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2020年 **12月11日** **金**

時間

15:00~17:00

場所

M1号館33講義室

■ 講演者 ■

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Chiromorphology and Schistosomiasis

■ お問い合わせ先 ■

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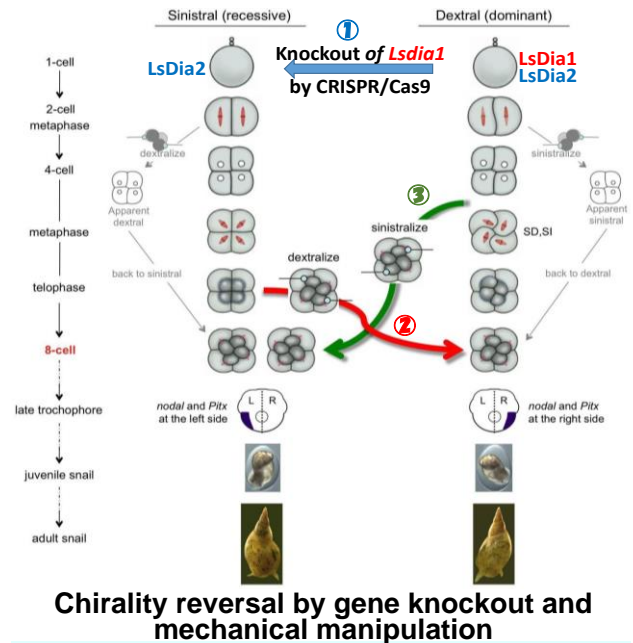
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Chiromorphology and Schistosomiasis

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Chiromorphology, the chirality of shape, is expressed throughout nature, whether microscopic or macroscopic, and whether animate or inanimate. We have been studying chiromorphology with a view to linking the microscopic and macroscopic domains in both biological and non-biological fields. In the biological field, using the freshwater snail *Lymnaea stagnalis*, we have revealed a surprising feature that the shell-coiling direction is determined by a single maternal ubiquitous gene, *Lsdia1*, already at the non-cleaved fertilized egg stage [1-3] and is firmly established at the eight-cell stage [4,5]. Knocking out the gene by CRISPR/Cas9 created sinistrally-coiled offspring generation-after-generation, in the otherwise totally dextral genetic background (①) [1,2]. Mechanical micro-manipulation of embryos at the third cleavage resulted in healthy mirror-imaged animals (②, ③) [5]. We are currently working on the chemistry of intra- and inter-cellular chirality, and the molecular mechanisms which lead eventually to individual organismal chirality.

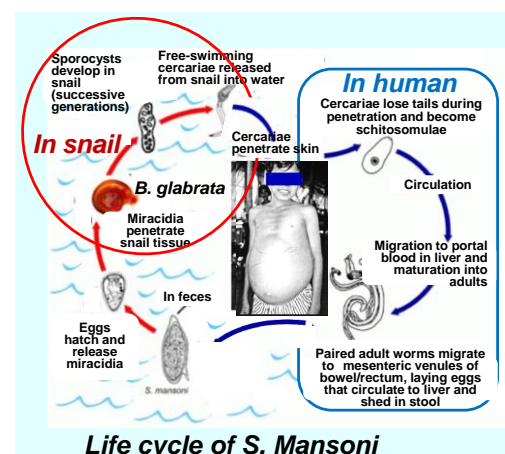


Chirality reversal by gene knockout and mechanical manipulation

Schistosomiasis

L. stagnalis serves as the intermediate host for the avian schistosome *Trichobilharzia szidati*, a causative agent of cercarial dermatitis in humans. A more serious disease is human schistosomiasis caused by several different parasites including *Schistosoma mansoni* for which the freshwater snail *Biomphalaria (B.) glabrata* is the specific intermediate host. Schistosomiasis continues to affect the health of 220 million people around the world, causing mortality and morbidity. The World Health Organization lists schistosomiasis as one of the “Neglected Tropical Diseases (NTDs)”. Considerable effort has been invested over several decades to understand the immunological responses of *B. glabrata* to various microorganisms.

As a consequence, a large number of immune- and stress-responsive genes and gene products have been documented, but most of them need to be functionally verified. As *B. glabrata* and *L. stagnalis* are phylogenetically closely related, the recent application of CRISPR-Cas9 mediated genome editing to *Lymnaea* should allow functional characterization of these immune-related genes [6]. We have recently started a new project to control the infection of *B. glabrata* by *Schistosoma mansoni* by understanding the innate immunity of the resistant BS-90 line.



Life cycle of *S. Mansoni*

References

- [1] Kuroda R and Abe M, *Development*, **2020**, 147. [2] Abe M and Kuroda R, *Development*, **2019**, 146, Dev175976.
- [3] Kuroda R et al., *Scientific Reports*, **2016**, 6, 34809. [4] Kuroda R, *Integrative and Comparative Biology*, **2014**, 54, 677. [5] Kuroda R et al., *Nature*, **2009**, 462, 790. [6] Maier T et al., *PLoS Negl Trop Dis*. **2019**;13: e0007833.