

SUPPORTING INFORMATION

Title:

The dimerization site-2 of the bacterial DNA-binding protein H-NS is required for gene silencing and stiffened nucleoprotein filament formation

Authors:

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Experimental procedures:

Western blotting analysis—*E. coli* cells grown in LB medium were harvested by centrifugation and re-suspended in 0.4 ml lysis buffer containing 8 M urea and sonicated. After centrifugation, the same volume of supernatant was subjected to 18% SDS-PAGE with prestained protein marker (Nacalai Tesque) and blotted on to PVDF membranes using an iBlot semi-dry transfer apparatus (Invitrogen). Membranes were first immuno-detected with anti-H-NS serum (Shimada *et al.*, 2011) and HRP- conjugated anti-rabbit IgG (Nacalai Tesque) antibodies and then developed with a chemiluminescence kit (Nacalai Tesque). The image was analyzed with a LAS-4000 IR multi colour imager (Fuji Film). Molecular marker

Circular dichroism spectroscopy (CD) —CD spectra of H-NS were measured using a J-820 spectropolarimeter (Jasco). The CD measurements were carried out in a wavelength range between 190 and 250 nm in a cell with a path length of 0.2 cm (volume 0.4 ml) at 25°C in the buffer (10 mM Tris-HCl pH 7.4 and 50 mM KCl). The spectra are the average of two or three independent measurements of each five scans recorded in 0.5 nm increments at a scan speed of 20 nm/min. The estimation of secondary structure content was performed using a Spectra Manager (Jasco).

Electrophoretic mobility shift assay (EMSA) —Probes were amplified by PCR using the pLUXslpp as a template, with a pair of primers: a specific primer and a FITC-labeled primer (Table S2). PCR products with FITC at their termini were purified using the QIAquick PCR purification kit (Qiagen). For EMSA, mixtures of the FITC-labeled probes and purified each H-NS protein were incubated at room temperature for 15 min in the binding buffer (10 mM Tris-HCl pH 7.4 and 50 mM KCl). After addition of a DNA dye solution, the mixture was directly subjected to 7% PAGE. Fluorescent-labeled DNA in gels was detected using LAS-4000 (Fuji Film).

Structured-illumination microscopy (SIM) — A single colony of a strain carrying an *hns*-expressing plasmid was grown overnight at 37°C with reciprocal shaking. The overnight culture was diluted 100-fold into the medium containing 10 µM IPTG to express *lac*-inducible H-NS. Transformants were grown to OD₆₀₀ ~0.5 at 37°C with shaking and were fixed with 1.5% PFA for 30 mins. Cells were pelleted and washed twice with PBS. Permeabilization was done using 0.1% Triton X100 for 30 mins, followed by pelleting and washing twice with PBS. After treatment of DAPI (10 µg/ml) for 15 min, the cells were pelleted and washed twice with PBS. Imaging was performed using structured-illumination microscopy (SIM) on a W1 spinning Disk microscope (CSU-W1 Nikon, Japan) combined with the Live-SR system (Roper scientific) as followed by Gao *et al.*, 2017.

References:

- Burton, N. A., Johnson, M. D., Antczak, P., Robinson, A., and Lund, P. A. (2010) Novel aspects of the acid response network of *E. coli* K-12 are revealed by a study of transcriptional dynamics. *J. Mol. Biol.*, 401, 726-742.
- Gao Y., Foo Y. H., Winardhi R. S., Tang Q., Yan J., and Kenney L. J. (2017) Charged residues in the H-NS linker drive DNA binding and gene silencing in single cells. *Proc. Natl. Acad. Sci.*, 114, 12560-12565.
- Jishage, M. and Ishihama, A. (1997) Variation in RNA polymerase sigma subunit composition within different stocks of *Escherichia coli* strain W3110. *J. Bacteriol.*, 179, 959-963.
- Louis-Jeune, C., Andrade-Navarro, M. A., and Perez-Iratxeta, C. (2012) Prediction of protein secondary structure from circular dichroism using theoretically derived spectra. *Proteins*, 80, 374-381.

- Shimada, T., Bridier, A., Briandet, R., and Ishihama, A. (2011) Novel roles of LeuO in transcription regulation in *E. coli*: Antagonistic interplay with the universal silencer H-NS. *Mol. Microbiol.*, 82, 376-397.
- Ueda, T., Takahashi, H., Uyar, E., Ogasawara, N., and Oshima, T. (2013) Functions of the Hha and YdgT proteins in transcriptional silencing by the nucleoid proteins, H-NS and StpA, in *Escherichia coli*. *DNA Res.*, 20, 263-271.
- Yamanaka, Y., Oshima, T., Ishihama, A., and Yamamoto, K. (2014) Characterization of the YdeO regulon in *Escherichia coli*. *PLoS ONE*, 9, e111962.

Table S1. Deconvolution of the circular dichroism data

Protein	α -helix (%)
H-NS	92.37
H-NS-C21S	92.37
H-NS-C21S-I70C	91.90
H-NS-I70A	92.37

The values were calculated using K2D3 (Gao et al., 2012).

Table S2. Bacterial strains, plasmids, and oligonucleotides used in this study.

Name	Characterization	Reference
<i>E. coli</i> strain		
W3110 typeA	Wild type, complete σ set	Jishage & Ishihama, 1997
W3110 Δ hns	W3110, Δ <i>hns</i>	Ueda <i>et al.</i> , 2013
W3110 Δ hha	W3110, Δ <i>hha</i>	Ueda <i>et al.</i> , 2013
W3110 Δ ydgT	W3110, Δ <i>ydgT</i>	Ueda <i>et al.</i> , 2013
W3110 Δ hha Δ ydgT	W3110, Δ <i>hha</i> , Δ <i>ydgT</i>	Ueda <i>et al.</i> , 2013
Plasmid		
pLUX	promoter-less <i>luxCDABE</i>	Burton <i>et al.</i> , 2010
pQE80L	T5 promoter, 6xHis	Qiagen
pLUXslpp	pLUX, <i>slp'</i> - <i>lux</i>	Burton <i>et al.</i> , 2010
pQE80Lhns	pQE80L, <i>hns</i>	Provided by T. Oshima
pQE80LhnsN1	pQE80L, truncated <i>hns</i> encoding residues 47-137	This study
pQE80Lhns-C21S	<i>hns</i> gene with a substitution of Cys21Ser on pQE80Lhns	This study
pQE80Lhns-C21S -S2C	<i>hns</i> gene with substitutions of Ser2Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E3C	<i>hns</i> gene with substitutions of Glu3Cys and δ Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -A4C	<i>hns</i> gene with substitutions of Ala4Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -L5C	<i>hns</i> gene with substitutions of Leu5Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -K6C	<i>hns</i> gene with substitutions of Lys6Cys and δ Xys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -I7C	<i>hns</i> gene with substitutions of Ile7Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -L8C	<i>hns</i> gene with substitutions of Leu8Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -N9C	<i>hns</i> gene with substitutions of Asn9Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -N10C	<i>hns</i> gene with substitutions of Asn10Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -I11C	<i>hns</i> gene with substitutions of Ile11Cys and Cys21Ser derived from pQE80Lhns-C21S	This study

pQE80Lhns-C21S -R12C	<i>hns</i> gene with substitutions of Arg12Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -T13C	<i>hns</i> gene with substitutions of Thr13Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -L14C	<i>hns</i> gene with substitutions of Leu14Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -R15C	<i>hns</i> gene with substitutions of Arg15Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -A16C	<i>hns</i> gene with substitutions of Ala16Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -Q17C	<i>hns</i> gene with substitutions of Gln17Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -R19C	<i>hns</i> gene with substitutions of Arg19Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E20C	<i>hns</i> gene with substitutions of Glu20Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -T22C	<i>hns</i> gene with substitutions of Thr22Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -L23C	<i>hns</i> gene with substitutions of Leu23Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E24C	<i>hns</i> gene with substitutions of Glu24Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -T25C	<i>hns</i> gene with substitutions of Thr25Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -L26C	<i>hns</i> gene with substitutions of Leu26Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E27C	<i>hns</i> gene with substitutions of Glu27Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E28C	<i>hns</i> gene with substitutions of Glu28Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -M29C	<i>hns</i> gene with substitutions of Met29Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -L30C	<i>hns</i> gene with substitutions of Leu30Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E31C	<i>hns</i> gene with substitutions of Glu31Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -K32C	<i>hns</i> gene with substitutions of Lys32Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -L33C	<i>hns</i> gene with substitutions of Leu33Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E34C	<i>hns</i> gene with substitutions of Glu34Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -V35C	<i>hns</i> gene with substitutions of Val35Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -V36C	<i>hns</i> gene with substitutions of Val36Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -V37C	<i>hns</i> gene with substitutions of Val37Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -N38C	<i>hns</i> gene with substitutions of Asn38Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E39C	<i>hns</i> gene with substitutions of Glu39Cys and Cys21Ser derived from pQE80Lhns-C21S	This study

