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Development: looking to the future

In early 2009, I was contacted by The Company of Biologists (CoB) about the position of Editor in Chief of *Development*. I was still working at the Stowers Institute for Medical Research in the USA, but had just accepted the position of Director of IGBMC, a well-known French biomedical research institute founded by Pierre Chambon. This would be a heavy responsibility, and while I was excited by the prospect of the new editorial role, it was unclear to me whether it was a good time to add to my already heavy workload. Still, I had always liked the journal and felt I could contribute. I had been an editor at *Developmental Biology* for almost ten years and it was time for a change. The prospect of becoming *Development*'s Editor in Chief was attractive as it offered the possibility to influence the strategy of the journal. I also felt that the times were changing fast in developmental biology and that someone had to move forwards with some of the policies that Jim Smith had initiated and with new ones. Because I was myself embarking on new scientific ventures involving more stem cell work and quantitative approaches, I believed I was well placed to help promote these new directions within the journal.

I was particularly concerned by the rise of the stem cell field and had the conviction that *Development* should get a much larger chunk of this literature. Jim had already made a start in this direction with the recruitment of outstanding stem cells editors such as Austin Smith and Ken Zaret, but in my view the move towards the stem cell field needed to be much more aggressive. In 2009, I was invited to give a talk at the International Society for Stem Cell Research (ISSCR) meeting in Barcelona and I was very impressed by the large number of attendees, particularly compared with most developmental biology meetings. I did not feel like an alien in this crowd of stem cell researchers and it was quite clear to me that most were really doing developmental biology. In fact, most had been calling themselves developmental biologists until recently. The meeting concluded with a talk from the well-known stem cell biologist Irv Weissman, the then President of the ISSCR. I was struck by the ideas he developed in his talk, and I found the following quote from this lecture particularly disturbing: "*We are a field, a discipline, and an entire branch of science that brings new ideas, experiments, concepts and approaches that impinge on every field of biomedical research and medical translation. Like anything new, we are a threat to the established order, and at every kind of educational and research institution, to thrive we must be recognised as entities, not divisions of the old entities*." I am myself doing a lot of stem cell work, and I instead felt that I belonged to the old entity (developmental biology!) and disagreed with the idea that the stem cell field is new; rather, it has only become so fashionable recently. In fact, if you look back through the pages of *Development* in its early days, you'll find quite a number of stem cell papers. So I was really bothered by the implications of Irv Weissman's statement; I wanted to continue to study the embryo while trying to apply some of this knowledge to stem cell differentiation and regenerative medicine. Thus, to me it was very important that stem cell biology remains tightly associated with developmental biology.

On the other hand, I fully concurred with Irv Weissman about the novelty of regenerative medicine as a future major field of medicine. But I also see regenerative medicine as an application of developmental biology. Until recently, the medical applications of our field have been considered to be mostly restricted to the study of rare human malformations. Regenerative medicine, which involves reconstructing tissues from stem cells, will most likely largely rely on knowledge of the development of these tissues. In fact, it is clear that a major bottleneck in this field is to harness the differentiation of pluripotent stem cells into the desired lineage, which in most cases involves recapitulating the development of this lineage in vitro. Thus, following the reprogramming frenzy, which dealt more with cell biology and epigenetics, stem cell research is entering a new phase that is more focused on differentiating cells and rebuilding organs. This new era will undoubtedly require a thorough understanding of the normal development of the various lineages that build the embryo. Therefore, I think it is vital for the success of regenerative medicine that stem cell biology and developmental biology remain tightly associated. This is why I strongly believe that our journal should become an important player in the stem cell field.

In order to increase our visibility in the field, we hired new editors Shin-Ishi Nishikawa, Magdalena Götz and Gordon Keller to cover more aspects of stem cell biology. I also created the new Development and Stem Cells section, which seems to be doing quite well, both in terms of quality and quantity. We have also invested in several initiatives aimed at this burgeoning field, including a more active participation at stem cell meetings and commissioning of timely reviews in the field. Going forwards, we plan to continue this push and are actively looking at ways to do so – we could even, as Jim mentioned, consider another change to the journal's name.

