

Supplemental Information for:
Understanding the role of amphipathic helices in N-
BAR domain driven membrane remodeling

Haosheng Cui,[†] Carsten Mim,^{‡§} Francisco X. Vázquez,[†] Edward Lyman,[¶] Vinzenz M. Unger,^{‡§} and Gregory A. Voth[†]

[†]Department of Chemistry, Institute for Biophysical Dynamics, James Franck Institute, and Computation Institute, University of Chicago, 5735 S Ellis Ave., Chicago, IL 60637

[‡]Department of Molecular Biosciences, Northwestern University, 2205 Campus Drive, Evanston IL 60208

[§]Chemistry of Life Processes Institute, Northwestern University, 2170 Campus Drive, Evanston, IL 60208

[¶]Department of Physics and Astronomy, Department of Chemistry and Biochemistry, University of Delaware, Newark, DE 19716

SUPPLEMENTAL TEXT

Membrane liposome and H0 interactions

A multi-component lipid membrane with 1:1 DOPC:DOPS is used. This composition captures the negative surface charge density that is essential for BAR domain binding, and necessitates incorporating screened electrostatic interactions in the simulation. Charge distributions are modeled based on the charges of the CG protein sites and the PS headgroups, which each carry a charge of $-1e$. Figure S1 shows a snapshot of a protein coated membrane liposome after 5 million timesteps, where the left panel shows the H0 density map on the liposome and on the right shows the local membrane curvature near each lipid. The local membrane curvature was approximated by the local radial variation, represented in a spherical basis—that is, by comparing the radial position of each lipid to the average radial position of all lipids in the liposome. Areas of locally curved membrane are evident on the surface of the liposome.

SUPPLEMENTAL FIGURE

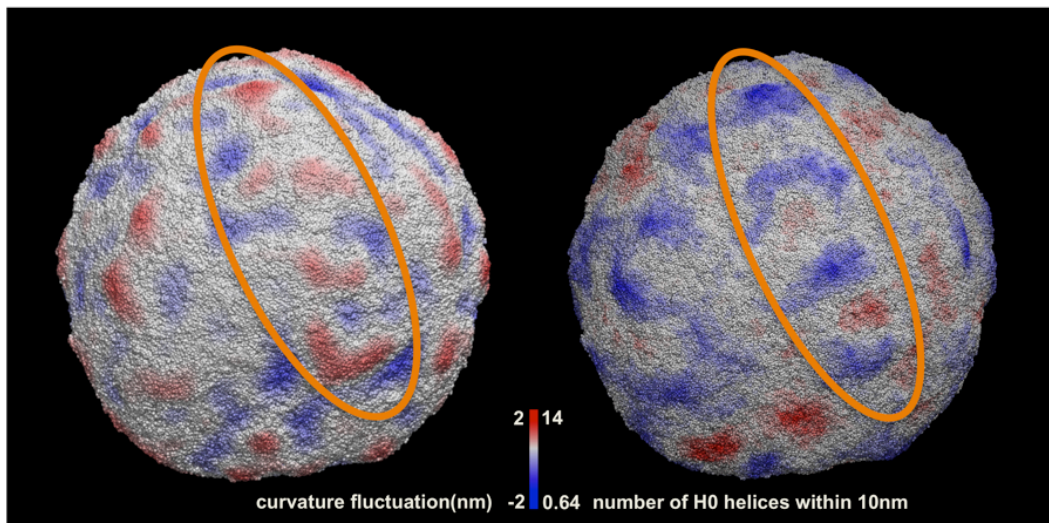


Figure S1: A comparison between the local membrane curvature fluctuation and H0 helix density for one simulation snapshot of a full liposome simulation. The left panel shows the local membrane curvature fluctuation calculated using radial variation as described in the main text, where red color indicates a convex surface and blue indicates a concave surface. The right panel shows lipids colored by the number of H0 helices within 10nm radius. Circles qualitatively highlight the correlation between curvature fluctuation and H0 helix density.

