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25 Years of *Current Opinion in Cell Biology*

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Current is a fleeting term. What was *current* yesterday is often outdated tomorrow. Staying *current* is difficult; but that is exactly what *Current Opinion of Cell Biology* set out to do 25 years ago. The journal was founded with the intention of capturing the pulse-of-the-moment in the most prominent fields of cell biology by publishing short, concise review pieces which focus on the recent experimental, technological and, most importantly, conceptual advances. As indicated in the title of the journal, authors were encouraged not just to summarize recent advances in a scholarly manner, but were, and still are, given free range to express their considered opinions. At its launch in 1989, the journal was ahead of its time. The concept of focusing only on the most recent advances in a field was novel and broke new ground. By recognizing the increasing pace and complexity of modern cell biology COCB was right on target and it has been much copied since.

The purpose of the published pieces was, and still is, to take a snapshot of where a field stands at the time of writing. In that sense, the review pieces are designed for immediate consumption. However, the celebration of the 25th anniversary of COCB also makes clear that the archives of the journal represent a unique collection of ‘frozen moments’ showing how the discipline of cell biology, and its subfields, has developed over the past quarter century. To illustrate some of these developments, the reader is invited to explore the interactive timeline at www.elsevier.com/locate/ceb, which highlights some of them. By clicking on individual topics along the timeline, the reader will be linked to key reviews in each field illustrating the progress over the past quarter century.

A quarter century ago, cell biology was largely dominated by the fields that founded the discipline: membrane trafficking, organelle biogenesis, cytoskeleton, mitosis and cell adhesion. In those days, these were already mature fields in the sense that the biological processes underlying them were well characterized morphologically, mostly through extensive light and electron microscopy studies. At the time they were entering a new era in which the molecular underpinnings of these fundamental phenomena were beginning to be investigated, often by application of a combined approach of biochemistry to identify key players in conjunction with molecular biology to manipulate them and assess their biological function. Other fields would follow the same path shortly thereafter. All of these fields are still with us and are going strong. They have progressed by deepening the level of molecular understanding, by identifying cross-talk with other processes, and by exploring their physiological and pathological relevance in development and disease.

While the typical progression of a cell biology field is to evolve from a morphological description toward molecular characterization, some fields took the opposite path. The best examples are the study of the traditional molecular processes of transcription, RNA splicing, replication and DNA repair. These processes were all exquisitely well characterized at the

molecular level, mostly through biochemical fractionation and reconstitution in the test tube, before cell biologists began to probe their cellular organization in the mid- to late 1990s. These efforts made it clear, even to the most entrenched biochemist, that these processes, like all other molecular events, cannot be understood in isolation and that their cellular organization and the cellular environment affects their regulation.

In addition to the staples of traditional cell biology, which founded the discipline, numerous new fields emerged over the past 25 years. Some of these were based on singular, sometimes forgotten, often provocative, sometimes obscure, observations, which became recognized as fundamental. Prime examples are apoptosis, epigenetics, or stem cell biology, which all made dramatic and impactful entrances onto the cell biology stage. Other new fields were entirely unexpected and surprising, none more so than RNAi mechanisms and the discovery of an entire universe of micro- and non-coding RNAs.

Maybe more than most other biomedical disciplines, cell biology is driven by technology developments. The invention of confocal microscopy and then the discovery and application of live cell imaging probes such as GFP changed forever the way we do cell biology and how we ask questions. In line with a general trend for disciplines to cross-fertilize each other and to merge, cell biology also benefited from technology development in the area of gene expression analysis including microarray and deepsequencing methods. These are now standard tools in cell biology laboratories.

Cell biology has become more complex over the years. Rather than attempting to understand cell biological processes in isolation, fields increasingly merge and reveal, at times, unexpected links between them such as the role of signaling in cytoskeleton architecture or the mechanisms of communication between cellular organelles. The exploration of complexity in cell biology has culminated in systems biology which has moved cell biology from a largely candidate-based approach to one of unbiased discovery using genomic and proteomics methods.

So, what is the future of cell biology? The future has already begun with the realization that many processes which we think of as fundamental events in the life of a cell drive physiological and pathological processes. The dividing line between basic and clinical sciences is rapidly disappearing and this trend will intensify and drive much of cell biology in the coming years. It is also safe to predict that a cell biological understanding of any disease will become indispensable for the rational design of the best diagnostic and therapeutic strategies. It is becoming clear that only if we understand the cell biology of a disease, do we really understand the disease itself. As disease genes are identified at an ever-increasing pace through the availability of genomic methods, more cell biological processes will become revealed as disease-causing and, even if they are not the cause of a disease, their alleviating or confounding function in the disease process will be characterized, and if possible, exploited to the patient's benefit. Importantly, every piece of cell biological knowledge that we have accumulated over the decades by exploring basic cellular processes will become relevant in uncovering causes and pathways of disease and will give us a head-start in combating them. Eventually, much of what basic cell biologists have discovered in

their laboratories in their pursuit of understanding how cells work will come to bear on biomedicine.

Current may be a fleeting term and our *opinions* on what is important and in vogue may change as we go along, but looking at the short history of cell biology over the past 25 years in the pages of COCB reveals a remarkable permanence and continuity in the field. Everything we do in our laboratories is built on the ideas and research of those who went before us. It is reassuring and humbling to realize that today's *current* will be the foundation for tomorrow's groundbreaking discoveries.

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