pQE80Lhns-C21S -R40C	<i>hns</i> gene with substitutions of Arg40Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -R41C	<i>hns</i> gene with substitutions of Arg41Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E42C	<i>hns</i> gene with substitutions of Glu42Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E43C	<i>hns</i> gene with substitutions of Glu43Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E44C	<i>hns</i> gene with substitutions of Glu44Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -S45C	<i>hns</i> gene with substitutions of Ser45Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -A46C	<i>hns</i> gene with substitutions of Ala46Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -A47C	<i>hns</i> gene with substitutions of Ala47Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -A48C	<i>hns</i> gene with substitutions of Ala48Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -A49C	<i>hns</i> gene with substitutions of Ala49Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E50C	<i>hns</i> gene with substitutions of Glu50Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -V51C	<i>hns</i> gene with substitutions of Val51Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E52C	<i>hns</i> gene with substitutions of Glu52Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E53C	<i>hns</i> gene with substitutions of Glu53Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -R54C	<i>hns</i> gene with substitutions of Arg54Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -T55C	<i>hns</i> gene with substitutions of Thr55Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -R56C	<i>hns</i> gene with substitutions of Arg56Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -K57C	<i>hns</i> gene with substitutions of Lys57Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -L58C	<i>hns</i> gene with substitutions of Leu58Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -Q59C	<i>hns</i> gene with substitutions of Gln59Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -Q60C	<i>hns</i> gene with substitutions of Gln60Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -Y61C	<i>hns</i> gene with substitutions of Tyr61Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -R62C	<i>hns</i> gene with substitutions of Arg62Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E63C	<i>hns</i> gene with substitutions of Glu63Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -M64C	<i>hns</i> gene with substitutions of Met64Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -L65C	<i>hns</i> gene with substitutions of Leu65Cys and Cys21Ser derived from pQE80Lhns-C21S	This study

pQE80Lhns-C21S -I66C	<i>hns</i> gene with substitutions of Ile66Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -A67C	<i>hns</i> gene with substitutions of Ala67Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -D68C	<i>hns</i> gene with substitutions of Asp68Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -G69C	<i>hns</i> gene with substitutions of Gly69Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -I70C	<i>hns</i> gene with substitutions of Ile70Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -D71C	<i>hns</i> gene with substitutions of Asp71Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -P72C	<i>hns</i> gene with substitutions of Pro72Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -N73C	<i>hns</i> gene with substitutions of Asn73Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E74C	<i>hns</i> gene with substitutions of Glu74Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -L75C	<i>hns</i> gene with substitutions of Leu75Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -L76C	<i>hns</i> gene with substitutions of Leu76Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -N77C	<i>hns</i> gene with substitutions of Asn77Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -S78C	<i>hns</i> gene with substitutions of Ser78Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -L79C	<i>hns</i> gene with substitutions of Leu79Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -A80C	<i>hns</i> gene with substitutions of Ala80Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -A81C	<i>hns</i> gene with substitutions of Ala81Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -V82C	<i>hns</i> gene with substitutions of Val82Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -K83C	<i>hns</i> gene with substitutions of Lys83Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -S84C	<i>hns</i> gene with substitutions of Ser84Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -G85C	<i>hns</i> gene with substitutions of Gly85Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -T86C	<i>hns</i> gene with substitutions of Thr86Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -K87C	<i>hns</i> gene with substitutions of Lys87Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -A88C	<i>hns</i> gene with substitutions of Ala88Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -K89C	<i>hns</i> gene with substitutions of Lys89Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -R90C	<i>hns</i> gene with substitutions of Arg90Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -A91C	<i>hns</i> gene with substitutions of Ala91Cys and Cys21Ser derived from pQE80Lhns-C21S	This study

pQE80Lhns-C21S -Q92C	<i>hns</i> gene with substitutions of Gln92Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -R93C	<i>hns</i> gene with substitutions of Arg93Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -P94C	<i>hns</i> gene with substitutions of Pro94Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -A95C	<i>hns</i> gene with substitutions of Ala95Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -K96C	<i>hns</i> gene with substitutions of Lys96Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -Y97C	<i>hns</i> gene with substitutions of Tyr97Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -S98C	<i>hns</i> gene with substitutions of Ser98Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -Y99C	<i>hns</i> gene with substitutions of Tyr99Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -V100C	<i>hns</i> gene with substitutions of Val100Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -D101C	<i>hns</i> gene with substitutions of Val101Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E102C	<i>hns</i> gene with substitutions of Asp102Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -N103C	<i>hns</i> gene with substitutions of Asn103Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -G104C	<i>hns</i> gene with substitutions of Gly104Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E105C	<i>hns</i> gene with substitutions of Glu105Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -T106C	<i>hns</i> gene with substitutions of Thr106Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -K107C	<i>hns</i> gene with substitutions of Lys107Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -T108C	<i>hns</i> gene with substitutions of Thr108Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -W109C	<i>hns</i> gene with substitutions of Trp109Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -T110C	<i>hns</i> gene with substitutions of Thr110Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -G111C	<i>hns</i> gene with substitutions of Gly111Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -Q112C	<i>hns</i> gene with substitutions of Gln112Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -G113C	<i>hns</i> gene with substitutions of Gly113Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -R114C	<i>hns</i> gene with substitutions of Arg114Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -T115C	<i>hns</i> gene with substitutions of Thr115Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -P116C	<i>hns</i> gene with substitutions of Pro116Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -A117C	<i>hns</i> gene with substitutions of Ala117Cys and Cys21Ser derived from pQE80Lhns-C21S	This study

pQE80Lhns-C21S -V118C	<i>hns</i> gene with substitutions of Val118Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -I119C	<i>hns</i> gene with substitutions of Ile119Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -K120C	<i>hns</i> gene with substitutions of Lys120Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -K121C	<i>hns</i> gene with substitutions of Lys121Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -A122C	<i>hns</i> gene with substitutions of Ala122Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -M123C	<i>hns</i> gene with substitutions of Met123Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -D124C	<i>hns</i> gene with substitutions of Asp124Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -E125C	<i>hns</i> gene with substitutions of Glu125Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -Q126C	<i>hns</i> gene with substitutions of Gln126Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -G127C	<i>hns</i> gene with substitutions of Gly127Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -K128C	<i>hns</i> gene with substitutions of Lys128Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -S129C	<i>hns</i> gene with substitutions of Ser129Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -L130C	<i>hns</i> gene with substitutions of Leu130Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -D131C	<i>hns</i> gene with substitutions of Asp131Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -D132C	<i>hns</i> gene with substitutions of Asp132Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -F133C	<i>hns</i> gene with substitutions of Phe133Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -L134C	<i>hns</i> gene with substitutions of Leu134Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -I135C	<i>hns</i> gene with substitutions of Ile135Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -K136C	<i>hns</i> gene with substitutions of Lys136Cys and Cys21Ser derived from pQE80Lhns-C21S	This study
pQE80Lhns-C21S -Q137C	<i>hns</i> gene with substitutions of Gln137Cys and Cys21Ser derived from pQE80Lhns-C21S	This study