SUPPLEMENTAL TABLES

Table S1 Equilibration distances (nm) and harmonic constants (kJ/(mol nm²)) in the 26-site zigzag N-BAR hENM model. Results in downloadable form are also give as supplemental files.

Equilibration distance	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26		
1	0	1.988	3.331	5.319	6.729	7.324	6.198	4.048	3.434	4.197	4.166	5.739	7.780	10.23	9.216	7.734	4.942	4.350	3.869	5.139	7.274	9.491	9.551	6.265	5.219			
2	83	0	2.192	4.677	5.783	6.946	5.486	2.551	1.549	2.246	2.645	5.026	7.497	9.826	9.121	7.620	4.790	4.828	3.354	5.018	7.436	9.695	9.856	8.272	6.009	4.414		
3	34	97	0	3.103	4.258	5.080	3.443	1.113	2.922	2.944	1.142	2.862	5.472	8.475	7.736	5.958	3.275	3.696	1.401	3.167	5.940	8.404	8.497	6.601	4.012	2.336		
4	88	19	88	0	1.657	2.518	1.726	2.845	5.362	5.382	3.690	2.418	3.657	5.381	4.711	3.225	1.341	2.867	2.746	2.477	3.467	5.570	5.815	4.150	2.763	3.581		
5	71	14	79	08	0	2.771	2.306	3.625	6.111	5.966	4.496	3.273	4.109	4.538	4.484	3.528	2.885	4.453	4.126	3.856	4.167	5.685	6.093	4.624	3.743	4.534		
6	5	88	14	83	73	0	2.771	1.890	5.016	7.708	7.636	5.559	2.829	1.597	4.407	3.406	1.330	2.437	3.578	4.148	2.709	2.116	4.199	4.226	2.116	1.981	4.386	
7	71	64	06	98	52	29	0	3.332	6.095	5.920	3.746	1.148	2.403	5.799	5.081	3.113	2.088	3.408	2.659	1.966	3.586	5.936	5.999	3.841	1.631	2.693		
8	02	06	23	49	2	86	94	0	2.794	2.623	1.124	3.012	5.622	8.035	7.547	5.954	3.462	4.266	2.188	3.666	6.099	8.383	8.581	6.747	4.322	2.800		
9	14	88	51	96	05	19	92	79	0	2.677	7.7	14	1	16	79	24	48	6.3	2.3	56	47	10.30	9.271	6.901	4.979			
10	8	61	45	92	34	1	45	46	26	0	2.430	5.458	8.183	10.36	10.02	8.549	5.948	6.447	4.322	6.086	8.634	10.85	11.08	9.338	6.834	4.712		
11	34	85	8	77	23	68	11	4	77	76	0	3.096	5.876	8.930	8.371	6.590	4.121	4.734	2.175	3.884	9.163	9.279	7.280	4.527	2.310			
12	5	82	84	12	61	62	51	05	14	31	81	0	8.5	62	94	32	7	22	5	31	18	8.3	6.3	26	18	5.78		
13	7.780	7.497	5.472	3.657	4.109	1.597	2.403	5.622	8.311	8.183	5.876	2.799	0	5.689	4.551	2.356	3.283	3.993	4.295	2.669	2.826	5.052	4.800	2.381	1.563	4.130		
14	10.23	9.826	8.475	5.381	4.538	4.407	5.799	8.035	10.37	10.36	8.930	6.934	5.689	0	1.982	3.785	5.758	6.843	7.985	6.848	4.459	3.263	4.034	4.473	6.362	8.479		
15	9.216	9.121	7.736	4.711	4.484	3.406	5.081	7.547	9.928	10.02	8.371	6.113	4.551	1.982	0	2.330	4.631	5.402	7.014	5.620	2.712	1.488	2.189	2.771	5.184	7.642		
16	7.734	7.620	5.958	3.225	3.528	1.330	3.113	5.954	8.510	8.549	6.590	4.001	2.356	3.785	2.330	0	2.858	3.661	5.011	3.429	1.100	2.897	2.910	1.142	2.883	5.501		
