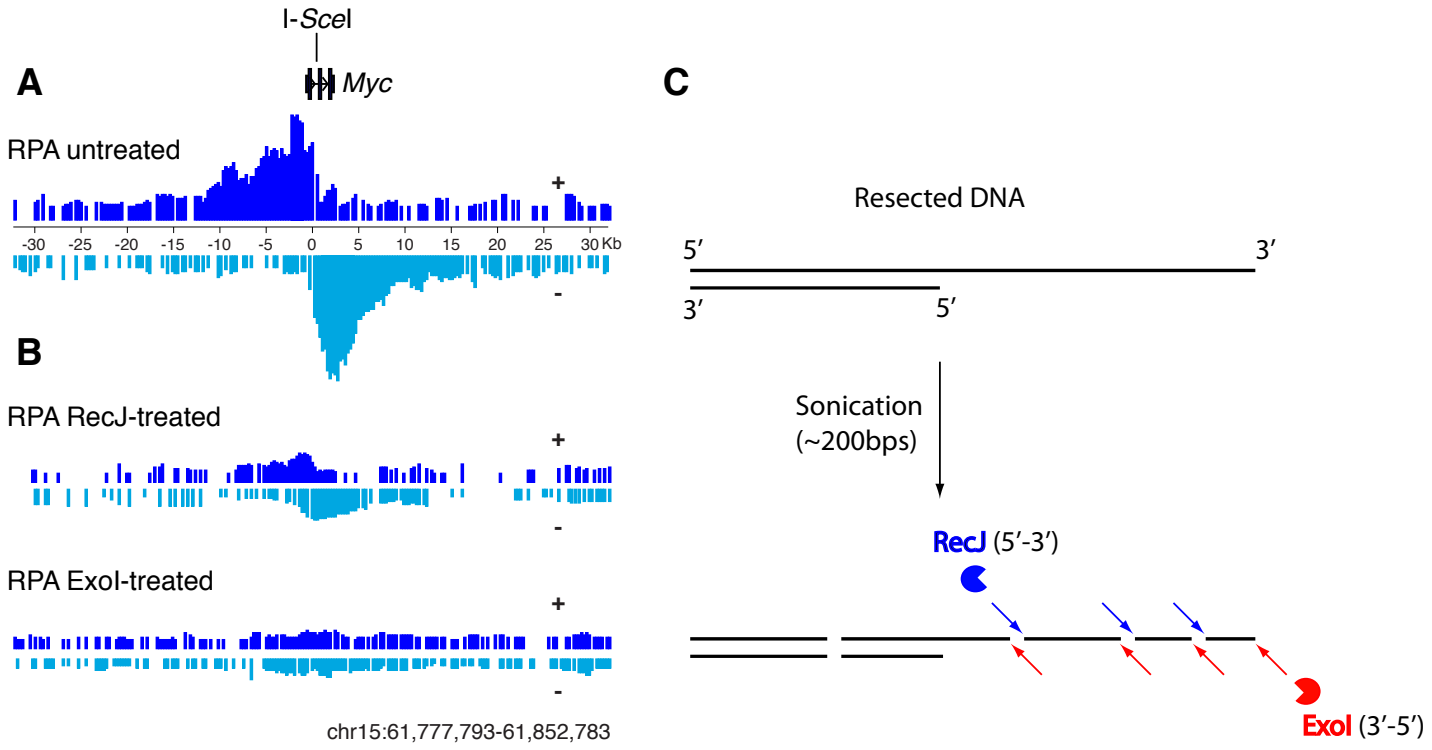
Figure S1



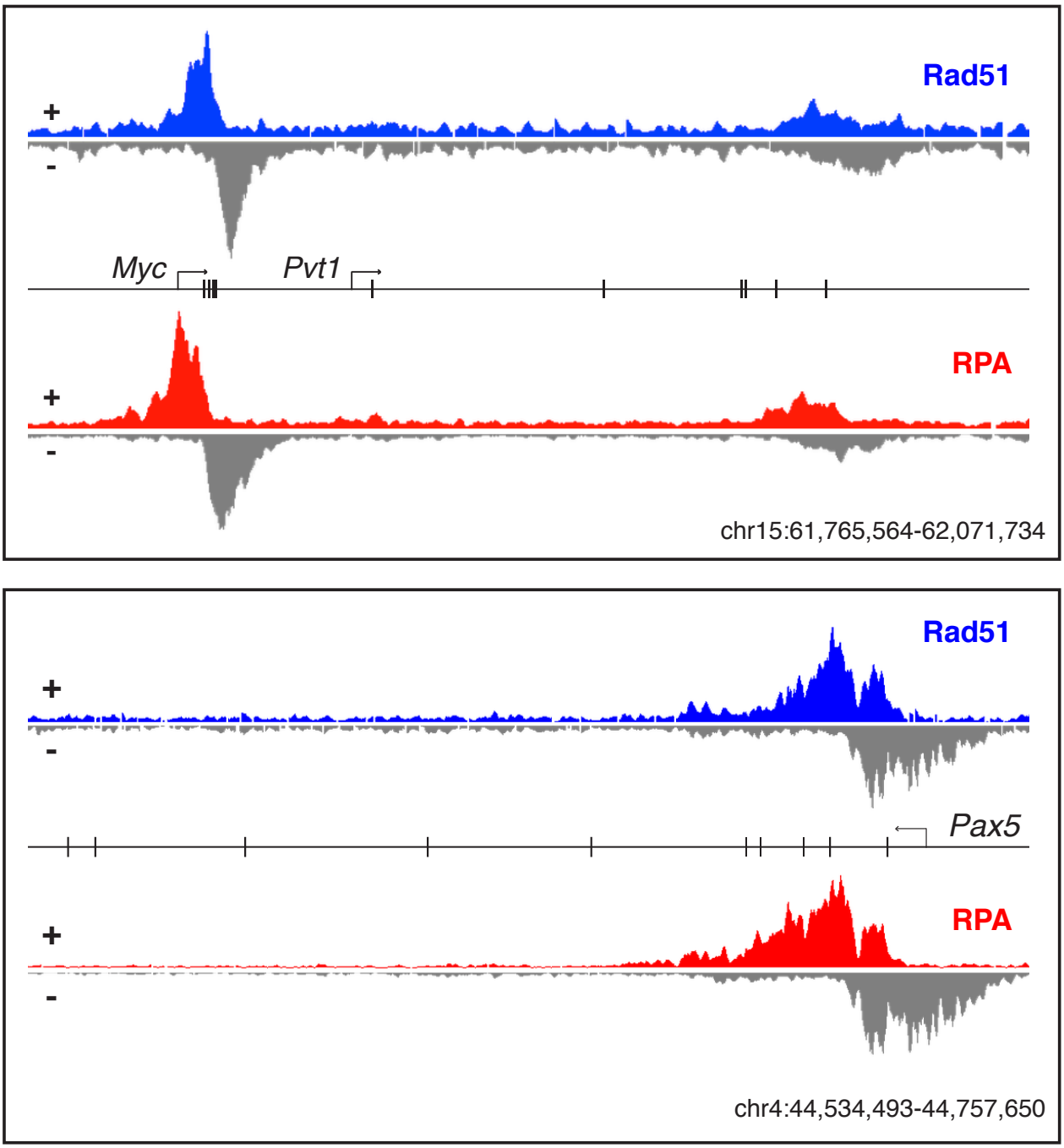
Increase in RPA occupancy at Ig loci in 53BP1+/+ (n = 3), 53BP1-/- (n = 5), and IgκAID_53BP1-/- (n = 3) B cells activated in the presence of LPS + IL4. RPA ChIP-Seq values at Igμ (chr12:114650000-114668000) and Igγ1 (chr12:114562000-114580000) were used in the comparison. P values were calculated using the unpaired T test.

Figure S2



(**A**) RPA-Seq signals resolved into upper (+) and lower (-) strands. (**B**) Treatment of anti-RPA ChIP DNA with E. coli Exonuclease I (ExoI) or RecJ. DNA samples were isolated from 53BP1$^{-/-}$AID$^{-/-}$Myc$^{I\text{-}SceI}$ B cells infected with a retrovirus expressing I-SceI homing nuclease. Cells were activated ex-vivo in the presence of LPS+IL-4. Sequence reads per million (RPM) were smoothed with a quadratic Svitzky-Goolay filter 501 nucleotides wide. Untreated sample also shows the extent of resection per kilobase pair. (**C**) Schematics representing RecJ- and ExoI-susceptibility of sonicated, resected DNA in RPA-Seq experiments. The model explains why more RPA signal is retained following RecJ nucleolytic activity compared to ExoI.

Figure S3



Rad51 occupancy by DNA strand at *Myc-Pvt1* and *Pax5* loci as measured in 53BP1-/-IgkAID B cells activated ex-vivo in the presence of LPS+IL-4.

Table S1: ChIP-Seq samples, biological replicates, and comparable experiments used in the manuscript.

