

INTERVENTION Fact Sheet /Q & A:

Intervention, a new book by Denise Caruso, former technology columnist for [The New York Times](#) and founder and director of [The Hybrid Vigor Institute](#), reassesses the risks of emerging biotechnologies and genetic engineering

What inspired Caruso to write Intervention?

Caruso's interest in the risks of genetic engineering began in 2000, shortly after leaving *The New York Times* and starting The Hybrid Vigor Institute, when she met Roger Brent, a highly regarded genomic biologist and president of the Molecular Sciences Institute in Berkeley. Their early conversations, chronicled in the introduction to *Intervention*, inspired Caruso to research and publish two reports on the subject through Hybrid Vigor. The first, in February 2002, was a 49-page monograph on risk, public policy and genomics, called "Risk as Continuum: A Redefinition of Risk for Governing the Post-Genome World." After its publication, Caruso was commissioned by the Rockefeller Foundation to research and write a report on the history of risk assessment for scientific and technological innovations, published in October 2002. The research for this paper, which she called "Risk: The Art and the Science of Choice," led her to Baruch Fischhoff, Ph.D., a leading risk expert and professor of social and decision sciences at Carnegie Mellon University. Fischhoff introduced Caruso to four seminal studies on risk assessment, published by the National Academy Press of the U.S. National Research Council between 1983 and 1996.

These peer-reviewed studies provided Caruso with the technical foundation for the arguments she presents in *Intervention*. (Both pre-*Intervention* papers are available at <http://hybridvigor.net/health-determinants/publications/>.) Her belief in the importance of her findings, as well as outside interest in the subject, led her to the decision to write a book for the general public to present her argument, using genetic engineering as a present-day example.

What's Caruso's background?

Caruso spent nearly 20 years as a thought leader in the technology industry. While starting as an editor and reporter for industry publications in 1982, she quickly moved into analysis, criticism and commentary of new technologies, companies and industries for the business sections of major metropolitan newspapers (primarily the San Francisco *Examiner*, where she wrote the Sunday "Inside Technology" column for five years). She was the founding editor of three seminal industry newsletters before she was asked to write the Technology column for the *Times* in 1995. Her pioneering expertise in the nascent digital media industry led her to familiarize herself with the world of public policy, both domestic and international, especially with regards to intellectual property, free speech and privacy issues.

In 2000, tired of the vacuity of the so-called Internet economy, she resigned her column at the *Times* in order to start the non-profit Hybrid Vigor Institute. The founding mission of Hybrid Vigor was to bring together experts from different disciplines in order to stimulate more robust thinking — and hopefully new and important discoveries — directed toward solving serious global problems, as well as to improve and formalize the research methods that would empower these kinds of cross-boundary inquiries. (The name refers to the biological term "hybrid vigor," which describes the increased intelligence and strength that result from cross-breeding.) Since its inception, the Institute has been funded by the U.S. National Science Foundation, private and public foundations, and individuals.

What is new about this book?

Most books about the risks of genetic engineering or biotechnology have been about the safety or danger of the products or the processes themselves; i.e., why genetic engineering or cloning is (or is not) safe; whether transgenic (a.k.a. "genetically engineered") food is (or is not) safe to eat, how transgenic plants

or microbes are (or are not) a threat to the environment, and so forth. What is unique about *Intervention* is that it refuses to take sides in these typical, well-worn and fundamentalist debates between pro and con. Instead, Caruso believes that such debates are not only irrelevant, but as is true with most fundamentalist positions, they obscure the real issue: that *no one* — not scientists, not regulators, and certainly not the public — knows the safety or danger of biotech products, because of the flawed methods that are used to assess their risks.

This is the central argument of *Intervention*: if the methods by which risks are assessed are flawed or outmoded, or the outcomes can be manipulated, then the public and the health of the planet may be at risk of significant unanticipated consequences because of the evidence that is being dismissed or ignored. Caruso has gathered an impressive body of evidence to support this argument, showing how (a) government regulators have been relying on outmoded methods for assessing the risks, of biotech products, thus their assertions of safety are based on false or misleading premises; (b) the methods now in use actually allow industry and regulators to slant risk analyses toward outcomes that declare “safety”; and (c) that there is a proven, alternative method for risk assessment that is far better at assessing the real risks of technological innovations like genetic engineering. If used, Caruso states, this method can lead to the development of better and safer biotech products, and can protect public health and the environment at the same time.

What evidence does Caruso use to support her argument?

Caruso has spent more than five years compiling articles from academic journals in several disciplines, including the biological, social and political sciences, as well as analyzing federal agency reports and literature from other relevant fields of expertise. Most influential to her thinking were the aforementioned National Academy risk studies, in combination with several other National Academy reports focused specifically on the health and environmental risks of genetically engineered food, plants, animals and other organisms. While she relied primarily on published literature, Caruso also confirmed and clarified her arguments through interviews with experts from several fields, including biology, statistics, biotechnology, public policy, bioterrorism and biosafety, and risk and decision analysis.

Another unique feature of *Intervention* is the fact that Caruso actually conducted original research to help improve biotech risk assessment. Joined by Baruch Fischhoff as co-investigator, the two developed a National Science Foundation-backed study titled “Understanding Genomics Risks: An Integrated Scenario and Analytic Approach.” The study was primarily designed to model and assess the risks of using transgenic pigs as human organ donors. (The results, which also included modeling the risks of avian influenza, were published in the September 2006 issue of the peer-reviewed *Journal of Risk and Uncertainty*.) The primary public health risk in xenotransplantation, as the technique is called, is the transmission of a retrovirus from pig to human, which could also recombine with a human virus as a result of a transplant procedure. But when Caruso and Fischhoff assembled a panel of risk experts to evaluate the utility of this basic risk model, the panelists quickly raised a series of much broader risk implications about xenotransplants, ranging from disposal of contaminated waste to effects on the health care system, all of which were significant —and none of which would be raised in a traditional, quantitative risk analysis.

The panelists concluded that these types of expanded conversations about risk, giving equal weight to available data as well as the scientific and social uncertainties involved, were critically important for making responsible public-policy decisions about whether a new technology could be safely adopted.

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For more information and to purchase your own copy of *Intervention*, please visit <http://hybridvigor.org/intervention>.