17	4.942	4.790	3.275	1.341	2.885	2.437	2.088	3.462	5.798	5.948	4.121	2.489	3.283	5.758	4.631	2.858	0	1.585	2.479	1.635	2.704	5.152	5.226	3.505	2.194	3.570		
18	4.350	4.828	3.696	2.867	4.453	3.578	3.408	4.266	6.130	6.447	4.734	3.223	3.993	6.843	5.402	3.661	1.585	0	2.759	1.934	3.034	5.511	5.407	3.895	2.811	4.071		
19	3.869	3.354	1.401	2.746	4.126	4.148	2.659	2.188	4.298	4.322	2.175	1.916	4.295	7.985	7.014	5.011	2.479	2.759	0	1.859	4.930	7.560	7.534	5.498	2.764	1.623		
20	5.139	5.018	3.167	2.477	3.856	2.709	1.966	3.666	6.045	6.086	3.884	1.658	2.669	6.848	5.620	3.429	1.635	1.934	1.859	0	3.291	6.025	5.881	3.728	1.143	2.494		
21	7.274	7.436	5.940	3.467	4.167	2.116	3.586	6.099	8.487	8.634	4.289	2.826	4.459	2.712	1.100	2.704	3.034	4.930	3.291	0	2.761	2.610	1.116	3.014	5.645			
22	5.9	9.19	38	45	77	93	08	13	34	7	83	22	01	94	75	53	15	75	97	92	0	76	74	37	4	8.296		
23	9.551	9.856	8.497	5.815	6.093	4.226	5.999	8.581	10.90	11.08	9.279	6.807	4.800	4.034	2.189	2.910	5.226	5.407	7.534	5.881	2.610	0.929	2.445	5.482	8.216			
24	8.186	8.272	6.601	4.150	4.624	2.116	3.841	6.747	9.271	9.338	7.280	4.535	2.381	4.473	2.771	1.142	3.505	5.498	3.728	1.116	2.795	2.445	3.125	0	7.3	5.935		
25	6.265	6.009	4.012	2.763	3.743	1.981	1.631	4.322	6.901	6.834	4.527	1.611	1.563	6.362	5.184	2.883	2.194	2.811	2.764	1.143	3.014	5.667	5.482	3.125	2.839	0.2		
26	5.219	4.414	2.336	3.581	4.534	4.386	2.693	2.800	4.979	4.712	2.310	1.578	4.130	8.479	7.642	5.501	3.570	4.071	1.623	2.494	5.645	8.296	8.216	2.839	0	0		
Harmonic constant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26		
1	0	41	9.614	6	22	4	4	18	6	8	78	6	4	74	18.81	8	8	4	6	6	2.926	0.4	4	3	6	4	0.2	
2	352.5	0	4.012	38.12	42.30	6.102	336.1	20.52	167.3	153.0	7.983	20.98	5.977	5.308	11.95	4.765	4.681	4.221	10.53	6.186	5.392	60.69	2	36	0	0		
3	9.614	8	0	64	16	46	74	4	51	12	08	76	08	6	4.389	7.691	15.84	5.099	425.6	83.43	6.102	9.697	8	8.36	6	9.614	76	4
4	8.234	38.12	111.5	397.4	166.5	60.40	9.906	14.50	12.37	4.974	10.70	9.028	8.276	8.067	142.8	245.6	244.6	253.3	366.7	20.06	22.11	12.28	15.08	96.85	0.6	8.778		
5	28.38	42.30	13.04	397.4	12.87	6.771	6.228	24.62	23.57	14.33	7.858	7.398	9.488	15.75	160.9	11.74	70.60	235.2	77.70	28.59	23.82	19.26	17.01	7.691	6	2		
6	3.469	6.102	10.32	166.5	12.87	142.5	9.935	5.977	6.437	7.064	254.5	535.5	7.691	59.35	416.4	449.0	17.43	269.8	568.3	47.15	701.4	687.5	16.17	88	26	66		
7	3.678	4	10.45	428.0	60.40	6.771	142.5	481.5	20.35	18.64	73.19	1236	560.2	8.610	185.4	197.5	12.37	291.1	485.0	170.2	24.57	39.75	149.3	905.8	195.5	82		

