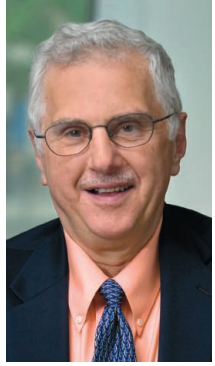
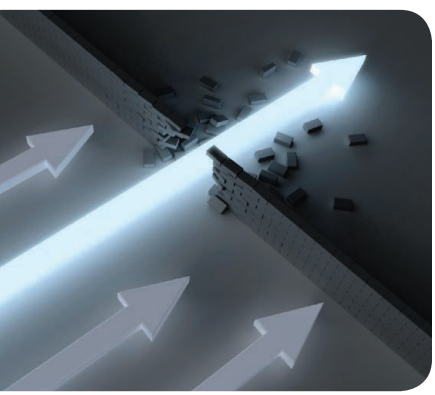


Bruce Alberts is Editor-in-Chief of *Science*.

Science Breakthroughs

AS ANNOUNCED IN THIS ISSUE, *SCIENCE*'S CHOICE FOR BREAKTHROUGH OF THE YEAR FOR 2011 is based on the paper *Prevention of HIV-1 Infection with Early Antiretroviral Therapy** (see p. 1628). This provocative choice was made after much deliberation involving our News and Editorial staff, plus our Board of Reviewing Editors. The study involved more than 1700 heterosexual couples, of whom one partner was infected with the human immunodeficiency virus (HIV) and the other was not at the start of the trial. All those infected still had relatively intact immune systems. The study gave antiretroviral drugs to half of the infected people and delayed giving treatment to the other half until their immune systems declined to a dangerous degree. The results of this early treatment with a cocktail of antiviral drugs were dramatic, lowering the rate at which the HIV-free partner became infected 20-fold, while also improving outcomes for the infected partner. In combination with other promising clinical trials, the results have galvanized efforts to end the world's AIDS epidemic in a way that would have been inconceivable even a year ago. "The goal of an AIDS-free generation is ambitious, but it is possible," U.S. Secretary of State Hillary Clinton told scientists last month.



This is not to say that we can abandon the search for an AIDS vaccine. Nor will profound change come overnight from the promise of using treatment as prevention. But for its role in making success conceivable, we have chosen the results of this trial as our Breakthrough of the Year.

Picking the nine Runners-Up was unusually challenging this year. In most fields, there was good steady progress, which is how science normally works. My favorite runner-up is the successful outcome from the heroic, problem-plagued Japanese mission to the Itokawa asteroid. The illuminating analysis of the asteroid dust returned by the Hayabusa spacecraft provided that nation with a triumph to help balance the year's greatest tragedy: the huge earthquake and tsunami that struck northern Japan in March 2011.

Already there are signs that 2012 will be an exciting science year. This month, physicists at the European particle physics laboratory CERN may have seen signs of the elusive Higgs boson, the hypothetical fundamental particle that would explain how other particles obtain their mass. This discovery would be one of the biggest breakthroughs in science, and we await the outcome of the latest reported glimpses. But predicting the future of science is always treacherous, and perhaps the greatest pleasure for those of us at *Science* is the certainty that there will be amazing surprises in the year ahead.

Not all of the news for science has been good this year. Regrettably, we live in an age where "science denial" has become fashionable. For instance, in the United States, the pressure to conform has become so great that even many politicians who know better have become unwilling to speak out to support what science knows about climate change. Part of the reason is that politicians need to raise funds to compete effectively in elections, and the large amount of money spent by special interest groups distorts the public debate. To counter such science denial, I have repeatedly argued on this page that scientists need to pay much more attention to science education. Teaching is not the same as simply telling students what one knows—a common approach pursued through lecturing. Instead, the scientific community needs to strongly support evidence-based methods for improving how students learn science both in college and at lower levels, focusing on empowering all students with the reasoning and problem-solving skills of scientists. Then, perhaps, *Science* might one day be able to highlight the striking results of a large "clinical trial" in science education as our Breakthrough of the Year, reporting the clear benefits to students inspired by a carefully designed, hands-on, inquiry-based exploration of the world.

– Bruce Alberts

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*M. S. Cohen *et al.*, *N. Engl. J. Med.* **365**, 493 (2011).

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