C E P Chemical Engineering Progress

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The Influence of DNA on Chemical Engineering

When I first heard that James D. Watson was the recipient of the 2005 Othmer Gold Medal given out by the Chemical Heritage Foundation, I was curious as to how his contributions tied into the world of chemical engineering and chemistry. Watson, of course, is famous for his 1953 discovery of the double-helical structure of DNA, for which he was awarded the Nobel Prize in Physiology and Medicine in 1962. Even Watson, a zoologist by degree, was initially taken aback by the honor. "I thought it was inappropriate to be giving a biologist this award, and not someone working in the chemical industry." However, upon further pondering, "finding DNA was pure chemistry and is the result of chemistry," he said in his acceptance speech. Indeed, without Watson's discovery, the biotechnology revolution, of which chemistry and chemical engineering concepts are so vital, would have been delayed, or may very well have not occurred.

The simple and elegant shape of the double-helix influenced Herbert W. Boyer, who discovered recombinant DNA, which has been used in groundbreaking research in developing therapeutic drugs. Boyer is the co-founder of Genentech and, to many, the father of the biotechnology industry. One interesting point that Watson mentioned about Boyer is the initial protests over recombinant DNA. Critics viewed research in this area as opening a Pandora's box —potentially having dire consequences. Yet, for proponents like Watson, "If you can do something good, go ahead and do it, but you have to have some courage to go forward."

Recombinant DNA has helped thousands of patients, including: insulin for the treatment of diabetes; growth hormones; cancer treatments; and an agent to dissolve blood clots in victims of heart attacks. Its potential doesn't stop there. Said Watson, "DNA analysis can eventually be used to determine the seriousness of a disease." The examples he gave included diagnosis of breast cancer, autism and even possibly schizophrenia. But, the problem with further research into these areas is money. "It likely takes $10–$20 million for research, but this is inexpensive compared to when you think about [the costs associated with] having to care for autistic children," said Watson. There is hope to successfully treat illnesses that were once thought to be terminal, as long as scientists and engineers continue to push the envelope in research.

Kristine Chin,
Publisher and Editor-in-Chief

Corrections for June 2005 Issue

On.p. 17, ProSim's website address should be www.prosim.net. Additionally, the second sentence should read, "In this field, the company is a long time member of the Professor Gmehling's UNIFAC Consortium, from the Oldenburg University. This allows ProSim to have privileged access to new developments from group contribution methods such as UNIFAC Dortmund or PSRK, widely used in particular for the synthesis and design of separation processes."

On p. 53, the author of the "Guidelines for Safe Handling of Powders and Bulk Solids," should be Robert Zalosh. We apologize for any inconvenience this may have caused.