8	31.39	336.1	1051.	9.906	6.228	5.935	481.5	0	754.8	312.7	827.0	393.3	8.861	5.601	3.803	5.141	9.948	27.00	413.3	40.96	7.231	5.977	10.07	208.2	
9	1.964	20.52	329.5	14.50	24.62	5.977	20.35	754.8	721.0	602.7	9.697	6.855	12.62	3.803	4.472	4.263	5.726	11.95	6.437	4.639	4.472	6.771	13.66		
10	2.967	167.3	265.0	12.37	23.57	6.437	18.64	312.7	721.0	713.2	29.38	11.99	3.636	4.848	4.263	7.482	21.98	9.781	3.887	4.974	4.848	5.141	9.572	104.5	
11	44.76	153.0	875.2	4.974	14.33	7.064	73.19	827.0	602.7	713.2	477.5	21.90	4.974	4.096				616.3	27.00	6.980	7.607	7.774	16.46	128.5	
12	4.681	256.2	10.70	7.858	254.5	1236.	393.3	9.697	29.38	477.5	379.6	7.022	7.858	23.99	12.12	28.13	724.0	983.0	13.25	15.59	21.98	35.36	929.2	314.5	
13	4.723	7.983	10.70	9.028	7.398	535.5	560.2	8.861	6.855	11.99	21.90	379.6	44.43	98.81	249.0	19.39	3.678	16.63	299.9	222.1	42.92	133.9	299.5	22.19	
14	33.14	20.98	6.771	8.276	7.691	5.601	12.62	4.974	7.022	44.43	306.9	3.845	9.028	7.565	4.890	6.353	5.977	97.68	6.729	7.900	7.064	8.443	2.6		
15	5.977	18.81	4	4.389	8.067	9.488	59.35	8.610	3.803	3.803	3.636	4.096	7.858	98.81	306.9	7.231	15.21	4.430	11.16	171.7	381.0	259.4	214.2	10.99	10.65
16	3.594	5.308	7.691	142.8	15.75	416.4	185.4	5.141	4.472	4.848	23.99	249.0	3.845	7.231	456.9	2.758	11.20	258.6	1194.	134.0	199.9	987.8	533.3	12.58	
17	2.340	8	5.434	22	59	72	57	05	4	6	6	4.598	2	52	99	0	14	42	24	82	34	82	3	88	6
18	4.096	11.95	5.099	244.6	11.74	12.37	27.00	5.726	7.482	28.13	3.678	7.565	2.758	357.0	92.83	116.7	1.504	5.266	2.424	1.713	5.099	38.16			
19	4.054	4.765	425.6	253.3	70.60	17.43	291.1	413.3	11.95	21.98	616.3	724.0	16.63	4.890	4.430	11.20	40.50	92.83	546.9		11.20	240.7	514.5		
20	3.009	4.681	83.43	366.7	235.2	269.8	485.0	40.96	6.437	9.781	27.00	983.0	299.9	6.353	11.16	258.6	483.1	116.7	546.9	448.8	51.95	26.58	86.35	1044.	422.1
21	4.221	6.102	20.06	77.70	568.3	170.2		3.887	13.25	222.1	5.977	171.7	1194.	237.3	1.504	448.8	751.6	414.4	1106.	340.7					
22	15.80	10.53	22.11	28.59	47.15	24.57		4.974	6.980	15.59	97.68	381.0	134.0	84.14	5.266	51.95	751.6	675.1	602.9	14.79	14.29				
23	4.305	6.186	9.697	12.28	23.82	39.75	7.231	4.639	4.848	7.607	21.98	42.92	6.729	259.4	199.9	56.38	2.424	26.58	414.4	675.1	609.5	24.45	16.63		
24	3.009		15.08	19.26	701.4	149.3	5.977	4.472	5.141	7.774	35.36	133.9	7.900	214.2	987.8	30.72	1.713	11.20	86.35	1106.	602.9	609.5	604.1	22.65	
25	3.469	5.392	26.41	96.85	17.01	687.5	905.8	10.07	6.771	9.572	16.46	929.2	299.5	7.064	10.99	533.3	299.2	5.099	240.7	1044.	340.7	14.79	24.45	97.85	
26	12.08	60.69	78.58	7.691	16.17	195.5	208.2	13.66	104.5	128.5	314.5	22.19	8.443	10.65	12.58	6.980	38.16	514.5	422.1	14.29	16.63	22.65	97.85	0	