Oligonucleotide

Lux-R	5'-GGCAGGTAAACACTATTATCACC-3'	Yamanaka et al., 2014
Lux-R-FITC	FITC-5'-GGCAGGTAAACACTATTATCACC-3'	Yamanaka et al., 2014
pQE-promoter	5'-CCCGAAAAGTGCCACCTG-3'	This study
pQE-reverse	5'-GTTCTGAGGTCATTACTGG-3'	This study

hnsC21S-F	5'-GCGTTTCAAGTGTAGATTCTCTTGCCTGCG-3' (For substitution of Cys21Ser in H-NS)	This study
hnsC21S-R2	5'-CGCAGGCAAGAGAATCTACACTTGAAACGC-3' (For substitution of Cys21Ser in H-NS)	This study
hnsS2C-F	5'-CGGATCCGCATGCTGTGAAGCACTTAAAAT-3' (For substitution of Ser2Cys in H-NS)	This study
hnsS2C-R	5'-ATTTTAAGTGCTTCACAGCATGCGGATCCG-3' (For substitution of Ser2Cys in H-NS)	This study
hnsE3C-F	5'-ATCCGCATGCAGCTGTGCACTTAAAATTCT-3' (For substitution of Glu3Cys in H-NS)	This study
hnsE3C-R	5'-AGAATTTTAAGTGCACAGCTGCATGCGGAT-3' (For substitution of Glu3Cys in H-NS)	This study
hnsA4C-F	5'-CGCATGCAGCGAATGTCTTAAAATTCTGAA-3' (For substitution of Ala4Cys in H-NS)	This study
hnsA4C-R	5'-TTCAGAATTTTAAGACATTCGCTGCATGCG-3' (For substitution of Ala4Cys in H-NS)	This study
hnsL5C-F	5'-ATGCAGCGAAGCATGTAAAATTCTGAACAA-3' (For substitution of Leu5Cys in H-NS)	This study
hns L5C-R	5'-TTGTTCAGAATTTTACATGCTTCGCTGCAT-3' (For substitution of Leu5Cys in H-NS)	This study
hns K6C-F	5'-CAGCGAAGCACTTTGTATTCTGAACAACAT-3' (For substitution of Lys6Cys in H-NS)	This study
hns K6C-R	5'-ATGTTGTTTCAGAATACAAAGTGCTTCGCTG-3' (For substitution of Lys6Cys in H-NS)	This study
hns I7C-F	5'-CGAAGCACTTAAATGTCTGAACAACATCCG-3' (For substitution of Ile7Cys in H-NS)	This study
hns I7C-R	5'-CGGATGTTGTTTCAGACATTTAAGTGCTTCG-3' (For substitution of Ile7Cys in H-NS)	This study
hns L8C-F	5'-AGCACTTAAAATTTGTAACAACATCCGTAC-3' (For substitution of Leu8Cys in H-NS)	This study
hns L8C-R	5'-GTACGGATGTTGTTACAAATTTAAGTGCT-3' (For substitution of Leu8Cys in H-NS)	This study
hns N9C-F	5'-ACTTAAAATTCTGTGTAACATCCGTACTCT-3' (For substitution of Asn9Cys in H-NS)	This study
hns N9C-R	5'-AGAGTACGGATGTTACACAGAATTTAAGT-3' (For substitution of Asn9Cys in H-NS)	This study
hns N10C-F	5'-TAAAATTCTGAACTGTATCCGTACTCTTCG-3' (For substitution of Asn10Cys in H-NS)	This study
hns N10C-R	5'-CGAAGAGTACGGATACAGTTCAGAATTTTA-3' (For substitution of Asn10Cys in H-NS)	This study
hns I11C-F	5'-AATTCTGAACAACACTGTCGTA CTCTTCGTGC-3' (For substitution of Ile11Cys in H-NS)	This study
hns I11C-R	5'-GCACGAAGAGTACGACAGTTGTTTCAGAATT-3' (For substitution of Ile11Cys in H-NS)	This study
hns R12C-F	5'-TCTGAACAACATCTGTACTCTTCGTGCGCA-3' (For substitution of Arg12Cys in H-NS)	This study
hns R12C-R	5'-TGCGCACGAAGAGTACAGATGTTGTTTCAGA-3' (For substitution of Arg12Cys in H-NS)	This study
hns T13C-F	5'-GAACAACATCCGTTGTCTTCGTGCGCAGGC-3' (For substitution of Thr13Cys in H-NS)	This study
hns T13C-R	5'-GCCTGCGCACGAAGACAACGGATGTTGTTTC-3' (For substitution of Thr13Cys in H-NS)	This study

hns L14C-F	5'-CAACATCCGTACTTGTTCGTGCGCAGGCAAG-3'(For substitution of Leu14Cys in H-NS)	This study
hns L14C-R	5'-CTTGCCTGCGCACGACAAGTACGGATGTTG-3'(For substitution of Leu14Cys in H-NS)	This study
hns R15C-F_2	5'-CATCCGTACTCTTTGTGCGCAGGCAAGAGA-3'(For substitution of Arg15Cys in H-NS)	This study
hns R15C-R_2	5'-TCTCTTGCCTGCGCACAAAGAGTACGGATG-3'(For substitution of Arg15Cys in H-NS)	This study
hns A16C-F_2	5'-CCGTACTCTTCGTTGTCAGGCAAGAGAATC-3'(For substitution of Ala16Cys in H-NS)	This study
hns A16C-R_2	5'-GATTCTCTTGCCTGACAACGAAGAGTACGG-3'(For substitution of Ala16Cys in H-NS)	This study
hns Q17C-F_2	5'-TACTCTTCGTGCGTGTGCAAGAGAATCTAC-3'(For substitution of Gln17Cys in H-NS)	This study
hns Q17C-R_2	5'-GTAGATTCTCTTGCACACGCACGAAGAGTA-3'(For substitution of Gln17Cys in H-NS)	This study
hns A18C-F_2	5'-TCTTCGTGCGCAGTGTAGAGAATCTACACT-3'(For substitution of Ala18Cys in H-NS)	This study
hns A18C-R_2	5'-AGTGTAGATTCTTACACTGCGCACGAAGA-3'(For substitution of Ala18Cys in H-NS)	This study
hns R19C-F_2	5'-TCGTGCGCAGGCATGTGAATCTACACTTGA-3'(For substitution of Arg19Cys in H-NS)	This study
hns R19C-R_2	5'-TCAAGTGTAGATTCACATGCCTGCGCACGA-3'(For substitution of Arg19Cys in H-NS)	This study
hns E20C-F_2	5'-TGCGCAGGCAAGATGTTCTACACTTGAAAC-3'(For substitution of Glu20Cys in H-NS)	This study
hns E20C-R_2	5'-GTTTCAAGTGTAGAACATCTTGCCTGCGCA-3'(For substitution of Glu20Cys in H-NS)	This study
hns T22C-F_2	5'-GGCAAGAGAATCTTGTCTTGAAACGCTGGA-3'(For substitution of Thr22Cys in H-NS)	This study
hns T22C-R_2	5'-TCCAGCGTTTCAAGACAAGATTCTCTTGCC-3'(For substitution of Thr22Cys in H-NS)	This study
hns L23C-F_2	5'-AAGAGAATCTACATGTGAAACGCTGGAAG-3'A(For substitution of Leu23Cys in H-NS)	This study
hns L23C-R_2	5'-TCTTCCAGCGTTTACATGTAGATTCTCTT-3'(For substitution of Leu23Cys in H-NS)	This study
hns E24C-F_2	5'-AGAATCTACACTTTGTACGCTGGAAGAAAT-3'(For substitution of Glu24Cys in H-NS)	This study
hns E24C-R_2	5'-ATTTCTTCCAGCGTACAAAGTGTAGATTCT-3'(For substitution of Glu24Cys in H-NS)	This study
hns T25C-F_2	5'-ATCTACACTTGAATGTCTGGAAGAAATGCT-3'(For substitution of Thr25Cys in H-NS)	This study
hns T25C-R_2	5'-AGCATTTCTTCCAGACATTCAAGTGTAGAT-3'(For substitution of Thr25Cys in H-NS)	This study
hns L26C-F	5'-TACACTTGAAACGTGTGAAGAAATGCTGGA-3'(For substitution of Leu26Cys in H-NS)	This study
hns L26C-R	5'-TCCAGCATTTCTTACACGTTTCAAGTGTA-3'(For substitution of Leu26Cys in H-NS)	This study
hns E27C-F	5'-ACTTGAAACGCTGTGTGAAATGCTGGAAA-3'(For substitution of Glu27Cys in H-NS)	This study
hns E27C-R	5'-TTTTCCAGCATTTACACAGCGTTTCAAGT-3'(For substitution of Glu27Cys in H-NS)	This study

