

**Nuclear Architecture of Rod Photoreceptor Cells Adapts to Vision in Mammalian
Evolution**

李聖林 (*S. Seirin Lee*)

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今回の **Journal Club** では、現在理論邸で進めている研究の一番ベースになっている論文を紹介します。生物的側面をより深く理解し、皆さんと一緒に議論させて頂きたいと思います。

(I. Solovei et al., Cell 137, 356–368, 2009)

Abstract: We show that the nuclear architecture of rod photoreceptor cells differs fundamentally in nocturnal and diurnal mammals. The rods of diurnal retinas possess the conventional architecture found in nearly all eukaryotic cells, with most heterochromatin situated at the nuclear periphery and euchromatin residing toward the nuclear interior. The rods of nocturnal retinas have a unique inverted pattern, where heterochromatin localizes in the nuclear center, whereas euchromatin, as well as nascent transcripts and splicing machinery, line the nuclear border. The inverted pattern forms by remodeling of the conventional one during terminal differentiation of rods. The inverted rod nuclei act as collecting lenses, and computer simulations indicate that columns of such nuclei channel light efficiently toward the light-sensing rod outer segments. Comparison of the two patterns suggests that the conventional architecture prevails in eukaryotic nuclei because it results in more flexible chromosome arrangements, facilitating positional regulation of nuclear functions.

References:

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2. Solovei, I. et al. (2013) LBR and lamin A/C sequentially tether peripheral heterochromatin and inversely regulate differentiation. *Cell* 152, 584–598
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