Table S2 Equilibration distances (nm) and harmonic constants (kJ/(mol nm²)) in the 26-site triad N-BAR hENM model.

Equilibration distance	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26		
1	0	1.879	3.900	5.802	7.181	7.363	8.679	6.979	4.598	3.887	4.760	6.907	9.206	10.23	10.24	9.959	7.305	5.634	5.576	5.231	7.019	9.289	11.21	9.976	7.807	6.318		
2	1.879	0	2.795	5.109	6.325	6.421	8.191	6.141	3.194	2.029	3.338	6.199	8.839	10.63	10.28	9.714	6.981	5.766	5.660	4.697	6.842	9.246	11.26	9.920	7.476	5.649		
3	3.900	2.795	0	2.873	4.483	4.284	5.936	3.613	1.231	2.543	1.124	3.531	6.402	9.512	8.979	7.810	5.024	4.450	4.050	2.221	4.715	7.558	9.771	8.066	5.098	2.934		
4	5.802	5.109	2.873	0	2.072	1.892	3.122	1.331	2.693	4.965	3.228	1.763	3.895	7.130	6.352	4.965	2.240	2.637	2.341	1.537	2.326	4.835	7.055	5.316	2.683	2.513		
5	7.181	6.325	4.483	2.072	0	0.859	2.812	2.175	3.796	5.933	4.541	3.164	4.220	6.800	5.490	4.218	2.354	3.579	3.712	3.598	3.372	4.375	6.262	4.931	3.540	4.308		
6	7.363	6.421	4.284	1.892	0.859	0	2.633	1.518	3.614	5.864	4.221	2.554	3.860	7.279	6.007	4.411	2.490	3.889	3.834	3.290	3.258	4.684	6.663	5.112	3.213	3.742		
7	8.679	8.191	5.936	3.122	2.812	2.633	0	2.597	5.700	8.027	6.156	2.954	1.609	5.598	4.523	2.277	1.566	3.678	3.559	4.060	2.158	2.734	4.784	1.735	4.290	8.777		
8	6.979	6.141	3.613	1.331	2.175	1.518	2.597	0	3.309	5.661	3.634	1.042	3.220	7.557	6.605	4.768	2.466	3.645	3.255	2.143	2.514	4.941	7.136	5.230	2.308	2.583		
9	4.598	3.194	1.231	2.693	3.796	3.614	5.700	3.309	0	2.356	0.980	3.557	6.704	9.535	8.752	7.569	4.896	4.680	4.420	2.691	4.900	7.442	9.883	5.206	3.254	3.166		
10	3.887	2.029	2.543	4.965	5.933	5.864	8.027	5.661	2.356	0	2.305	5.826	8.722	11.38	10.71	9.797	7.104	6.473	6.286	4.720	7.075	9.571	11.64	10.18	7.474	5.323		
11	4.760	3.338	1.124	3.228	4.541	4.221	6.156	3.634	0.980	2.305	0	3.651	6.655	10.20	9.492	8.156	5.466	5.266	4.870	2.807	5.264	8.057	10.26	8.528	5.468	3.109		
