

Advances to Watch

Every research discovery has its own path. While the research that leads to discovery typically takes five to eight years, it can span decades. Still more time elapses between patenting a new pharmaceutical and making it available as a treatment.

But it is impossible to predict when a finding in basic research will revolutionize our ability to treat human disease. Such was the case with the discovery of the “restriction enzymes” that bacteria use to recognize and cut foreign DNA. “The discovery of these enzymes was the basis for the entire biotechnology industry,” says molecular geneticist Jerry Chi-Ping Yin at the University of Wisconsin-Madison. “And no one could have foreseen it.”

Today, scientists are using new research tools—such as high-throughput DNA sequencing and meticulous imaging techniques—to accelerate research. Researchers are probing the ingenious ways pathogens cause disease, how the immune system fights back, and ways genes and the environment interact in myriad other diseases. Progress is being made across the spectrum of biomedical science. Here are six areas—among many—to watch.

- Saving and Improving Memory
- Targeted Therapies for Cancer
- Outwitting the Agents of Infectious Disease
- Tackling Twin Epidemics of Obesity and Diabetes
- New Tools for Bioterrorism Preparedness
- Repairing Spinal Cord Damage