Another area that I have aimed to promote is quantitative or systems biology. Whether this is truly a new field or simply a different and complementary way to address developmental biology is an open question. With the sophisticated imaging tools and the various '-omics' approaches available today, it is now possible to acquire highly quantitative data on developmental processes. This opens the door to revisiting many old questions using new quantitative analyses. Importantly, this has provided solid data for our physicist colleagues who, now that our problems are more tractable to their approaches, have become keen to address them. There is a natural interest among physicists and mathematicians in trying to understand the principles involved in the generation of shapes from elementary elements, which is what morphogenesis is about. Uncovering the physical principles underlying embryo formation will be a major challenge for this century, and, in the past few years, we have seen more and more outstanding physicists and mathematicians joining our field. This trend is now reflected in various kinds of developmental papers, both as collaborative ventures between biologists and theoreticians as well as purely theoretical papers. I am convinced that quantitative approaches and modelling will become ever more important for our field and that the new developmental biologists will need a more solid background in physics and mathematics than the previous generations. Several of our editors are able to handle such papers and it is becoming easier to find appropriate referees who are able to judge the quality of both the experiments and the theory.

While pushing into these new fields, I have tried not to forget the more traditional areas, including plant biology, which I realised was a major strength of *Development*. Our plant papers are very highly cited and the journal is highly regarded in this field. We have also expanded our scope in neurosciences and in evo-devo, and have recruited new editors with expertise in these fields. Recently, and recognising our position as a community journal, we have also added a Technical Papers section to publish new techniques and resources of wide interest to developmental biologists.

Other important developments at the journal have come from the revolution caused by the online world. Although we may have been a little late in updating our online image, I hope we are now catching up, and even pushing at the forefront in some ways. Key to this has been the launch of the Node, our community website. From the beginning, I was very supportive of promoting the journal and the field using more modern communication strategies such as those introduced by social networking. Jane Alfred and Claire Moulton, the CoB's Publisher, had already started to explore the possibility of creating a community-oriented blogging website that would be run by the journal and serve as a forum for all developmental biologists. The Node went live in 2010 and is run by *Development*'s Online Editor and Community Manager Eva Amsen. It is now becoming very popular and provides the community with a variety of interesting resources and discussions. We are confident that the Node will continue to flourish, and we invite you to take a look – and to contribute! – if you haven't done so already. We are also actively looking at our online content and seeking ways to improve article and data presentation and accessibility, as well as to reach out to a more tech-savvy readership, and we hope that you will notice the changes going forwards.

Looking back at Chris's and Jim's recollections, have we achieved the goals that we set ourselves over the last 25 years? Well, *Development* certainly encompasses the field of molecular genetics and our venture into plant developmental biology has definitely been a success. We're also a lot more international, both in terms of our editorial board – which reaches from Berkeley to Sydney, via Toronto, Marseille and Kobe, to mention but a few – and in terms of our author, reviewer and reader pools. Jim's efforts to create a close-knit team of editors working together to select the best papers have definitely paid off, as has his expansion of the front section – thanks to the work of Jane Alfred and now continued by the new Executive Editor Katherine Brown and Reviews Editor Seema Grewal. Our online presence is ever improving, and although it was sad to see the end of the printing presses at CoB last autumn (the journal is still available in print form), the future is electronic and we're looking that way. Finally, I hope that my push into the new fields in developmental biology will ensure the continuing success of the journal.

I would like to conclude by thanking the board of the CoB, particularly directors past and present, John Gurdon and Tim Hunt. I am also grateful to the *Development* Advisory Board and, more specifically, to James Briscoe and Kate Storey for valuable discussions and support. The team of academic editors deserves great credit for their dedication and enthusiasm for the job and I thank our editorial board for their engagement and support. I also thank the *Development* staff: Administrators Jenny Ostler and Debbie Thorpe; Production Editors Colin Davey, Jane Gunthorpe and Lindsay Roberts; the editorial team of Katherine Brown, Seema Grewal and Eva Amsen; as well as CoB's production department and Publisher Claire Moulton.

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