12	6.907	6.199	3.531	1.763	3.164	2.554	2.954	1.042	3.557	5.826	3.651	0	3.048	7.797	7.071	5.157	2.841	3.744	3.140	1.718	2.334	5.253	7.513	5.441	2.015	1.404		
13	9.206	8.839	6.402	3.895	4.220	3.860	1.609	3.220	6.404	8.722	6.655	3.048	0	6.084	5.411	3.059	2.635	4.316	3.936	4.285	2.298	3.436	5.790	3.129	1.409	4.123		
14	10.23	10.63	9.512	7.130	6.800	7.279	5.598	7.557	9.535	11.38	10.20	7.797	6.084	0	2.062	3.858	5.098	5.118	5.660	7.869	5.584	2.899	2.207	3.210	6.108	8.743		
15	10.24	10.28	8.979	6.352	5.490	6.007	4.523	6.605	8.752	10.71	9.492	7.071	5.411	2.062	0	2.563	4.278	4.969	5.544	7.413	5.191	2.032	1.249	2.521	5.559	8.231		
16	9.959	9.714	7.810	4.965	4.218	4.411	2.277	4.768	7.569	9.797	8.156	5.157	3.059	3.858	2.563	0	2.814	4.448	4.670	5.976	3.625	1.205	2.564	1.091	3.563	6.428		
17	7.305	6.981	5.024	2.240	2.354	2.490	1.566	2.466	4.896	7.104	5.466	2.841	2.635	5.098	4.278	2.814	0	2.156	2.192	3.246	1.386	2.608	4.861	3.093	1.848	3.985		
18	5.634	5.766	4.450	2.637	3.579	3.889	3.678	3.645	4.680	6.473	5.266	3.744	4.316	5.118	4.969	4.448	2.156	0	0.881	3.040	2.130	3.697	5.753	4.354	3.162	4.282		
19	5.576	5.660	4.050	2.341	3.712	3.834	3.559	3.255	4.420	6.286	4.870	3.140	3.936	5.660	5.544	4.670	2.192	0.881	0	2.386	1.649	4.030	6.206	4.544	2.659	3.540		
20	5.231	4.697	2.221	1.537	3.598	3.290	4.060	2.143	2.691	4.720	2.807	1.718	4.285	7.869	7.413	5.976	3.246	3.040	2.386	0	2.610	5.742	8.031	6.117	2.941	1.463		
21	7.019	6.842	4.715	2.326	3.372	3.258	2.158	2.514	4.900	7.075	5.264	2.334	2.298	5.584	5.191	3.625	1.386	2.130	1.649	2.610	0	3.318	5.612	3.574	1.051	3.180		
22	9.289	9.246	7.558	4.835	4.375	4.684	2.734	4.941	7.442	9.571	8.057	5.253	3.436	2.899	2.032	1.205	2.608	3.697	4.030	5.742	3.318	0	2.305	0.942	3.580	6.396		
23	11.21	11.26	9.976	7.055	6.262	6.663	4.784	7.136	9.584	11.64	10.26	7.513	5.390	2.207	1.249	2.564	4.861	5.753	6.206	8.031	5.612	2.305	0	2.303	5.813	8.689		
24	9.976	9.920	8.066	5.316	4.931	5.112	5.230	7.983	10.18	8.528	5.441	3.129	3.210	2.521	1.091	3.093	4.354	4.544	6.117	3.574	0.942	2.303	0	3.609	6.586	3.576		
