From the Editor

Beyond Darwin: The Future of Molecular Biology

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A year ago, we knew that 2009 would be Charles Darwin's year. We knew that our colleagues at other journals would all properly honor the 200th anniversary of his birth and the 150th anniversary of *On the Origin of Species*. But when *BioTechniques* started planning this year's special review issue, we wanted to look forward, not backward. We had, after all, just completed our retrospective 25th Anniversary issue, and frankly, we did not want to join what we expected to be a long (albeit distinguished) roster of historical assessments of, well, the evolution of evolution.

The result is *Beyond Darwin: The Future of Molecular Biology*. We invited leading researchers to survey the life-science landscape and report what they see as biology's most promising new investigational tools.

But why, then, keep Darwin in the title at all? Because there is a sense in which Darwin's own method of discovery now dominates modern biology. Certainly today's science would have been impossible without the cause-and-effect concepts of evolution. But perhaps more important, Darwin was unique in his ability to gather, retain, and synthesize huge amounts of information—to see through to the fundamental patterns behind the data. Only recently has technology allowed scientists in general to undertake studies that rival in scope the investigations that Charles Darwin undertook alone.

So we wanted to try to gather clues to the lifesciences' next few years or decades. Some of those hints should be apparent now: When I first started covering molecular biology in 1984, the general shapes of genomics and proteomics were already becoming clear . . . to some researchers, at least. After Lee Hood first explained two-dimensional electrophoresis to me, I remember walking through New York's Washington Square Park in a pleasant daze, letting the implications unfold in my imagination: panoplies of differential displays of proteins expressed in different tissues in varying states of development, health, and disease. By the early '90s, I had begun to think that, if I were just then starting a research career of my own, I would study not genes but "junk" DNA, looking between the exons for the logic of the biological machine.

As we assembled *The Future of Molecular Biology*, we asked our contributors to assess current trends and predict the evolution of technique—the methods that will move us to finer resolutions, larger scales, higher throughputs, and clearer resolution; the tools that will fulfill the promises of genomics, epigenetics, proteomics, metabolomics, systems biology, and whatever may come next.

We also challenged contributors to consider some questions: Can you see among today's emerging methodologies a strong but not-quite-recognized theme for biological research? How do you see it developing, or (better yet) how should it develop? What are today's—and tomorrow's—most interesting methodological challenges? What kinds of data do we need most but cannot attain with current technology? What technical advances would bring those data within reach?

We present some responses in this issue, but the questions will continue. Please take a moment to consider what answers you would give, and how you see the road leading to tomorrow.

And if the answer is interesting, please share it.

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It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent on each other in so complex a manner, have all been produced by laws acting around us.

Charles Darwin, MA. 1859. *On the Origin of Species by Means of Natural Selection,* or *The Preservation of Favoured Races in the Struggle for Life*. From the last paragraph.