

**Summary of integrative structure determination of Integrative structure and functional anatomy
of eight spokes of a nuclear pore complex (PDB ID: 8ZZC | pdb_00008zzc, PDB-Dev ID:
PDBDEV_00000012)**

1. Model Composition	
1.1. Entry composition	- Nup84: chain(s) A, H, BR, BY, CF, CM, CT, DA, DH, DO, DV, EC, EJ, EQ, EX, FE (726 residues) - Nic96: chain(s) AE, AI, JT, JU, KB, KC, KJ, KK, KR, KS, KZ, LA, LH, LI, LP, LQ (839 residues) - Nup49: chain(s) AG, AK, JX, JY, KF, KG, KN, KO, KV, KW, LD, LE, LL, LM, LT, LU (472 residues) - Nup57: chain(s) AH, AL, JZ, KA, KH, KI, KP, KQ, KX, KY, LF, LG, LN, LO, LV, LW (541 residues) - Nup157: chain(s) AM, AQ, LX, MB, MF, MJ, MN, MR, MV, MZ, ND, NH, NL, NP, NT, NX (1391 residues) - Nup170: chain(s) AN, AR, LY, MC, MG, MK, MO, MS, MW, NA, NE, NI, NM, NQ, NU, NY (1502 residues) - Nup188: chain(s) AO, AS, LZ, MD, MH, ML, MP, MT, MX, NB, NF, NJ, NN, NR, NV, NZ (1655 residues) - Nup192: chain(s) AP, AT, MA, ME, MI, MM, MQ, MU, MY, NC, NG, NK, NO, NS, NW, OA (1683 residues) - Nup53: chain(s) AU, AZ, OB, OG, OL, OQ, OV, PA, PF, PK, PP, PU, PZ, QE, QJ, QO (475 residues) - Nup59: chain(s) AV, BA, OC, OH, OM, OR, OW, PB, PG, PL, PQ, PV, QA, QF, QK, QP (528 residues) - Ndc1: chain(s) AW, BB, OD, OI, ON, OS, OX, PC, PH, PM, PR, PW, QB, QG, QL, QQ (655 residues) - Pom34: chain(s) AX, BC, OE, OJ, OO, OT, OY, PD, PI, PN, PS, PX, QC, QH, QM, QR (299 residues) - Pom152: chain(s) AY, BD, OF, OK, OP, OU, OZ, PE, PJ, PO, PT, PY, QD, QI, QN, QS (1337 residues) - Nup85: chain(s) B, I, BS, BZ, CG, CN, CU, DB, DI, DP, DW, ED, EK, ER, EY, FF (744 residues) - Nup100: chain(s) BE, BF, QT, QU, QZ, RA, RF, RG, RL, RM, RR, RS, RX, RY, SD, SE (959 residues) - Nup116: chain(s) BG, BH, QV, QW, RB, RC, RH, RI, RN, RO, RT, RU, RZ, SA, SF, SG (1113 residues) - Gle1: chain(s) BJ, QY, RE, RK, RQ, RW, SC, SI (538 residues) - Nup145: chain(s) BK, BL, SJ, SK, SO, SP, ST, SU, SY, SZ, TD, TE, TI, TJ, TN, TO (1317 residues) - Nup1: chain(s) BM, SN, SS, SX, TC, TH, TM, TR (1076 residues) - Nup60: chain(s) BN, BO, SL, SM, SQ, SR, SV, SW, TA, TB, TF, TG, TK, TL, TP, TQ (539 residues) - Mlp1: chain(s) BP, TS, TU, TW, TY, UA, UC, UE (1875 residues) - Mlp2: chain(s) BQ, TT, TV, TX, TZ, UB, UD, UF (1679 residues) - Nup120: chain(s) C, J, BT, CA, CH, CO, CV, DC, DJ, DQ, DX, EE, EL, ES, EZ, FG (1037 residues) - Nup133: chain(s) D, K, BU, CB, CI, CP, CW, DD, DK, DR, DY, EF, EM, ET, FA, FH (1157 residues) - Nup145c: chain(s) E, L, BV, CC, CJ, CQ, CX, DE, DL, DS, DZ, EG, EN, EU, FB, FI (712 residues) - Seh1: chain(s) F, M, BW, CD, CK, CR, CY, DF, DM, DT, EA, EH, EO, EV, FC, FJ (349 residues) - Sec13: chain(s) G, N, BX, CE, CL, CS, CZ, DG, DN,

