



## Left-Right Asymmetry in Cell Biology

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### Message from the Guest Editors

Directional left–right symmetry is a fundamental property of organisms, including bacteria, protozoans, plants, and animals. However, the underlying mechanisms of left–right symmetry formation remain a fascinating mystery. Conditions of left–right inversion were already perceived in humans in the 19th century. A pivotal breakthrough was made with the proposal of the “nodal flow model”, in which the leftward flow of extra-embryonic fluid acts as the first cue to start the left–right asymmetric development. In Ecdysozoa and Lophotrochozoa, chirality of cells and blastomeres is responsible for the left–right asymmetric development. In plants, the organization of microtubules is central to their left–right asymmetric structures. Based on these findings, interestingly, the mechanisms of left–right asymmetric development are exceedingly evolutionarily divergent. It is easy to imagine that these divergent mechanisms depend on distinctive cellular machineries. In this Special Issue, the cell biology underlying left–right asymmetric development will be summarized and discussed.





## Editor-in-Chief

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## Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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