**EDITORIAL**

**Plant development: a Special Issue**

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I am very pleased to introduce this Special Issue focusing on plant developmental biology, published in honour of a founding father of the field, Ian Sussex.

At its core, developmental biology is about understanding how a single cell, the zygote, becomes a complex multicellular organism with specialised cell types organised into coherent functional patterns. Evolution has provided two particularly successful independent solutions to this problem in the form of plants and animals. In each kingdom, the problems to be solved are the same, and the solutions are derived from a common single-celled ancestor. However, the constraints of autotrophy versus heterotrophy have driven significant differences in the solutions that have survived the filter of natural selection.

For me, this has always made the comparison of developmental mechanisms between plants and animals particularly interesting. In each kingdom, the same key concepts recur: specification, determination, commitment, differentiation, feedback loops, that encode the regulatory properties of the systems.

The application of molecular approaches has revealed the identity of some of the main players in these patterning systems. For example, significant progress has been made in understanding the role of meristem-derived signals in patterning developing organs, as reviewed in this issue (Kuhlemeier and Timmermans, 2016). As knowledge of the parts has grown, it has become abundantly clear that it is their dynamic interactions, characterised by interlocking feedback loops, that encode the regulatory properties of the systems.

After decades in the shadows, computational modelling has re-emerged as an essential tool in understanding these processes, but now with previously theoretical parameters replaced with known players, although not always known quantities. This perhaps defines a central current bottleneck in developmental biology, namely the quantification over real time of key systems parameters.

This renewed zoomed-out focus, emphasizing the properties of dynamic systems, has reunified developmental biology. The regulatory logic of the systems is universal, even if the proteins making up the circuits are not. As the big overarching questions in development re-emerge centre stage, journals such as Development are more important than ever in providing a forum for the communication and discussion of these ideas within the field as a whole. I therefore very much hope that you will enjoy this Special Issue, which illustrates some of these points with plant examples. Development has a long and strong track record of publishing influential plant developmental studies and I encourage you to continue to submit papers in this great tradition. Our sister journal, *Journal of Cell Science*, is also planning a Special Issue on plant cell biology, so look out for an announcement from them in the coming weeks.

Finally, I would like to thank Jane Langdale (a member of The Company of Biologists’ Board of Directors) for suggesting this initiative, and members of Development’s Advisory Board (Dominique Bergmann, Enrico Coen, Ykä Helariutta, Elliot Meyerowitz, Ben Scheres, Jan Traas and Miltos Tsiantis) for assistance with handling submissions to the Special Issue.

**References**


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