makes it seem inherently difficult. For example, the frameworks expect students to understand that "exogenous DNA can be inserted into bacterial cells to alter their genetic makeup and support expression of new protein products." If the educational leaders want to make biotechnology seem alien, inaccessible, and mysterious, they do a very good job. If they intend for average students to carry an understanding of biotechnology with them into adulthood, they need to revise their thinking. Science teachers simply cannot afford to "waste time" on biotechnology and genomics if it is not incorporated in these high-stakes tests—this in states that are bustling with biotechnology companies.

Once out of school, there are few opportunities for adults who do not work in the field to learn about biotechnology. As difficult as it is to keep the "captive audience" of the classroom informed, it is harder to educate adults whose school days predate the discoveries now at play in biotechnology. Many adults have difficulty defining a cell or describing where DNA and genes are in the body. They simply cannot meld reports on cancer research, a new flu drug, a debate about patenting genes, the uproar over cloning and GM crops, and a gene therapy death into a coherent picture that weighs the risks and benefits (if they are indeed paying attention to these stories at all).

Biotechnology companies may have different reactions to the wrath and puzzlement that sometimes bubbles up regarding genetic engineering. They may feel a sense of responsibility to help educate the public—for self-preservation and/or for the general good—but at the moment they are right to feel helpless about how to do so. Most don't have the resources to develop educational materials on their own, and most are completely baffled at how to reach the adult public.

We have a suggestion. Industry leaders could direct some of their lobbying efforts to the public education arena. They could pressure state departments of education to update their science curriculum standards with relevant biotechnology material. They could serve on science advisory boards to incorporate up-to-date biotechnology concepts into standardized testing from the earliest grades. If biotechnology were a firm curriculum requirement, curriculum developers would rise to the challenge. To ensure that curriculum is high quality and relevant to real-life issues, industry leaders could serve as curriculum advisors.

Most straightforwardly, biotechnology companies could sponsor programs for television and radio that provide a balanced look at the risks and benefits of a technology. A good example is the recent NOVA/Frontline episode on genetically modified foods that presented numerous opposing viewpoints and exposed the enormous complexity of the debate. Industry leaders also need to learn the lessons of risk communication: it is simply a fact of human nature that people fear the unknown, especially when it comes packaged in language they don't understand, seems "unnatural," and takes place outside of their control. Industry communicators must address this instinctual attitude before their public can begin to learn and understand.

In short, the dearth of public understanding of biotechnology is a two-pronged problem. One prong affects the education of our youth and the other affects our adult peers. Biotechnology companies can become involved in solutions to both prongs by advocating for better curriculum standards and more sophisticated communication with the lay public. In the long run, this effort will translate into greater public understanding of the biotechnology industry. Whether or not that translates into smoother sailing and greater public acceptance depends on the efficacy of the science and the quality of the education effort.

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Errata

On the "In this Issue" page of the July 2001 issue, the brief entitled "Delivery by a bit of Tat" by Kathy Aschheim erroneously described the paper by Xia *et al.* as follows: "The HIV Tat protein transduction domain improves the biodistribution of β-glucuronidase expressed from recombinant viral vectors." In fact, the paper does not show that modification of β-glucuronidase with the Tat protein transduction domain enhances delivery of the enzyme across the blood–brain barrier; rather, it improves the biodistribution of the enzyme expressed from cells in the brain or periphery.

On p. 1123 of the November 2000 issue, the commentary entitled "Good faith gone bad" by Harvey Bialy contains the sentence "Their collaboration continued, during which time Alagon discovered that the bat protein had a specificity for fibrin that was many times greater than other commercially produced tissue plasminogen activators (tPAs)." This is inaccurate in that, at the time, commercial production of tPAs was still a few years away.