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Seeking future growth

Without a doubt, nanotechnology has become a hot research area. Almost two decades ago, fullerenes were identified in the mass spectra of sootlike substances produced at Rice University. Commercial-scale production of these and similar nanostructured materials, with unique size-dependent properties, is beginning as they find application in new products. Many technology pundits call this the "dry side" of nanotechnology.

Others yet, including Nobel laureate and Rice Chemistry and Physics Professor Richard E. Smalley, use an even broader definition to also encompass the "wet side." Thus, in what may come as a surprise to those working in drug discovery, many nanotechnologists are taking ownership of most biological molecules and systems, such as proteins and cells, as well as biomaterials with nanoscale structures. Biotechnology, they say, is simply nanotech's wet side.

Even the NIH has caught nanotech fever, launching plans to develop and support Nanomedicine Development Centers as part of its Nanomedicine Roadmap Initiative. The initiative's goals include measuring assemblies to understand molecular pathways and networks, and using this information to design and develop new nanomachines and technologies to improve human health.

Wet or dry, nanotechnology is being touted as the next industrial revolution, with long-term and wide-ranging effects on many products and industries. The U.S. government has gone so far as to suggest that in another 10–15 years, nanotechnology will impact more than $1 trillion per year in products and services. Still, it's important to remember that it is an enabling technology and not necessarily an end in itself.

Nanotechnology represents one of several multidisciplinary scientific and commercial areas blossoming today. And, separately from simply usurping all of cellular biology as nanotechnology, clear synergistic opportunities for nanomaterials in drug development exist on their own. One that is showing promise, as described in this month's cover story (see page 30), is drug delivery.

Another opportunity is nanotechnology's potential to offer economic, as well as intellectual, growth. The April 19 issue of *Chemical & Engineering News* quotes Phillip J. Bond, a longstanding nanotech champion and U.S. Department of Commerce undersecretary for technology, as saying: "Nanotechnology—and nanotechnology-related jobs and economic growth—is no longer science fiction but economic reality."

If nanotechnology is part of a prosperous future, so, too, is drug R&D. Although the overall job market remains challenging, the U.S. Department of Labor reports that the pharmaceutical industry will be one of just a few chemically related sectors to show employment growth, at about 2% per year, out to 2012. Meanwhile, the biotechnology industry is seeing positive shifts in its fortunes and improved growth.

The idea of growth is echoed throughout this month's issue. It appears in new technology areas such as microwave chemistry, genomic microarrays for cancer research, assays for detecting DNA and RNA, high-content screening, and protein refolding. On the business side, economic growth is cited as a critical factor in R&D shifts among world regions, incentives behind high-stake patents, and markets for drug therapies

It also is why *MDD* has provided a special employment feature, which includes an outstanding editorial contribution from *C&EN*'s Aalok Mehta on the roles scientists play in drug development. Along with this, *MDD* is happy to see leading drug firms reaching out to readers and potential employees through its pages and hopes this heralds a renewed sense of growth for drug R&D.

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