hns E28C-F	5'-TGAAACGCTGGAATGTATGCTGGAAAAATT-3'(For substitution of Glu28Cys in H-NS)	This study
hns E28C-R	5'-AATTTTTCCAGCATACATTCCAGCGTTTCA-3'(For substitution of Glu28Cys in H-NS)	This study
hns M29C-F	5'-AACGCTGGAAGAATGTCTGGAAAAATTAGA-3'(For substitution of Met29Cys in H-NS)	This study
hns M29C-R	5'-TCTAATTTTTCCAGACATTCTTCCAGCGTT-3'(For substitution of Met29Cys in H-NS)	This study
hns L30C-F	5'-GCTGGAAGAAATGTGTGAAAAATTAGAAG-3'T(For substitution of Leu30Cys in H-NS)	This study
hns L30C-R	5'-ACTTCTAATTTTTCACACATTTCTTCCAGC-3'(For substitution of Leu30Cys in H-NS)	This study
hns E31C-F	5'-GGAAGAAATGCTGTGTAAATTAGAAGTTGT-3'(For substitution of Glu31Cys in H-NS)	This study
hns E31C-R	5'-ACAACCTTCTAATTTACACAGCATTCTTCC-3'(For substitution of Glu31Cys in H-NS)	This study
hns K32C-F	5'-AGAAATGCTGGAATGTTTAGAAGTTGTTGT-3'(For substitution of Lys32Cys in H-NS)	This study
hns K32C-R	5'-ACAACAACCTTCTAAACATTCCAGCATTCT-3'(For substitution of Lys32Cys in H-NS)	This study
hns L33C-F	5'-AATGCTGGAAAAATGTGAAGTTGTTGTTA-3'(For substitution of Leu33Cys in H-NS)	This study
hns L33C-R	5'-TTAACAACAACCTTACATTTTTCCAGCATT-3'(For substitution of Leu33Cys in H-NS)	This study
hns E34C-F	5'-GCTGGAAAAATTATGTGTTGTTGTTAACGA-3'(For substitution of Glu34Cys in H-NS)	This study
hns E34C-R	5'-TCGTTAACAACAACACATAATTTTTCCAGC-3'(For substitution of Glu34Cys in H-NS)	This study
hns V35C-F	5'-GGAAAAATTAGAATGTGTTGTTAACGAACG-3'(For substitution of Val35Cys in H-NS)	This study
hns V35C-R	5'-CGTTCGTTAACAACACATTCTAATTTTTCC-3'(For substitution of Val35Cys in H-NS)	This study
hns V36C-F	5'-AAAATTAGAAGTTTGTGTTAACGAACGT-3'(For substitution of Val36Cys in H-NS)	This study
hns V36C-R	5'-ACGTTTCGTTAACACAAACTTCTAATTTT-3'(For substitution of Val36Cys in H-NS)	This study
hns V37C-F	5'-ATTAGAAGTTGTTTGTAAACGAACGTCGCGA-3'(For substitution of Val37ys in H-NS)	This study
hns V37C-R	5'-TCGCGACGTTTCGTTACAAACAACCTTCTAAT-3'(For substitution of Val37Cys in H-NS)	This study
hns N38C-F	5'-AGAAGTTGTTGTTTGTGAACGTCGCGAAGA-3'(For substitution of Asn38Cys in H-NS)	This study
hns N38C-R	5'-TCTTCGCGACGTTTCAACAACAACCTTCT-3'(For substitution of Asn38Cys in H-NS)	This study
hns E39C-F	5'-TTGTTGTTAACTGTCGTCGCGAAGAAGA-3'(For substitution of Glu39Cys in H-NS)	This study
hns E39C-R	5'-TCTTCTTCGCGACGACAGTTAACAACAA-3'(For substitution of Glu39Cys in H-NS)	This study
hns R40C-F	5'-TGTTGTTAACGAATGTTCGCGAAGAAGAAAG-3'(For substitution of Arg40Cys in H-NS)	This study
hns R40C-R2	5'-CTTTCTTCTTCGCGACATTCGTTAACAACA-3'(For substitution of Arg40Cys in H-NS)	This study

hns R41C-F	5'-TGTTAACGAACGTTGTGAAGAAGAAAGCG-3'(For substitution of Arg41Cys in H-NS)	This study
hns R41C-R	5'-GCGCTTTCTTCTTCACAACGTTTCGTAAACA-3'(For substitution of Arg41Cys in H-NS)	This study
hns E42C-F	5'-TAACGAACGTCGCTGTGAAGAAGCGCGGC-3'(For substitution of Glu42Cys in H-NS)	This study
hns E42C-R	5'-GCCGCGCTTTCTTCACAGCGACGTTTCGTAA-3'(For substitution of Glu42Cys in H-NS)	This study
hns E43C-F	5'-CGAACGTCGCGAATGTGAAAGCGCGGCTGC-3'(For substitution of Glu43Cys in H-NS)	This study
hns E43C-R	5'-GCAGCCGCGCTTTCACATTCGCGACGTTTCG-3'(For substitution of Glu43Cys in H-NS)	This study
hns E44C-F	5'-AACGTCGCGAAGAATGTAGCGCGGCTGCTGC-3'(For substitution of Glu44Cys in H-NS)	This study
hns E44C-R	5'-GCAGCAGCCGCGCTACATTCTTCGCGACGTT-3'(For substitution of Glu44Cys in H-NS)	This study
hns S45C-F	5'-TCGCGAAGAAGAATGTGCGGCTGCTGCTGA-3'(For substitution of Ser45Cys in H-NS)	This study
hns S45C-R	5'-TCAGCAGCAGCCGCACATTCTTCTTCGCGA-3'(For substitution of Ser45Cys in H-NS)	This study
hns A46C-F	5'-CGAAGAAGAAAGCTGTGCTGCTGCTGAAGT-3'(For substitution of Ala46Cys in H-NS)	This study
hns A46C-R	5'-ACTTCAGCAGCAGCACAGCTTCTTCTTCG-3'(For substitution of Ala46Cys in H-NS)	This study
hns A47C-F2	5'-AGAAGAAGCGCGTGTGCTGCTGAAGTTG-3'(For substitution of Ala47Cys in H-NS)	This study
hns A47C-R	5'-CAACTTCAGCAGCACACGCGCTTCTTCT-3'(For substitution of Ala47Cys in H-NS)	This study
hns A48C-F	5'-AGAAAGCGCGGCTTGTGCTGAAGTTGAAGA-3'(For substitution of Ala48Cys in H-NS)	This study
hns A48C-R	5'-TCTTCAACTTCAGCACAAGCCGCGCTTCT-3'(For substitution of Ala48Cys in H-NS)	This study
hns A49C-F	5'-AAGCGCGGCTGCTTGTGAAGTTGAAGAG-3'(For substitution of Ala49Cys in H-NS)	This study
hns A49C-R	5'-CTCTTCAACTTCACAAGCAGCCGCGCTT-3'(For substitution of Ala49Cys in H-NS)	This study
hns E50C-F	5'-CGCGGCTGCTGCTTGTGTTGAAGAGCGCAC-3'(For substitution of Glu50Cys in H-NS)	This study
hns E50C-R	5'-GTGCGCTCTTCAACACAAGCAGCAGCCGCG-3'(For substitution of Glu50Cys in H-NS)	This study
hns V51C-F	5'-GGCTGCTGCTGAATGTGAAGAGCGCACTCG-3'(For substitution of Val51Cys in H-NS)	This study
hns V51C-R	5'-CGAGTGCGCTCTTCACATTCAGCAGCAGCC-3'(For substitution of Val51Cys in H-NS)	This study
hns E52C-F	5'-TGCTGCTGAAGTTTGTGAGCGCACTCGTAA-3'(For substitution of Glu52Cys in H-NS)	This study
hns E52C-R	5'-TTACGAGTGCGCTCACAACTTCAGCAGCA-3'(For substitution of Glu52Cys in H-NS)	This study
hns E53C-F	5'-TGCTGAAGTTGAATGTGCACTCGTAACT-3'(For substitution of Glu53Cys in H-NS)	This study
hns E53C-R	5'-AGTTTACGAGTGCGACATTCAACTTCAGCA-3'(For substitution of Glu53Cys in H-NS)	This study

