PITTMED

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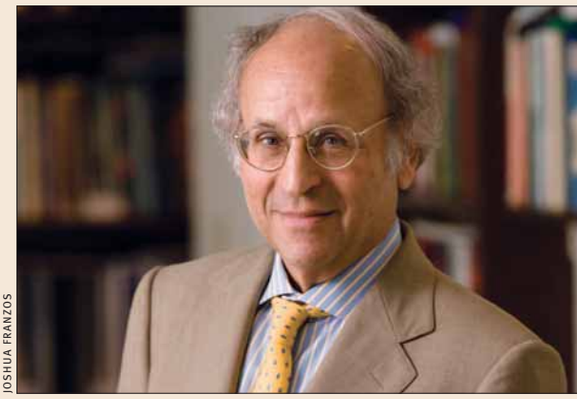

JOSHUA FRANZOS

*And no, we don't know where it will lead. We just know there's something much bigger than any of us here.*
—Steve Jobs

We live in an era of spectacular advances in medical research. Driven by almost unimaginably powerful technology, we gain further insight into human biology and illness almost by the hour; the momentum isn't slowing. A family of cellular molecules known as microRNAs (miRNA), not even known until the mid-1990s, is able to affect the ultimate expression of many of our genes. Just in the past few months, we have learned that these molecules can be transferred between our tissues and organs and that we can even absorb them by eating miRNA-containing plants. The human benefit may be profound: For example, certain miRNAs can increase our high-density lipoproteins (HDL) and lower our low-density lipoproteins (LDL), thereby potentially reducing the risk of cardiovascular disease. Although the pharmaceutical pipeline is thought to be "dry," with few if any new paradigm-shifting drugs emerging, the fact is that we sit on the brink of extraordinary discoveries based on our rapidly emerging knowledge of druggable cellular targets, the use of molecules like miRNAs as "drugs," the new ability to grow human cells on chips for drug effect and toxicity studies, and the power of computational and systems biology to take us past our knowledge of an individual patient's genome to a rich understanding of how that person's genome is ultimately expressed in a single cell and at an instant in time.

Thus, there is no question that great science today is leading to great medicine tomorrow—faster than ever. Great science is also great business. Every $1 million in research funding is estimated to generate 36 jobs—directly and indirectly. In fiscal year 2010, the University of Pittsburgh, driven by the medical school, received $800 million in research support. That has yielded almost 30,000 jobs! A November 2011 economic analysis estimates that federal- and state-funded research received by U.S. medical schools and their associated teaching hospitals added close to $45 billion to our economy in 2009. Moreover, the $4 billion invested so far in mapping the human genome has yielded an estimated $560 billion in new drugs and other health-related research advances—quite a return! The NIH estimates that the gains in life expectancy in this country since 1970 are worth some $3.2 trillion annually in enhanced productivity. Antiretroviral therapies have turned AIDS from a fatal to a chronic condition, enabling people diagnosed in their 20s to live and work until a normal retirement age. Cancer incidence is now falling at the rate of 1 percent per year, with each percent decline saving approximately $500 billion in otherwise lost productivity. But I've described only the economic impact that research has had in the past, not what we can anticipate for the future. The long-awaited era of "personalized medicine" will be part of routine clinical practice within the next decade; therapies based on a person's specific genetic profile are already used routinely for some diseases. Here, in collaboration with UPMC, we are launching a new Institute for Personalized Medicine to apply our own research to improving disease prevention and the treatment of our patients. Forgive the idiom, but … is great science great medicine *and* great business—or what?

Arthur S. Levine, MD
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