# 生命科学研究科・理学部生物学科 特別セミナー
# Special Seminar


## Dr. Erina Kuranaga（倉永 英里奈 博士）

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## “Collective Movement of Epithelial Cells Regulated by Left-Right Asymmetric Cell Polarity in Clockwise Morphogenesis”

Wed, January 6, 2016; 16:00~17:00

Life Sciences Project Research Laboratory, Lecture Room (Katahira Campus)
片平キャンパス・生命科学プロジェクト研究棟　1階講義室


The collective migration of cohesive cells is a key process involved in epithelial morphogenesis, wound healing, and cancer metastasis. Collective cell migration is thought to respond to cell-extrinsic chemoattractants sensed by the leading edge of a moving cell cluster, however, how cells even non-leader cells synchronously or collectively move towards the same direction is less understood. Here, we describe an alternative mechanism occurring during *Drosophila* development that requires the generation of local left-right (LR) asymmetric mechanical force within the apical plane of epithelial cells. During the morphogenesis of *Drosophila* male terminalia, the genitalia undergo a 360˚ clockwise rotation, inducing dextral spermiduct looping. While genitalia rotation involves the rotation of surrounding epithelial tissue during metamorphosis, the underlying mechanistic details have remained unclear. We found that individual epithelial cells surrounding the genitalia adopt LR asymmetric polarity within their apical plane, termed planar cell-shape chirality (PCC), which was discovered as an intrinsic cellular process. An intact PCC can determine the clockwise genitalia rotation because *myosinID* (*myoID*) mutant, which shows counter-clockwise genitalia rotation, exhibited reversed PCC in surrounding epithelial cells. Moreover, using live imaging analysis we found that the epithelial cells migrated collectively, resulting in epithelial tissue rotation. The migrating cells exhibited cell junction remodelling, while remaining attached to their neighbours through adherence junctions. Most of the remodelled cell boundaries formed a right oblique angle with the anterior-posterior axis, and were associated with Myosin-II accumulation at right oblique cell boundaries during genitalia rotation. The LR asymmetric distribution of Myosin-II was reversed in flies expressing *myoID* dsRNA. Numerical simulations showed that LR asymmetric contractility and junction remodelling were sufficient to induce the collective cell migration in virtual 2D tissues. These findings provide new mechanistic insight into the directional collective cell movement that induces the LR asymmetric morphogenesis of epithelial tissue, which is different from conventional guidance-mediated cell movement.


* In April, 2016, Dr. Kuranaga will join Graduate School of Life Sciences as a professor.
* 倉永博士は2016年4月に生命科学研究科 教授に着任される予定です。

* This seminar wil be held in English.
* 本セミナーは生命科学研究科単位認定セミナー（1ポイント）です。


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