hns R54C-F	5'-TGAAGTTGAAGAGTGTACTCGTAAACTGCA-3'(For substitution of Arg54Cys in H-NS)	This study
hns R54C-R	5'-TGCAGTTTACGAGTACACTCTTCAACTTCA-3'(For substitution of Arg54Cys in H-NS)	This study
hns T55C-F	5'-AGTTGAAGAGCGCTGTCGTAAACTGCAGCA-3'(For substitution of Thr55Cys in H-NS)	This study
hns T55C-R	5'-TGCTGCAGTTTACGACAGCGCTCTTCAACT-3'(For substitution of Thr55Cys in H-NS)	This study
hns R56C-F	5'-TGAAGAGCGCACTTGTAAACTGCAGCAATA-3'(For substitution of Arg56Cys in H-NS)	This study
hns R56C-R	5'-TATTGCTGCAGTTTACAAGTGCCTCTTCA-3'(For substitution of Arg56Cys in H-NS)	This study
hns K57C-F	5'-AGAGCGCACTCGTTGTCTGCAGCAATATCG-3'(For substitution of Lys57Cys in H-NS)	This study
hns K57C-R	5'-CGATATTGCTGCAGACAACGAGTGCCTCT-3'(For substitution of Lys57Cys in H-NS)	This study
hns L58C-F	5'-GCGCACTCGTAAATGTCAGCAATATCGCGA-3'(For substitution of Leu58Cys in H-NS)	This study
hns L58C-R	5'-TCGCGATATTGCTGACATTTACGAGTGCGC-3'(For substitution of Leu58Cys in H-NS)	This study
hns Q59C-F	5'-CACTCGTAAACTGTGTCAATATCGCGAAAT-3'(For substitution of Gln59Cys in H-NS)	This study
hns Q59C-R	5'-ATTCGCGATATTGACACAGTTTACGAGTG-3'(For substitution of Gln59Cys in H-NS)	This study
hns Q60C-F	5'-TCGTAAACTGCAGTGTTATCGCGAAATGCT-3'(For substitution of Gln60Cys in H-NS)	This study
hns Q60C-R	5'-AGCATTTTCGCGATAACACTGCAGTTTACGA-3'(For substitution of Gln60Cys in H-NS)	This study
hns Y61C-F	5'-TAAACTGCAGCAATGTCGCGAAATGCTGAT-3'(For substitution of Tyr61Cys in H-NS)	This study
hns Y61C-R	5'-ATCAGCATTTTCGCGACATTGCTGCAGTTTA-3'(For substitution of Tyr61Cys in H-NS)	This study
hns R62C-F	5'-ACTGCAGCAATATTGTGAAATGCTGATCGC-3'(For substitution of Arg62Cys in H-NS)	This study
hns R62C-R	5'-GCGATCAGCATTTTACAATATTGCTGCAGT-3'(For substitution of Arg62Cys in H-NS)	This study
hns E63C-F	5'-GCAGCAATATCGCTGTATGCTGATCGCTGA-3'(For substitution of Glu63Cys in H-NS)	This study
hns E63C-R	5'-TCAGCGATCAGCATAACAGCGATATTGCTGC-3'(For substitution of Glu63Cys in H-NS)	This study
hns M64C-F	5'-GCAATATCGCGAATGTCTGATCGCTGACGG-3'(For substitution of Met64Cys in H-NS)	This study
hns M64C-R	5'-CCGTCAGCGATCAGACATTTCGCGATATTGC-3'(For substitution of Met64Cys in H-NS)	This study
hns L65C-F	5'-ATATCGCGAAATGTGTATCGCTGACGGTAT-3'(For substitution of Leu65Cys in H-NS)	This study
hns L65C-R	5'-ATACCGTCAGCGATAACACATTTTCGCGATAT-3'(For substitution of Leu65Cys in H-NS)	This study
hns I66C-F	5'-TCGCGAAATGCTGTGTGCTGACGGTATTGA-3'(For substitution of Ile66Cys in H-NS)	This study
hns I66C-R	5'-TCAATACCGTCAGCACACAGCATTTTCGCGA-3'(For substitution of Ile66Cys in H-NS)	This study

hns A67C-F	5'-CGAAATGCTGATCTGTGACGGTATTGACCC-3'(For substitution of Ala67Cys in H-NS)	This study
hns A67C-R	5'-GGGTCAATACCGTCACAGATCAGCATTTTCG-3'(For substitution of Ala67Cys in H-NS)	This study
hns D68C-F	5'-AATGCTGATCGCTTGTGGTATTGACCCGAA-3'(For substitution of Asp68Cys in H-NS)	This study
hns D68C-R	5'-TTCGGGTCAATACCACAAGCGATCAGCATT-3'(For substitution of Asp68Cys in H-NS)	This study
hns G69C-F	5'-GCTGATCGCTGACTGTATTGACCCGAACGA-3'(For substitution of Gly69Cys in H-NS)	This study
hns G69C-R	5'-TCGTTTCGGGTCAATACAGTCAGCGATCAGC-3'(For substitution of Gly69Cys in H-NS)	This study
hns I70C-F	5'-GATCGCTGACGGTTGTGACCCGAACGAACT-3'(For substitution of Ile70Cys in H-NS)	This study
hns I70C-R	5'-AGTTCGTTTCGGGTCACAACCGTCAGCGATC-3'(For substitution of Ile70Cys in H-NS)	This study
hns D71C-F	5'-CGCTGACGGTATTTGTCCGAACGAACTGCT-3'(For substitution of Asp71Cys in H-NS)	This study
hns D71C-R	5'-AGCAGTTCGTTTCGGACAAATACCGTCAGCG-3'(For substitution of Asp71Cys in H-NS)	This study
hns P72C-F	5'-TGACGGTATTGACTGTAACGAACTGCTGAA-3'(For substitution of Pro72Cys in H-NS)	This study
hns P72C-R	5'-TTCAGCAGTTCGTTACAGTCAATACCGTCA-3'(For substitution of Pro72Cys in H-NS)	This study
hns N73C-F	5'-CGGTATTGACCCGTGTGAACTGCTGAATAG-3'(For substitution of Asn73Cys in H-NS)	This study
hns N73C-R	5'-CTATTCAGCAGTTCACACGGGTCAATACCG-3'(For substitution of Asn73Cys in H-NS)	This study
hns E74C-F	5'-TATTGACCCGAACTGTCTGCTGAATAGCCT-3'(For substitution of Glu74Cys in H-NS)	This study
hns E74C-R	5'-AGGCTATTCAGCAGACAGTTCGGGTCAATA-3'(For substitution of Glu74Cys in H-NS)	This study
hns L75C-F	5'-TGACCCGAACGAATGTCTGAATAGCCTTGC-3'(For substitution of Leu75Cys in H-NS)	This study
hns L75C-R	5'-GCAAGGCTATTCAGACATTCGTTTCGGGTCA-3'(For substitution of Leu75Cys in H-NS)	This study
hns L76C-F	5'-CCCGAACGAACTGTGTAATAGCCTTGCTGC-3'(For substitution of Leu76Cys in H-NS)	This study
hns L76C-R	5'-GCAGCAAGGCTATTACACAGTTCGTTTCGGG-3'(For substitution of Leu76Cys in H-NS)	This study
hns N77C-F	5'-GAACGAACTGCTGTGTAGCCTTGCTGCCGT-3'(For substitution of Asn77Cys in H-NS)	This study
hns N77C-R	5'-ACGGCAGCAAGGCTACACAGCAGTTCGTTTC-3'(For substitution of Asn77Cys in H-NS)	This study
hns S78C-F	5'-CGAACTGCTGAATTGTCTTGCTGCCGTAA-3'(For substitution of Ser78Cys in H-NS)	This study
hns S78C-R	5'-TTAACGGCAGCAAGACAATTCAGCAGTTCG-3'(For substitution of Ser78Cys in H-NS)	This study
hns L79C-F	5'-ACTGCTGAATAGCTGTGCTGCCGTAAATC-3'(For substitution of Leu79Cys in H-NS)	This study
hns L79C-R	5'-GATTTAACGGCAGCACAGCTATTCAGCAGT-3'(For substitution of Leu79Cys in H-NS)	This study