Figure	Panels	Samples	Biological replicates and comparable experiments
Fig1	A	activatedB_53BP1ko_RPAip_a activatedB_H2AXko_RPAip_a activatedB_H2AXko_UNGko_MSH2ko_RPAip_a	activatedB_53BP1ko_RPAip_b, activatedB_53BP1ko_RPAip_c Figure 4A samples
	B	thymocyte_53BP1ko_RPAip_a RAG2 from (Ji et al. Cell, 2010) thymocyte_WT_RPAip_a	thymocyte_53BP1ko_RPAip_b thymocyte_WT_RPAip_b
	C	activatedB_ER-IsceI_53BP1ko_AIDko_RPAip_0min activatedB_ER-IsceI_53BP1ko_AIDko_RPAip_30min activatedB_ER-IsceI_53BP1ko_AIDko_RPAip_3h activatedB_ER-IsceI_53BP1ko_AIDko_RPAip_24h	
Fig2	A	activatedB_AIDtg_53BP1ko_RPAip_a	activatedB_AIDtg_53BP1ko_RPAip_b, activatedB_AIDtg_53BP1ko_RPAip_c, activatedB_AIDtg_53BP1ko_RPAip_d
	B	activatedB_AIDtg_53BP1ko_RPAip_a activatedB_AIDtg_53BP1ko_RPAip_ExoI activatedB_AIDtg_53BP1ko_RPAip_RecJf	activatedB_AIDtg_53BP1ko_RPAip_b, activatedB_AIDtg_53BP1ko_RPAip_c, activatedB_AIDtg_53BP1ko_RPAip_d FigS1B IsceI ExoI treated sample FigS1B IsceI RecJ treated sample
	C	activatedB_WT_PolIIip_combined	Data combined from (Pavri et al. Cell, 2010), (Kuchen et al., Immunity, 2010), and (Yamane et al, Nat. Immunology, 2011)
	D	The same as Fig 2B	
	E	MEF_I-PpoI_53BP1ko_RPAip	
Fig3	A	activatedB_AIDtg_53BP1ko_RAD51ip_combined	activatedB_53BP1ko_RAD51ip, activatedB_53BP1ko_SG2M_RAD51ip
	B	activatedB_AIDtg_53BP1ko_RPAip_combined	Data combined from 4 biological replicates of AIDtg_53BP1ko_RPAip
Fig4	A	activatedB_H2AXko_G1_RPAip_a activatedB_H2AXko_S_RPAip_a activatedB_H2AXko_G2M_RPAip_a	activatedB_53BP1ko_G1_RPAip_a activatedB_53BP1ko_S_RPAip_a activatedB_53BP1ko_SG2M_RPA_b
	B	activatedB_WT_G1_gH2AXip_a activatedB_WT_S_gH2AXip_a activatedB_H2AXko_G1_gH2AXip_a activatedB_53BP1ko_G1_gH2AXip_a activatedB_53BP1ko_S_gH2AXip_a	
	C	activatedB_H2AXko_G1_RPAip_a activatedB_H2AXko_S_RPAip_a activatedB_53BP1ko_G2M_gH2AXip_a	
Fig5	A	activatedB_53BP1ko_G1_RPA_b activatedB_53BP1ko_SG2M_RPA_b activatedB_53BP1ko_ATMi_G1_RPA_b activatedB_53BP1ko_ATMi_SG2M_RPA_combined	activatedB_53BP1ko_G1_RPA_c activatedB_53BP1ko_SG2M_RPA_c activatedB_53BP1ko_ATMi_G1_RPA_c
	C	thymocyte_53BP1ko_RPAip_a thymocyte_53BP1ko_ATMko_RPAip_a	thymocyte_53BP1ko_RPAip_b thymocyte_53BP1ko_ATMko_RPAip_b
	D	activatedB_53BP1ko_RPAip_b activatedB_53BP1ko_ATMko_RPAip_a	activatedB_53BP1ko_RPAip_a, activatedB_53BP1ko_RPAip_c activatedB_53BP1ko_ATMko_RPAip_b
	E	AIDtg_RPA from (Hakim et al. Nature, 2012) AIDwt_RPA from (Hakim et al. Nature, 2012) AIDko_RPA from (Hakim et al. Nature, 2012) activatedB_AIDwt_RAD51ip	
FigS1		activatedB_53BP1ko_RPAip_b activatedB_WT_RPAip_a activatedB_AIDtg_53BP1ko_RPAip_d	activatedB_53BP1ko_RPAip_d, activatedB_53BP1ko_RPAip_e, activatedB_53BP1ko_RPAip_f, activatedB_53BP1ko_RPAip_g activatedB_WT_RPAip_b, activatedB_WT_RPAip_c activatedB_AIDtg_53BP1ko_RPAip_e, activatedB_AIDtg_53BP1ko_RPAip_f
FigS2	A	activatedB_IsceI_53BP1ko_AIDko_RPAip	
	B	activatedB_IsceI_53BP1ko_AIDko_RPAip_ExoI_a activatedB_IsceI_53BP1ko_AIDko_RPAip_RecJf_a	Fig2B AIDtg ExoI treated sample Fig2B AIDtg RecJf treated sample
FigS3		activatedB_AIDtg_53BP1ko_RAD51ip_combined activatedB_AIDtg_53BP1ko_RPAip_combined	