Cryo-EM Analysis of the Nuclear Pore Complex from *Xenopus Laevis*

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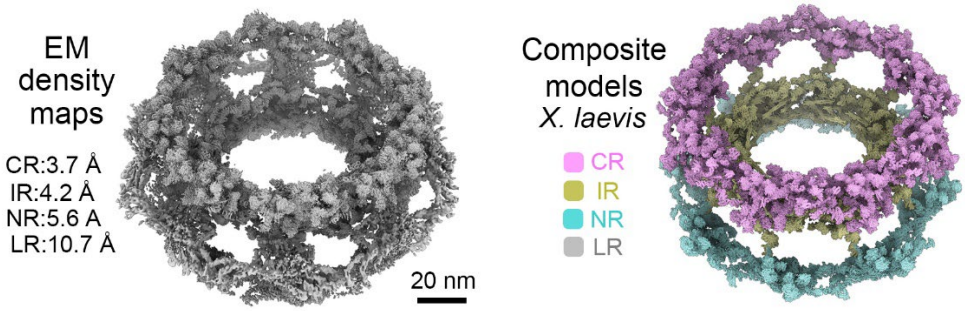
The nuclear pore complex (NPC) resides on the nuclear envelope (NE) and mediates nucleocytoplasmic cargo transport. As one of the largest cellular machineries, a vertebrate NPC has a molecular mass of over 100 MDa and consists of multiple cytoplasmic filaments (CF), a cytoplasmic ring (CR), an inner ring (IR), a nuclear ring (NR), a nuclear basket (NB), and a luminal ring (LR). Each ring scaffold consists of eight repeating subunits. Relying on single particle cryo-EM analysis of the NPC from *Xenopus laevis* (*X. laevis*) [1], we previously obtained a reconstruction of the LR subunit at an average resolution of 10.7 Å [2], which for the first time reveals detailed structural features of the LR. We then obtained reconstructions of the CR subunit, IR subunit, and NR subunit of the *X. laevis* NPC at average resolutions of 3.7-4.7 Å [3], 4.2 Å [4], and 5.6 Å [5], respectively. These reconstructions allow identification of previously unrecognized nucleoporin components and revelation of key interface features among neighboring nucleoporins. These experimental advances, together with AI-based structure prediction, have given rise to a composite atomic model of the NPC with marked improvement over previous models of vertebrate NPC [Figure 1].

Figure 1. The EM reconstructions (left) and composite models (right) of the *X. laevis* NPC.



References:

[1] G. Huang, Y. Zhang, X. Zhu, C. Zeng, Q. Wang et al, Cell Res. 30, 520-531 (2020).

[2] Y. Zhang, S. Li, C. Zeng, G. Huang, X. Zhu, et al, Cell Res. 30, 532-540 (2020).

[3] X. Zhu, G. Huang, C. Zeng, X. Zhan, K. Liang, et al, Science 376, 6598, eabl8280 (2022).

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