hns A80C-F	5'-GCTGAATAGCCTTTGTGCCGTAAATCTGG-3'(For substitution of Ala80Cys in H-NS)	This study
hns A80C-R	5'-CCAGATTTAACGGCACAAAGGCTATTCAGC-3'(For substitution of Ala80Cys in H-NS)	This study
hns A81C-F	5'-GAATAGCCTTGCTTGTGTAAATCTGGCAC-3'(For substitution of Ala81Cys in H-NS)	This study
hns A81C-R	5'-GTGCCAGATTTAACACAAGCAAGGCTATTC-3'(For substitution of Ala81Cys in H-NS)	This study
hns V82C-F	5'-TAGCCTTGCTGCCTGTAAATCTGGCACCAA-3'(For substitution of Val82Cys in H-NS)	This study
hns V82C-R	5'-TTGGTGCCAGATTTACAGGCAGCAAGGCTA-3'(For substitution of Val82Cys in H-NS)	This study
hns K83C-F	5'-CCTTGCTGCCGTTTGTCTGGCACCAAAGC-3'(For substitution of Lys83Cys in H-NS)	This study
hns K83C-R	5'-GCTTTGGTGCCAGAACAACGGCAGCAAGG-3'(For substitution of Lys83Cys in H-NS)	This study
hns S84C-F	5'-TGCTGCCGTTAAATGTGGCACCAAAGCTAA-3'(For substitution of Ser84Cys in H-NS)	This study
hns S84C-R	5'-TTAGCTTTGGTGCCACATTTAACGGCAGCA-3'(For substitution of Ser84Cys in H-NS)	This study
hns G85C-F	5'-TGCCGTTAAATCTTGTACCAAAGCTAAACG-3'(For substitution of Gly85Cys in H-NS)	This study
hns G85C-R	5'-CGTTTAGCTTTGGTACAAGATTTAACGGCA-3'(For substitution of Gly85Cys in H-NS)	This study
hns T86C-F	5'-CGTTAAATCTGGCTGTAAAGCTAAACGTGC-3'(For substitution of Thr86Cys in H-NS)	This study
hns T86C-R	5'-GCACGTTTAGCTTTACAGCCAGATTTAACG-3'(For substitution of Thr86Cys in H-NS)	This study
hns K87C-F	5'-TAAATCTGGCACCTGTGCTAAACGTGCTCA-3'(For substitution of Lys87Cys in H-NS)	This study
hns K87C-R	5'-TGAGCACGTTTAGCACAGGTGCCAGATTTA-3'(For substitution of Lys87Cys in H-NS)	This study
hns A88C-F	5'-ATCTGGCACCAAATGTAAACGTGCTCAGCG-3'(For substitution of Ala88Cys in H-NS)	This study
hns A88C-R	5'-CGCTGAGCACGTTTACATTTGGTGCCAGAT-3'(For substitution of Ala88Cys in H-NS)	This study
hns K89C-F	5'-TGGCACCAAAGCTTGTCGTGCTCAGCGTCC-3'(For substitution of Lys89Cys in H-NS)	This study
hns K89C-R	5'-GGACGCTGAGCACGACAAGCTTTGGTGCCA-3'(For substitution of Lys89Cys in H-NS)	This study
hns R90C-F	5'-CACCAAAGCTAAATGTGCTCAGCGTCCGGC-3'(For substitution of Arg90Cys in H-NS)	This study
hns R90C-R	5'-GCCGGACGCTGAGCACATTTAGCTTTGGTG-3'(For substitution of Arg90Cys in H-NS)	This study
hns A91C-F	5'-CAAAGCTAAACGTTGTCAGCGTCCGGCAA-3'(For substitution of Ala91Cys in H-NS)	This study
hns A91C-R	5'-TTTGCCGGACGCTGACAACGTTTAGCTTTG-3'(For substitution of Ala91Cys in H-NS)	This study
hns Q92C-F	5'-AGCTAAACGTGCTTGTCTCGTCCGGCAAATA-3'(For substitution of Gln92Cys in H-NS)	This study
hns Q92C-R	5'-TATTTTGCCGGACGACAAGCACGTTTAGCT-3'(For substitution of Gln92Cys in H-NS)	This study

hns R93C-F	5'-TAAACGTGCTCAGTGTCCGGCAAATATAG-3'(For substitution of Arg93Cys in H-NS)	This study
hns R93C-R	5'-CTATATTTTGCCGGACACTGAGCACGTTTA-3'(For substitution of Arg93Cys in H-NS)	This study
hns P94C-F	5'-ACGTGCTCAGCGTTGTGCAAATATAGCTA-3'(For substitution of Pro94Cys in H-NS)	This study
hns P94C-R	5'-TAGCTATATTTTGCACAACGCTGAGCACGT-3'(For substitution of Pro94Cys in H-NS)	This study
hns A95C-F	5'-TGCTCAGCGTCCGTGTAAATATAGCTACGT-3'(For substitution of Ala95Cys in H-NS)	This study
hns A95C-R	5'-ACGTAGCTATATTTACACGGACGCTGAGCA-3'(For substitution of Ala95Cys in H-NS)	This study
hns K96C-F	5'-TCAGCGTCCGGCATGTTATAGCTACGTTGA-3'(For substitution of Lys96Cys in H-NS)	This study
hns K96C-R	5'-TCAACGTAGCTATAACATGCCGGACGCTGA-3'(For substitution of Lys96Cys in H-NS)	This study
hns Y97C-F	5'-GCGTCCGGCAAATGTAGCTACGTTGACGA-3'(For substitution of Tyr97Cys in H-NS)	This study
hns Y97C-R	5'-TCGTCAACGTAGCTACATTTTGCCGGACGC-3'(For substitution of Tyr97Cys in H-NS)	This study
hns S98C-F	5'-TCCGGCAAATATTGTTACGTTGACGAAA-3'(For substitution of Ser98Cys in H-NS)	This study
hns S98C-R	5'-TTTTCGTCAACGTAACAATTTTGCCGGA-3'(For substitution of Ser98Cys in H-NS)	This study
hns Y99C-F	5'-GGCAAATATAGCTGTGTTGACGAAAACGG-3'(For substitution of Tyr99Cys in H-NS)	This study
hns Y99C-R	5'-CCGTTTTCGTCAACACAGCTATATTTTGCC-3'(For substitution of Tyr99Cys in H-NS)	This study
hns V100C-F	5'-AAAATATAGCTACTGTGACGAAAACGGCGA-3'(For substitution of Val100Cys in H-NS)	This study
hns V100C-R	5'-TCGCCGTTTTCGTCACAGTAGCTATATTTT-3'(For substitution of Val100Cys in H-NS)	This study
hns D101C-F	5'-ATATAGCTACGTTTGTGAAAACGGCGAAAC-3'(For substitution of Asp101Cys in H-NS)	This study
hns D101C-R	5'-GTTTCGCCGTTTTCACAAACGTAGCTATAT-3'(For substitution of Asp101Cys in H-NS)	This study
hns E102C-F	5'-TAGCTACGTTGACTGTAACGGCGAAACTAA-3'(For substitution of Glu102Cys in H-NS)	This study
hns E102C-R	5'-TTAGTTTTCGCCGTTACAGTCAACGTAGCTA-3'(For substitution of Glu102Cys in H-NS)	This study
hns N103C-F	5'-CTACGTTGACGAATGTGGCGAAACTAAAAC-3'(For substitution of Asn103Cys in H-NS)	This study
hns N103C-R	5'-GTTTTAGTTTTCGCCACATTCGTCAACGTAG-3'(For substitution of Asn103Cys in H-NS)	This study
hns G104C-F	5'-CGTTGACGAAAACGTGAAACTAAAACCTG-3'(For substitution of Gly104Cys in H-NS)	This study
hns G104C-R	5'-CAGGTTTTAGTTTTCACAGTTTTTCGTCAACG-3'(For substitution of Gly104Cys in H-NS)	This study
hns E105C-F	5'-TGACGAAAACGGCTGTACTAAAACCTGGAC-3'(For substitution of Glu105Cys in H-NS)	This study
hns E105C-R	5'-GTCCAGGTTTTAGTACAGCCGTTTTTCGTCA-3'(For substitution of Glu105Cys in H-NS)	This study

