contentincontext

What lies beneath

Although this editorial shares its title with a movie about a self-absorbed, philandering, and murderous geneticist, that's merely coincidental and not really relevant. Actually, the phrase popped into my head when I was reading the stories in this month's issue.

I began thinking about the nature of scientific endeavor, and more specifically about how medical and drug research has evolved. Once, the most doctors could do was treat symptoms or obvious physical manifestations of disease. Treatments often had little effect on root causes since the treatments were based largely on hypothetical or phenomenological understandings. At worst, the treatment could be more harmful than the ailment.

Historically, as the ability to study disease advanced and greater knowledge was gained, researchers began creating therapies with more direct bearing. A critical step came more than 120 years ago when it became widely accepted that microbes caused diseases. As a result, therapeutic drugs and vaccines began to emerge to target these causes.

What has always been true is that scientists feel compelled to find an explanation, a cause, or a cure—that is, to know what lies beneath. Driven by this need to uncover and understand the unknown, they have created the necessary tools. And, although there are still many unanswered questions, these tools are giving us a better grasp on the biological, genetic, and even molecular bases of many diseases.

Among these tools is polymerase chain reaction technology, which, along with other molecular diagnostic approaches, is highlighted in this month's special poster section. The poster shows how we've gotten beneath the superficial, progressing, for example, from merely culturing bacteria as a means to implicate them in disease to assessing their function in detail.

But the tools to delve this deep are not limited to diagnostics, as the feature stories on pages 28 and 39 illustrate. One describes how scientists are using microscopy and molecular tagging to image drug and cellular interactions in real time. The second shows how they are using various approaches to comprehensively view the transcriptional state of genes in healthy and disease processes.

Similarly, the Tool Box department (page 51) outlines a method for knowing what's really happening inside cell cultures—whether the cells are alive, dead, or dying—and for monitoring protein expression levels. And our Clinical Trials Track (page 55) describes a new class of histone deacetylase inhibitors that trigger cancer cell death. These drugs are yet another example of probing into cellular pathways to make targeted attacks.

This month's issue also looks at what's beneath the surface of regulations and business events. We explore what is and isn't an antibiotic in regulators' eyes and the pitfalls of new privacy laws on clinical development. We examine new drug developments and which products are helping to drive pharmaceutical and biotechnology companies' sales and earnings growth. And we offer insight from Jürgen Drews, former head of global R&D at Hoffman-La Roche and now managing partner at Bear Stearns Health Innoventures, who offers a cautionary view of technology's impact on drug R&D.

Recent technological developments and changes in the approach to drug discovery have created a gap, Drews says, where productivity has not been commensurate with the industry's outlay of money and effort. As a remedy, he suggests that companies should move away from focusing on broad disease areas and markets and concentrate instead on common molecular targets—the ones that lie beneath.