	DU, EB, EI, EP, EW, FD, FK (297 residues) - Dyn2: chain(s) O, P, FL, FM, FT, FU, GB, GC, GJ, GK, GR, GS, GZ, HA, HH, HI (92 residues) - Nup82: chain(s) Q, R, FN, FO, FV, FW, GD, GE, GL, GM, GT, GU, HB, HC, HJ, HK (713 residues) - Nup159: chain(s) S, T, FP, FQ, FX, FY, GF, GG, GN, GO, GV, GW, HD, HE, HL, HM (1460 residues) - Nsp1: chain(s) U, V, AF, AJ, FR, FS, FZ, GA, GH, GI, GP, GQ, GX, GY, HF, HG, HN, HO, JV, JW, KD, KE, KL, KM, KT, KU, LB, LC, LJ, LK, LR, LS (823 residues) - Nsp1: chain(s) U, V, X, AB, AF, AJ, FR, FS, FZ, GA, GH, GI, GP, GQ, GX, GY, HF, HG, HN, HO, HR, HS, HZ, IA, IH, II, IP, IQ, IX, IY, JF, JG, JN, JO, JV, JW, KD, KE, KL, KM, KT, KU, LB, LC, LJ, LK, LR, LS (823 residues) - Nic96: chain(s) W, AA, HP, HQ, HX, HY, IF, IG, IN, IO, IV, IW, JD, JE, JL, JM (839 residues) - Nsp1: chain(s) X, AB, HR, HS, HZ, IA, IH, II, IP, IQ, IX, IY, JF, JG, JN, JO (823 residues) - Nup49: chain(s) Y, AC, AG, AK, HT, HU, IB, IC, IJ, IK, IR, IS, IZ, JA, JH, JI, JP, JQ, JX, JY, KF, KG, KN, KO, KV, KW, LD, LE, LL, LM, LT, LU (472 residues) - Nup49: chain(s) Y, AC, HT, HU, IB, IC, IJ, IK, IR, IS, IZ, JA, JH, JI, JP, JQ (472 residues) - Nup57: chain(s) Z, AD, AH, AL, HV, HW, ID, IE, IL, IM, IT, IU, JB, JC, JJ, JK, JR, JS, JZ, KA, KH, KI, KP, KQ, KX, KY, LF, LG, LN, LO, LV, LW (541 residues) - Nup57: chain(s) Z, AD, HV, HW, ID, IE, IL, IM, IT, IU, JB, JC, JJ, JK, JR, JS (541 residues)
<i>1.2. Datasets used for modeling</i>	- Integrative model, Not available: 10.1016/j.cell.2016.10.028 - Integrative model, Zenodo: 10.5281/zenodo.1194547 - Experimental model, PDB: pdb_00005cws - Comparative model, Zenodo: 10.5281/zenodo.1194547 - Experimental model, PDB: pdb_00002qx5 - Experimental model, Zenodo: 10.5281/zenodo.1194547 - Experimental model, Zenodo: 10.5281/zenodo.1194547 - Comparative model, Zenodo: 10.5281/zenodo.1194547 - Comparative model, Zenodo: 10.5281/zenodo.1194547 - Comparative model, Zenodo: 10.5281/zenodo.1194547 - Comparative model, Zenodo: 10.5281/zenodo.1194547 - Comparative model, Zenodo: 10.5281/zenodo.1194547 - Integrative model, Not available: 10.1016/j.str.2017.01.006 - Integrative model, Zenodo: 10.5281/zenodo.1194547 - Experimental model, PDB: pdb_00003nf5 - Comparative model, Zenodo: 10.5281/zenodo.1194547 - Comparative model, Zenodo: 10.5281/zenodo.1194547 - Experimental model, PDB: pdb_00003kep - Experimental model, Zenodo: 10.5281/zenodo.1194547 - Mass Spectrometry data, Zenodo: 10.5281/zenodo.1149746 - Crosslinking-MS data, Zenodo: 10.5281/zenodo.1194547 - Crosslinking-MS data, Zenodo: 10.5281/zenodo.1194547 - EM raw micrographs, EMPIAR: EMPIAR-10155 - 3DEM volume, EMDB: EMD-7321 - 3DEM volume, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547

	- SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, SASBDB: SASDBV9 - SAS data, SASBDB: SASDBW9 - SAS data, SASBDB: SASDBZ9 - SAS data, SASBDB: SASDBX9 - SAS data, SASBDB: SASDBY9 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - SAS data, Zenodo: 10.5281/zenodo.1194547 - EM raw micrographs, EMPIAR: EMPIAR-10162 - 2DEM class average, Zenodo: 10.5281/zenodo.1194547 - 2DEM class average, Zenodo: 10.5281/zenodo.1194547
2. Representation	
2.1. Number of representations	2
2.2. Scale	- Multiscale: Coarse-grained: 1 - 100 residue(s) per bead - Multiscale: Coarse-grained: 18 - 20 residue(s) per bead
2.3. Number of rigid and flexible segments	- 192, 6528 - 0, 200
3. Restraints	
3.1. Physical principles	Information about physical principles was not provided
3.2. Experimental data	- 1 unique SASRestraint: DSS, 509 crosslinks - 1 unique CrossLinkRestraint: Assembly name: SAXS subassembly Fitting method: FoXS Multi-state: False - 1 unique EM3DRestraint: DSS, 508 crosslinks - 1 unique GeometricRestraint: Gaussian mixture models - 1 unique EM2DRestraint: Number of micrographs: 800, Image resolution: 35.0

4. Validation	
4.2. Number of ensembles	2
4.3. Number of models in ensembles	5, 1000
4.4. Number of deposited models	2
4.5. Model precision	- 1.00, Å - 1.00, Å
4.6. Data quality	- SASDBV9: Rg from Gunier is 1.77 nm and Rg from p(r) is 1.82 nm - SASDBW9: Rg from Gunier is 2.71 nm and Rg from p(r) is 2.79 nm - SASDBZ9: Rg from Gunier is 4.34 nm and Rg from p(r) is 4.63 nm - SASDBX9: Rg from Gunier is 2.78 nm and Rg from p(r) is 2.64 nm - SASDBY9: Rg from Gunier is 2.95 nm and Rg from p(r) is 2.98 nm - EMD-7321: resolution is 28.00 Å
4.7. Model quality: assessment of excluded volume	Satisfaction: 100.00-100.00%
4.8. Fit to data used for modeling	- SASDBV9: Fit 1 with X ² value 1.28 - SASDBV9: Fit 2 with X ² value 1.1 - SASDBW9: Fit 1 with X ² value 1.97 - SASDBZ9: Fit 1 with X ² value 1.94 - SASDBX9: Fit 1 with X ² value 2.86 - SASDBY9: Fit 1 with X ² value 2.02 - Satisfaction of crosslinks: 87.52%
4.9. Fit to data used for validation	Fit of model to information not used to compute it has not been determined
5. Methodology and Software	
1. 5.1. Method name	Sampling
5.2. Method type	Replica exchange monte carlo
5.4. Number of computed models	500
2. 5.1. Method name	Sampling
5.2. Method type	Replica exchange monte carlo
5.4. Number of computed models	3000
3. 5.1. Method name	Sampling
5.2. Method type	Replica exchange monte carlo
5.4. Number of computed models	1000
4. 5.1. Method name	Sampling

<i>5.2. Method type</i>	Brownian dynamics
<i>5.4. Number of computed models</i>	1000
<i>5.5. Software</i>	- Integrative Modeling Platform (IMP) (version develop-0a5706e202) - IMP PMI module (version 67456c0) - HHpred (version 2.0.16) - PSIPRED (version 4.0) - DISOPRED (version 3) - DomPred (version Not available) - COILS/PCOILS (version Not available) - EMAN2 (version 2.2) - RELION (version 1.4) - SGD (version Not available) - HeliQuest (version Not available) - MODELLER (version 9.15) - MODELLER (version 9.13)