hns T106C-F	5'-CGAAAACGGCGAATGTAAAACCTGGACTG-3'G(For substitution of Thr106Cys in H-NS)	This study
hns T106C-R	5'-CCAGTCCAGGTTTTACATTCGCCGTTTTCG-3'(For substitution of Thr106Cys in H-NS)	This study
hns K107C-F	5'-AAACGGCGAAACTTGTACCTGGACTGGCCA-3'(For substitution of Lys107Cys in H-NS)	This study
hns K107C-R	5'-TGGCCAGTCCAGGTACAAGTTTCGCCGTTT-3'(For substitution of Lys107Cys in H-NS)	This study
hns T108C-F	5'-CGGCGAAACTAAATGTTGGACTGGCCAAGG-3'(For substitution of Thr108Cys in H-NS)	This study
hns T108C-R	5'-CCTTGGCCAGTCCAACATTTAGTTTCGCCG-3'(For substitution of Thr108Cys in H-NS)	This study
hns W109C-F	5'-CGAAACTAAAACCTGTACTGGCCAAGGCCG-3'(For substitution of Trp109Cys in H-NS)	This study
hns W109C-R	5'-CGGCCTTGGCCAGTACAGGTTTTAGTTTCG-3'(For substitution of Trp109Cys in H-NS)	This study
hns T110C-F	5'-AACTAAAACCTGGTGTGGCCAAGGCCGTAC-3'(For substitution of Thr110Cys in H-NS)	This study
hns T110C-R	5'-GTACGGCCTTGGCCACACCAGGTTTTAGTT-3'(For substitution of Thr110Cys in H-NS)	This study
hns G111C-F	5'-TAAAACCTGGACTTGTC AAGGCCGTACTCC-3'(For substitution of Gly111Cys in H-NS)	This study
hns G111C-R	5'-GGAGTACGGCCTTGACAAGTCCAGGTTTTA-3'(For substitution of Gly111Cys in H-NS)	This study
hns Q112C-F	5'-AACCTGGACTGGCTGTGGCCGTACTCCAGC-3'(For substitution of Gln112Cys in H-NS)	This study
hns Q112C-R	5'-GCTGGAGTACGGCCACAGCCAGTCCAGGTT-3'(For substitution of Gln112Cys in H-NS)	This study
hns G113C-F	5'-CTGGACTGGCCAATGTCGTA CTCCAGCTGT-3'(For substitution of Gly113Cys in H-NS)	This study
hns G113C-R	5'-ACAGCTGGAGTACGACATTGGCCAGTCCAG-3'(For substitution of Gly113Cys in H-NS)	This study
hns R114C-F	5'-GACTGGCCAAGGCTGTACTCCAGCTGTAAT-3'(For substitution of Arg114Cys in H-NS)	This study
hns R114C-R	5'-ATTACAGCTGGAGTACAGCCTTGGCCAGTC-3'(For substitution of Arg114Cys in H-NS)	This study
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hns T115C-R	5'-TTGATTACAGCTGGACAACGGCCTTGGCCA-3'(For substitution of Thr115Cys in H-NS)	This study
hns P116C-F	5'-CCAAGGCCGTACTTGTGCTGTAATCAAAA-3'(For substitution of Pro116Cys in H-NS)	This study
hns P116C-R	5'-TTTTTGATTACAGCACAAGTACGGCCTTGG-3'(For substitution of Pro116Cys in H-NS)	This study
hns A117C-F	5'-AGGCCGTACTCCATGTGTAATCAAAAAGC-3'(For substitution of Ala117Cys in H-NS)	This study
hns A117C-R	5'-GCTTTTTTGATTACACATGGAGTACGGCCT-3'(For substitution of Ala117Cys in H-NS)	This study
hns V118C-F	5'-CCGTACTCCAGCTTGTATCAAAAAGCAAT-3'(For substitution of Val118Cys in H-NS)	This study
hns V118C-R	5'-ATTGCTTTTTTGATACAAGCTGGAGTACGG-3'(For substitution of Val118Cys in H-NS)	This study

hns I119C-F	5'-TACTCCAGCTGTATGTAAAAAAGCAATGGA-3'(For substitution of Ile119Cys in H-NS)	This study
hns I119C-R	5'-TCCATTGCTTTTTTACATACAGCTGGAGTA-3'(For substitution of Ile119Cys in H-NS)	This study
hns K120C-F	5'-TCCAGCTGTAATCTGTAAAGCAATGGATGA-3'(For substitution of Lys120Cys in H-NS)	This study
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hns K121C-F	5'-AGCTGTAATCAAATGTGCAATGGATGAGCA-3'(For substitution of Lys121Cys in H-NS)	This study
hns K121C-R	5'-TGCTCATCCATTGCACATTTGATTACAGCT-3'(For substitution of Lys121Cys in H-NS)	This study
hns A122C-F	5'-TGTAATCAAAAAATGTATGGATGAGCAAGG-3'(For substitution of Ala122Cys in H-NS)	This study
hns A122C-R	5'-CCTTGCTCATCCATACATTTTTTTGATTACA-3'(For substitution of Ala122Cys in H-NS)	This study
hns M123C-F	5'-AATCAAAAAAGCATGTGATGAGCAAGGTAA-3'(For substitution of Met123Cys in H-NS)	This study
hns M123C-R	5'-TTACCTTGCTCATCACATGCTTTTTTTGATT-3'(For substitution of Met123Cys in H-NS)	This study
hns D124C-F	5'-CAAAAAAGCAATGTGTGAGCAAGGTAAATC-3'(For substitution of Asp124Cys in H-NS)	This study
hns D124C-R	5'-GATTTACCTTGCTCACACATTGCTTTTTTG-3'(For substitution of Asp124Cys in H-NS)	This study
hns E125C-F	5'-AAAAGCAATGGATTGTCAAGGTAAATCCCT-3'(For substitution of Glu125Cys in H-NS)	This study
hns E125C-R	5'-AGGGATTTACCTTGACAATCCATTGCTTTT-3'(For substitution of Glu125Cys in H-NS)	This study
hns Q126C-F	5'-AGCAATGGATGAGTGTGGTAAATCCCTCGA-3'(For substitution of Gln126Cys in H-NS)	This study
hns Q126C-R	5'-TCGAGGGATTTACCACACTCATCCATTGCT-3'(For substitution of Gln126Cys in H-NS)	This study
hns G127C-F	5'-AATGGATGAGCAATGTAAATCCCTCGACGA-3'(For substitution of Gly127Cys in H-NS)	This study
hns G127C-R	5'-TCGTTCGAGGGATTTACATTGCTCATCCATT-3'(For substitution of Gly127Cys in H-NS)	This study
hns K128C-F	5'-GGATGAGCAAGGTTGTTCCCTCGACGATTT-3'(For substitution of Lys128Cys in H-NS)	This study
hns K128C-R	5'-AAATCGTCGAGGGAACAACCTTGCTCATCC-3'(For substitution of Lys128Cys in H-NS)	This study
hns S129C-F	5'-TGAGCAAGGTAAATGTCTCGACGATTTCCCT-3'(For substitution of Ser129Cys in H-NS)	This study
hns S129C-R	5'-AGGAAATCGTCGAGACATTTACCTTGCTCA-3'(For substitution of Ser129Cys in H-NS)	This study
hns L130C-F	5'-GCAAGGTAAATCCTGTGACGATTTCCCTGAT-3'(For substitution of Leu130Cys in H-NS)	This study
hns L130C-R	5'-ATCAGGAAATCGTCACAGGATTTACCTTGC-3'(For substitution of Leu130Cys in H-NS)	This study
hns D131C-F	5'-AGGTAAATCCCTCTGTGATTTCCCTGATCAA-3'(For substitution of Asp131Cys in H-NS)	This study
hns D131C-R	5'-TTGATCAGGAAATCACAGAGGGATTTACCT-3'(For substitution of Asp131Cys in H-NS)	This study

hns D132C-F	5'-TAAATCCCTCGACTGTTTCCTGATCAAGCA-3'(For substitution of Asp132Cys in H-NS)	This study
hns D132C-R	5'-TGCTTGATCAGGAAACAGTCGAGGGATTTA-3'(For substitution of Asp132Cys in H-NS)	This study
hns F133C-F	5'-ATCCCTCGACGATTGTCTGATCAAGCAATA-3'(For substitution of Phe133Cys in H-NS)	This study
hns F133C-R	5'-TATTGCTTGATCAGACAATCGTCGAGGGAT-3'(For substitution of Phe133Cys in H-NS)	This study
hns L134C-F	5'-CCTCGACGATTTCTGTATCAAGCAATAAGT-3'(For substitution of Leu134Cys in H-NS)	This study
hns L134C-R	5'-ACTTATTGCTTGATACAGAAATCGTCGAGG-3'(For substitution of Leu134Cys in H-NS)	This study
hns I135C-F	5'-CGACGATTCCTGTGTAAGCAATAAGTCGA-3'(For substitution of Ile135Cys in H-NS)	This study
hns I135C-R	5'-TCGACTTATTGCTTACACAGGAAATCGTCG-3'(For substitution of Ile135Cys in H-NS)	This study
hns K136C-F	5'-CGATTCCTGATCTGTCAATAAGTCGACCT-3'(For substitution of Lys136Cys in H-NS)	This study
hns K136C-R	5'-AGGTCGACTTATTGACAGATCAGGAAATCG-3'(For substitution of Lys136Cys in H-NS)	This study
hns Q137C-F	5'-TTTCCTGATCAAGTGTTAAGTCGACCTGCA-3'(For substitution of Gln137Cys in H-NS)	This study
hns Q137C-R	5'-TGCAGGTCGACTTAACACTTGATCAGGAAA-3'(For substitution of Gln137Cys in H-NS)	This study