25	7.807	7.476	5.098	2.683	3.540	3.213	1.735	2.308	5.206	7.474	5.468	2.015	1.409	6.108	5.559	3.563	1.848	3.162	2.659	2.941	1.051	3.580	5.813	3.609	0	3.029		
26	6.318	5.649	2.934	2.513	4.308	3.742	4.290	2.283	3.354	5.323	3.109	1.404	4.123	8.743	8.231	6.428	3.985	4.282	3.540	1.463	3.180	6.396	8.689	6.586	3.029	0		
Harmonic constant	0	799.4	0.459	0.083			0.167	0.167	0.250	0.585	18.22	0.250		26.12	6.520	0.167	0.125	0.501	39.45		0.167	0.501	0.250		12.20			
1	0	11.87	0.292	3.009	10.53	0.501		128.0	65.37	107.4	0.501	0.543	18.55			0.292	92.29	49.65	0.501	0.543		0.668	0.501	70.43				
2	25	0	12	6	6	36	6	0.418	33	52	26	6	4	92	1.463	0.418	6	44	84	6	4	0.418	1.045	8	6	3		
3	459	11.87		1148.		0.250	2.382	845.9	2422.	1236.	2007.	354.8	0.877		0.877	1.003	1.295	0.334	0.167	1.086	1.170	0.710	1.128	1.295	2.173	232.6		
4	0.083	0.292	1148.		110.8	210.7	468.8	1220.	307.7	2.466	270.2	830.3		0.501	1.170	1.086	197.6	0.919	27.37	721.9	786.3	0.919	1.379	3.093	8.485	59.48		
5	0.209	3.009	6	0.209	54	0	91	2	18	4	0.418	4		2	76	6	2	58	38	42	84	0.209	92	4	2	68	2	
6	0.209	36	8	14	91	0	45	4	2	2	4	8	0.418	1.463	6	4	8	0.418	1.463	6	4	0.209	6	2	2	6	12	2
7	0.167	0.501	2.382	468.8	2.884	142.2		863.3	1.588	2.591	1.588	867.3		0.961	115.0	678.9	0.459	0.668			29.21	461.2		306.9	1748.	0.877		
8	0.167	845.9	1220.	35.57	1.170	863.3		1742.	1.504	176.5	2917.	404.7	0.501	8.945	0.459	467.1	0.334	15.80	79.08	181.2	0.919	1.170	0.668	1486.	497.6			
9	0.250	128.0	2422.	307.7	0.125	0.167	1.588	1742.		2168.	1742.	135.4	1.170	19.43	16.13	0.501	1.128	30.68	0.501	365.0	2.173	0.961	1.755	1.922	1.421	10.95		
10	0.585	65.37	1236.	2.466		0.376	2.591	1.504	2168.		2730.	1.212	0.961	3.051		1.086		4.096	0.292		1.295	1.170	3.720	3.051		1.337		
11	18.22	107.4	2007.	270.2	0.125	0.125	1.588	176.5	1742.	2730.		903.2	2.006	0.877	3.636	0.585	1.170	0.459	0.292	527.4	1.713	1.128	2.131		3.218	101.7		
	48	26	11	37	4	4	4	63	64	5	0	56	4	8	6	2	4	8	6	2	4	8	6	8	4.807	6	83	

