

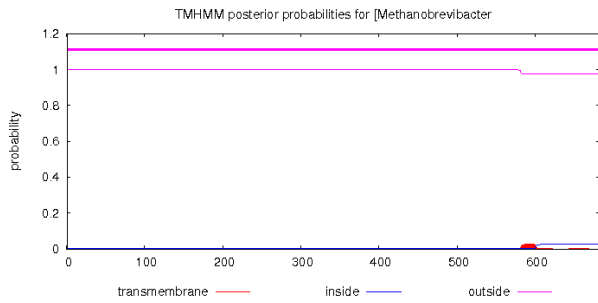
Supplementary Table 1. Percent sequence identity matrix of Lon-like and Lon proteases from *Methanobrevibacter smithii* (msm_1754 (WP_011954752) and msm_1569 (WP_011954598.1)), *Paenibacillus sanguinis* (WP_018751256.1), *Desulfosporosinus* sp. Tol-M (KGP77159.1), *Thermoanaerobacterium thermosaccharolyticum* (WP_013297045.1), *Bacillus cereus* (WP_001993072.1), *Clostridium ljungdahlii* (WP_013239896.1), *Escherichia coli* (WP_001295325.1), *Homo sapiens* (NP_004784.2), *Saccharomyces cerevisiae* (NP_009531.1), *Haloferax volcanii* (WP_004044154.1), *Thermococcus kodakarensis* (WP_011250215.1), *Thermoplasma acidophilum* (WP_010901491.1), and *Methanocaldococcus jannaschii* (AAB99427.1).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Lon-like-Ms (msm_1754) (1)	100.00	64.96	64.22	63.26	62.67	62.67	19.31	18.64	17.38	17.00	13.05	15.67	14.92	17.47
<i>P. sanguinis</i> (2)	64.96	100.00	86.59	74.70	72.19	70.71	19.00	18.68	18.84	15.86	13.94	15.16	15.38	18.73
<i>D. sp.</i> Tol-M (3)	64.22	86.59	100.00	73.52	70.12	70.56	17.71	18.47	17.93	15.03	14.12	13.95	14.97	17.30
<i>T. thermosaccharolyticum</i> (4)	63.26	74.70	73.52	100.00	81.66	83.43	20.44	20.11	19.00	17.42	13.82	14.86	15.29	18.90
<i>B. cereus</i> (5)	62.67	72.19	70.12	81.66	100.00	81.51	20.44	20.29	19.35	17.21	14.63	16.27	15.88	18.29
<i>C. ljungdahlii</i> (6)	62.67	70.71	70.56	83.43	81.51	100.00	19.89	20.11	19.35	17.62	13.62	15.46	14.71	18.29
<i>E. coli</i> (7)	19.31	19.00	17.71	20.44	20.44	19.89	100.00	36.92	37.29	19.15	21.61	21.28	19.11	22.37
<i>H. sapiens</i> (8)	18.64	18.68	18.47	20.11	20.29	20.11	36.92	100.00	44.50	18.28	21.18	19.86	19.56	20.61
<i>S. cerevisiae</i> (9)	17.38	18.84	17.93	19.00	19.35	19.35	37.29	44.50	100.00	19.50	20.44	20.34	21.39	20.82
Lon-Ms (msm_1569) (10)	17.00	15.86	15.03	17.42	17.21	17.62	19.15	18.28	19.50	100.00	50.46	53.07	35.94	57.84
<i>H. volcanii</i> (11)	13.05	13.94	14.12	13.82	14.63	13.62	21.61	21.18	20.44	50.46	100.00	53.00	34.66	55.68
<i>T. acidophilum</i> (12)	15.67	15.16	13.95	14.86	16.27	15.46	21.28	19.86	20.34	53.07	53.00	100.00	35.25	59.65
<i>M. jannaschii</i> (13)	14.92	15.38	14.97	15.29	15.88	14.71	19.11	19.56	21.39	35.94	34.66	35.25	100.00	38.69
<i>M. jannaschii</i> (14)	17.47	18.73	17.30	18.90	18.29	18.29	22.37	20.61	20.82	57.84	55.68	59.65	38.69	100.00

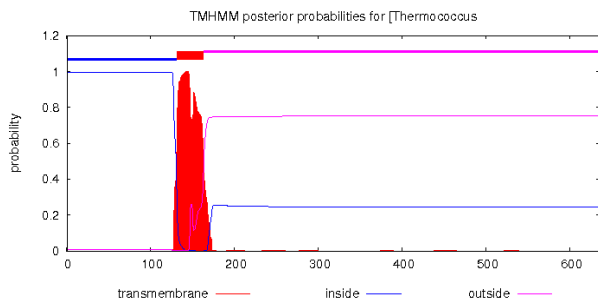
Supplementary Fig. 1

A

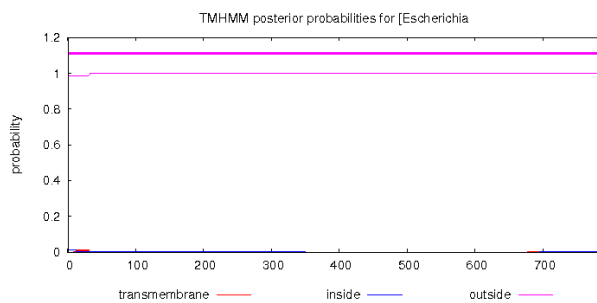
Lon-like-Ms



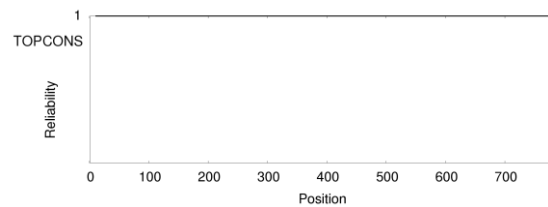
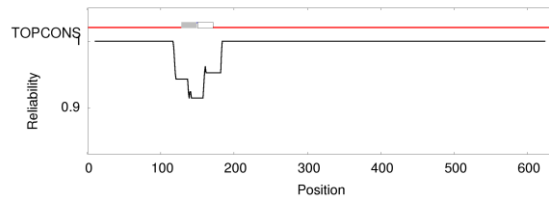
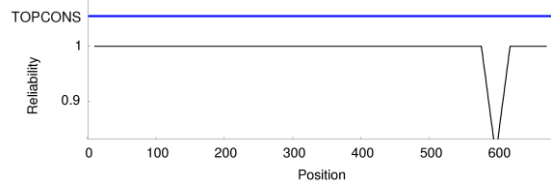
Lon-Tk



Lon-Ec



B



Supplementary Fig. 1. Transmembrane prediction of of Lon-like-Ms, Lon-Ec and Lon-Tk by TMHMM (A) and TOPCONS (B).