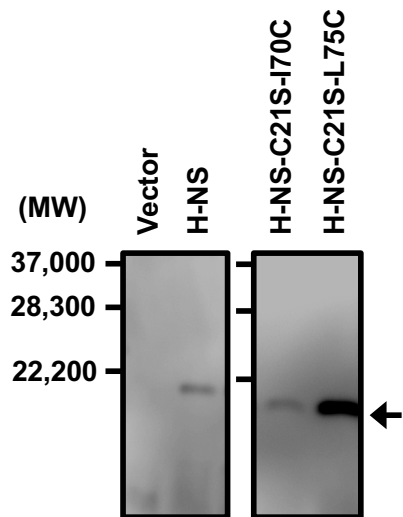
Figure legends:

FIGURE S1. Whole cell extracts were prepared from overnight cultures of Δhns strains harbouring pQE80L (vector), pQE80Lhns (H-NS), pQE80Lhns Δ C-I70C (H-NS Δ C-I70C), and pQE80Lhns Δ C-L75C (H-NS Δ C-L75C). The cell extracts were subjected to Western blotting analysis against anti-H-NS and HRP-conjugated anti-rabbit IgG (Nacalai) antibodies. Arrow indicates the detected H-NS protein.

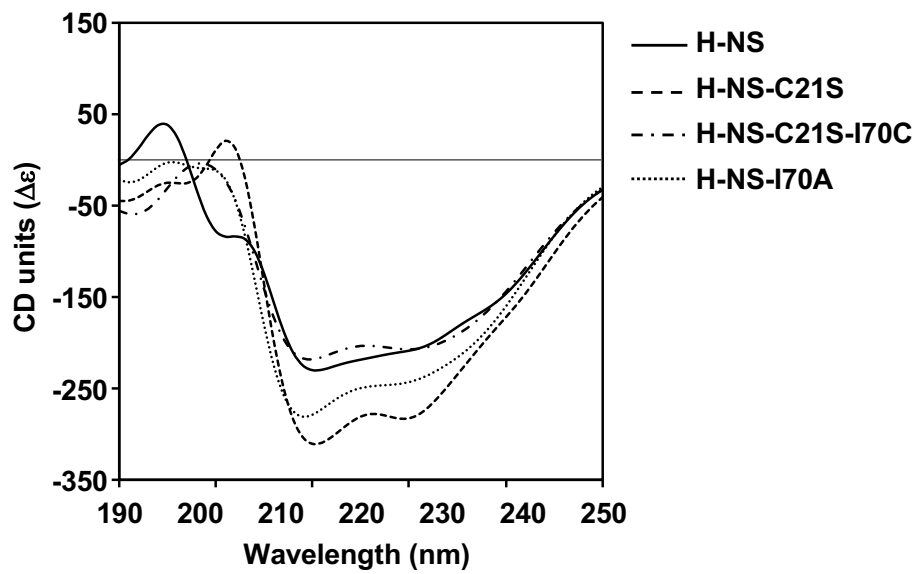
FIGURE S2. CD spectrum of H-NS in 10 mM Tris-HCl pH 7.4 and 50 mM KCl at 25°C. The CD measurements for 5 μ M H-NS, H-NS C21S, H-NS C21S I70C and H-NS I70A were carried out in a wavelength range between 190 and 250 nm.

FIGURE S3. (A) The level of H-NS-targeted promoter activity by H-NS I70A or L75A. We used the *lux* reporter system pLUXslpp. The promoter activity was calculated as described in EXPERIMENTAL PROCEDURES. (B) The level of H-NS-I70A and -L75A in cells as follow as Fig. S1.

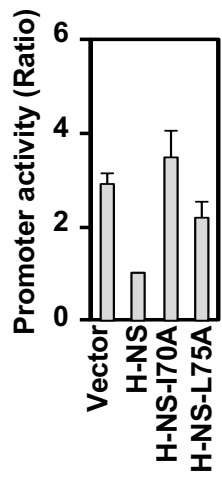
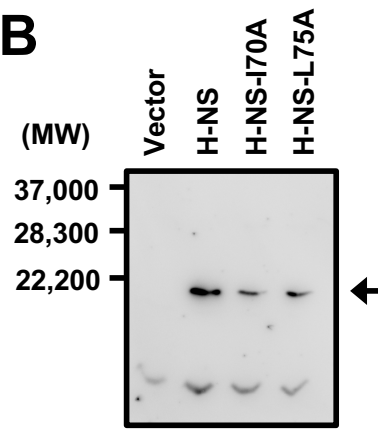
FIGURE S4. Representative SIM images of bacterial cells stained with DAPI followed as Gao et al. (2017).



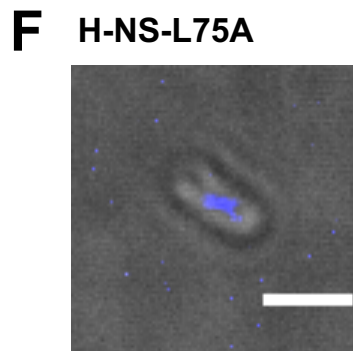
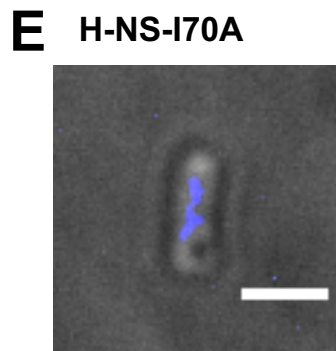
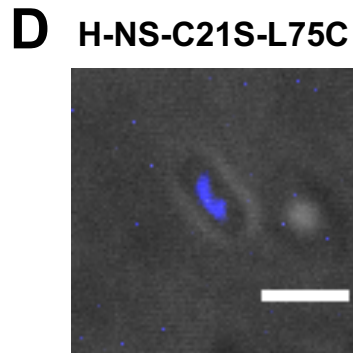
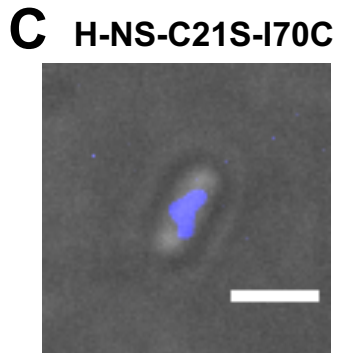
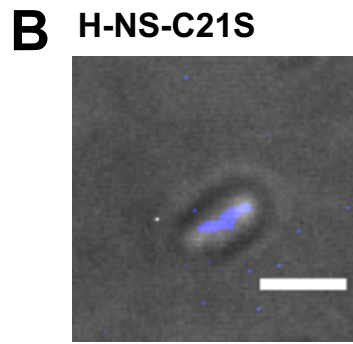
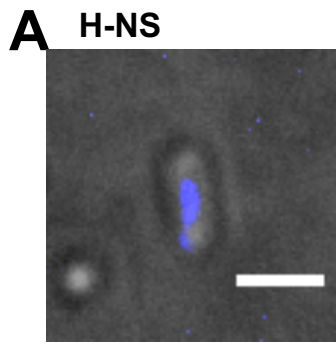
Yamanaka et al. (Supplemental Fig. S1)



Yamanaka et al. (Supplemental Fig. S2)

A**B**

Yamanaka et al. (Supplemental Fig. S3)



Yamanaka et al. (Supplemental Fig. S4)