12	0.250	0.501	354.8	830.3	1.212	1.755	867.3	2917.	135.4	1.212	903.2	198.2	2.591	0.794	1.212	0.292	94.30	1197.	1471.	1.003	1.379	1.003	1513.	174.8			
	8	6	82	57	2	6	08	85	32	2	56	0	16	0.418	6	2	2	6	08	49	69	2	4	2	29	49	
			0.543	0.877		55.67	1.379	404.7	1.170	0.961	2.006	198.2	30.22	29.13	148.8	57.26		52.58	348.9	77.78	115.3	48.48	0.585	0.376			
13	0.209	4	8	0.627	76	4	8.778	08	4	4	4	16	0	14	0.418	46	5	6	0.209	44	46	98	68	8	2	2	
	26.12	18.55		0.501	0.501	0.250		0.501	19.43	3.051	0.877		30.22	332.7	0.919	0.292	21.61	5.308	0.334	0.250	0.250	46.39	22.82	0.585			
14	5	92	0.418	6	6	8	0.418	6	7	4	8	0.418	14	0	7	6	6	06	6	4	8	8	8	28	2	0.418	
	6.520	0.877	1.170	2.884		0.961	8.945	16.13		3.636	2.591		332.7	169.7	0.501	15.67	58.47	1.839	5.684		402.2	83.76	1.839	71.51			
15	8	1.463	8	4	2	0.418	4	2	48	7.106	6	6	0.418	7	0	08	6	5	82	2	8	1.463	41	72	2	98	
	0.167	1.003	1.086	47.27		115.0	0.459	0.501	1.086	0.585	0.794	29.13	0.919	169.7		1311.	0.250	0.250	0.543	155.4	2160.	954.0	1947.	1094.	0.752		
16	2	0.418	2	8	58	1.463	75	8	6	8	2	2	46	6	08	0	85	8	8	4	96	27	85	13	16	4	
	0.125	0.292	1.295	197.6	158.3	97.47	678.9	467.1	1.128		1.170	1.212	148.8	0.292	0.501	1311.		153.6	0.334	0.376	541.3	216.1		309.3	472.3	0.334	
17	4	6	8	72	38	76	57	99	6	3.762	4	2	5	6	6	85	0	57	4	2	52	9	1.463	62	4	4	
	0.501	92.29	0.334	0.919	69.76	0.501	0.459	0.334	30.68	4.096	0.459	0.292	57.26	21.61	15.67	0.250	153.6		108.2		71.35	0.125	0.292	0.250	14.25	0.877	
18	6	44	4	6	42	6	8	4	12	4	8	6	6	06	5	8	57	0	2	0.209	26	4	6	8	38	8	
	39.45	49.65	0.167	27.37	60.10	0.961	0.668	15.80	0.501	0.292	0.292	94.30		5.308	58.47	0.250	0.334	108.2		0.459	0.250	0.167	0.376	0.334	70.60		
19	92	84	2	9	84	4	8	04	6	6	6	08	0.209	6	82	8	4	2	0	8	8	2	2	4	1.672	02	
	0.501	1.086	721.9			79.08	365.0		527.4	1197.	52.58	0.334	1.839	0.543	0.376		0.459		1143.	0.710	1.212	1.337	542.8	1034.			
20	0.209	6	8	28	0.209	0.209	1.045	56	81	1.045	32	49	44	4	2	4	2	0.209	8	0	4	6	2	6	98	17	
	0.167	0.543	1.170	786.3	130.7	0.501	29.21	181.2	2.173	1.295	1.713	1471.	348.9	0.250	5.684	155.4	541.3	71.35	0.250	1143.		1008.	1.630	199.2	3742.	142.1	
21	2	4	4	83	92	6	82	45	6	8	8	69	46	8	8	96	52	26	8	4	0	17	2	19	1	2	
	0.710	0.919	9.530	0.585	461.2	0.919	0.961	1.170	1.128	1.003	77.78	0.250		2160.	216.1	0.125	0.167	0.710	1008.		951.9	2785.	463.1				
22	0.209	0.418	6	6	4	2	21	6	4	4	6	2	98	8	1.463	27	9	4	2	6	17	0	53	01	86	0.836	
	0.501	1.128	1.379	3.093	0.585		1.170	1.755	3.720	2.131	1.379	115.3	46.39	402.2	954.0		0.292	0.376	1.212	1.630	951.9		2322.	3.803			
23	6	1.045	6	4	2	2	2.299	4	6	2	8	4	68	8	41	85	1.463	6	2	2	2	53	0	91	8	1.254	
	0.250	0.668	1.295	3.093	1.003	0.919	306.9	0.668	1.922	3.051		1.003	48.48	22.82	83.76	1947.	309.3	0.250	0.334	1.337	199.2	2785.	2322.		818.7	0.961	
24	8	8	8	2	2	2	6	37	8	8	4	4.807	2	8	28	72	13	62	8	4	6	19	01	91	0	78	4
	0.501	2.173	8.485	97.22	24.41	1748.	1486.	1.421		3.218	1513.	0.585	0.585	1.839	1094.	472.3	14.25		542.8	3742.	463.1	3.803	818.7		382.1		
25	0.209	6	6	4	68	12	16	66	2	1.254	6	29	2	2	2	16	4	38	1.672	98	1	86	8	78	0	36	
	12.20	70.43	232.6	59.48	0.585	4.974	0.877	497.6	10.95	1.337	101.7	174.8	0.376		71.51	0.752	0.334	0.877	70.60	1034.	142.1		0.961	382.1			
26	56	3	17	14	2	2	8	71	16	6	83	49	2	0.418	98	4	4	8	02	17	2	0.836	1.254	4	36	0	