Description of Additional Supplementary Files

File Name: Supplementary Data 1
Description: **Pulse-chase iPOND-SILAC-MS data. Associated with Fig. 1d, Supplementary Fig. 2 a, b.** Data includes normalized heavy vs. light (H/L) ratios for proteins enriched on nascent DNA in each of the three repeats, mean normalized H/L ratios, mean normalized Log2 H/L ratios and -Log p-values (unpaired t-test). GO terms with p-values (hypergeometric distribution) for the identified proteins are also displayed. Data underlying the Venn diagrams in Supplementary Fig. 2b are included as separate tabs.

File Name: Supplementary Data 2
Description: **iPOND-SILAC-MS data from Nbs1/+/ cells with or without 4-OHT treatment. Associated with Fig. 1e.** Data includes normalized heavy vs. light (H/L) ratios, mean normalized H/L ratios and -Log p-values (unpaired t-test) for proteins identified in each of the three repeats. Lists of GO terms with p-values (hypergeometric distribution) for proteins identified as enriched or depleted on nascent DNA upon Nbs1 depletion are included as separate tabs.

File Name: Supplementary Data 3
Description: **TMT-Mass spectrometry data of chromatin associated ISGylated proteins. Data accompanies Fig. 4b-d and Supplementary Fig. 5a.** Data includes mean Log2 ratios and mean Log10 absorbances for Nbs1/+/ 3FLAG-6HIS-ISG15 vs. Nbs1/+/ ISG15 (Fig. 4c) and Nbs1/+/ 3FLAG-6HIS-ISG15 vs. Nbs1+/− 3FLAG-6HIS-ISG15 (Fig. 4d). Lists of GO terms with p-values (hypergeometric distribution) for the identified proteins are also included. Data underlying the Venn diagram in Supplementary Figure 5a are displayed in a separate tab.

File Name: Supplementary Data 4
Description: **iPOND-SILAC-MS data from Nbs1/+/ vs. Nbs1/− ISG15/−. Data associated with Fig. 4g and Supplementary Fig. 5d.** Data includes normalized heavy vs. light (H/L) ratios, mean normalized H/L ratios, and mean normalized Log2 H/L ratios for proteins identified in each of the three repeats. GO terms with p-values (hypergeometric distribution) for the identified proteins are displayed in separate tabs.

File Name: Supplementary Data 5
Description: **Reagent tables.** Lists of antibodies, qPCR primers, CRISPR guides and templates and genotyping primers used in this study.