**S1 Text. Protein purification:** SSB mutants Y50A, Y57A and Y76A were obtained using the QuickChange Site-Directed Mutagenesis Kit provided by Stratagene, using as template the plasmid pT7-3 containing the viral gene 5 that encodes the wild-type φ29 SSB. The presence of the desired mutations, as well as the absence of additional ones, was determined by sequencing the entire gene. The wild-type and mutant plasmids were overexpressed in XL1-Blue *Escherichia coli* cells and, then, purified.

*E. coli* Solub-BL21 (DE3) strain was transformed with plasmid pT7-3 containing the gene 5 wild-type or mutants. The cells were grown at 30 oC in LB broth in the presence of ampicillin up to an optical density of 0.6. After 45 minutes, the temperature was raised to 37 oC and the expression of the φ29 SSBs was induced with 0.5 mM IPTG for 4 hours and 30 minutes. Cultures were centrifuged 11 minutes at 4 oC at 5,000 rpm in a GSA rotor to remove the culture medium. Part of the pellet was suspended in buffer 6 (50 mM Tris-HCl, pH 7.5, 5% (v/v) glycerol, 7 mM β-mercaptoethanol, 1 mM EDTA) supplemented with 0.2 M NaCl and sonicated to lyse the cells. Part of the lysate was centrifuged at 4 oC for 20 minutes at 20370 g to analyze the soluble protein in the supernatant.

Grown bacteria (14.6 grams) were pelleted and lysed with 17.5 g of alumina. The lysates were resuspended in buffer 6 supplemented with 0.2 M NaCl. To remove the alumina, the lysates were centrifuged 5 minutes at 2,000 rpm at 4 ºC in a GSA rotor and the supernatants were recollected (lysate). The cleared lysates were centrifugated again 20 minutes at 12,000 rpm at 4 ºC in a GSA rotor to separate the soluble fraction (super high velocity). The DNA in the soluble extract was precipitated with 10% polyethylenimine and centrifugated at 4 ºC for 10 minutes at 12,000 rpm in a GSA rotor. The SSBs were in the supernatant (super polyethylenimine). We precipitated them with ammonium sulphate (AS) to 35% saturation to obtain polyethylenimine-free protein after centrifugation during 30 minutes at 4 ºC at 12,000 rpm in a GSA rotor. These pellets were resuspended in buffer 6 supplemented with 30% AS and centrifuged 30 min at 4 ºC at 12,000 rpm in a GSA rotor (pellet ammonium sulphate 30%). The resulting pellets were resuspended in buffer 6 and passed through phosphocellulose and mono Q columns, previously equilibrated with the same buffer. The proteins were eluted first with buffer 6 supplemented with 50 mM NaCl, then with buffer 6 with 75 mM NaCl and, finally, with buffer 6 with 0.1 M NaCl (eluted PH/Q columns). The eluted fractions with the highest concentrations of proteins were joined, precipitated with AS 65% and centrifuged for 30 minutes at 4 ºC at 12,000 rpm in a GSA rotor (pellet ammonium sulphate 65%). These pellets were resuspended in buffer 6 with 0.5 M NaCl and dialysed in a Whisking membrane against buffer 6, 50% glycerol, 0.025% tween (after dialysis). S1 Fig shows the principal steps of the purification of the wild-type SSB. The same method was followed to purify the SSB mutants. The purified proteins are shown in S2 Fig.