Vibrant biomedical landscape lays solid foundation

The Seattle metropolitan region hosts a rare convergence of bioscience and information-science talent, the underpinnings of a vibrant biomedical research community. The Benaroya Research Institute at Virginia Mason (BRI) and other not-for-profit research centers flourish in this rich corporate and academic environment.

At the forefront of our work is the effort to integrate genomics with molecular medicine, to determine how certain genes influence the course of major diseases like diabetes and cancer, and how some genes influence a patient’s response to treatments for these diseases.

We are acquiring a sophisticated understanding of how basic functions like cell growth and maturation are regulated. The ultimate impact of these new approaches will be a profound change in the delivery of medicine: one in which both drugs and information are specifically tailored to the individual.

These laboratory advances also improve our ability to diagnose disease in individuals, and improve the accuracy of prognosis. Preparing for this radical change in our approach to human health demands a dedication of resources to deal with several key issues. In particular, on the social and political front, we must:

- Create effective personal privacy protection laws, to take into account the impact of being able to predict disease and individual medical outcomes at a previously unimagined level;
- Find a way to make health insurance universal, so that it is not only individuals with the most comprehensive policies who benefit from the new array of diagnostic tools and treatments;
- Address complex and sometimes controversial societal issues, including potential rationing of scarce and expensive therapies and the allocation of resources based on differences in disease susceptibility — which may create disparities in health-care delivery.

On the scientific front, the issues are no less demanding. Scientists who have traditionally worked in isolation must now form interdisciplinary teams in order to unravel the intricacies of human biology and genetics and the relationship of these fundamental processes to the development of disease.

The BRI is a prototype for this type of scientific approach, housing a “task force”-style research team composed of immunologists, geneticists, molecular biologists and physicians from around the world. The illnesses that are central to our laboratory work are among those with the largest economic tolls in this country: diabetes, arthritis and cancer.

The scientific and medical infrastructure required to support this type of interactive program comes from institutions dedicated to collaboration.

An outstanding example in 2002 was the successful Human Islet Transplantation program, which combined the efforts of six Seattle institutions and their scientists. The Benaroya Research Institute, Puget Sound Blood Center and Pacific Northwest Research Institute worked closely with all three major Seattle hospitals — Virginia Mason, Swedish, and University — to make this innovative therapy possible for patients with autoimmune diabetes.

The pace of scientific advances is clearly much faster than the ability of our social and political institutions to deal with the resulting issues. Institutions like the BRI have a role to play by communicating with corporate and public leaders about the convergence of bioinformation and biotechnology. Underlying all these issues are needs that require the involvement of the entire community:

- Adequate support for K-12 and higher education. We need to be preparing the next generations of scientists, and we need a scientifically and technologically literate populace: people who can participate in the conversations about societal priorities and ethics that will be generated by ongoing discovery. We need not only Ph.D.-level molecular biologists and immunologists, but also laboratory technicians, computer engineers and information systems managers.
- Funding. The National Institutes of Health’s support for bioscience has been largely responsible for the enormous benefits stemming from research: social changes, medical breakthroughs, and the entire biotechnology industry. But NIH grants are strictly limited in scope.

To enable the timely development of promising new research, we need to supplement the federal government’s role with state and local funding and corporate support. This additional funding, unfortunately, is quite rare in the Puget Sound region — even though bioscience research and its related work (not including the information/computer technology fields) are responsible for more than 75,000 jobs in the area.

Even with the confluence of so many positive factors in the Seattle area, the success of our local biomedical research institutions is not a given. We have much work to do in the economic, political and societal arenas as well as in the laboratories and clinics.

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SCIENTIFIC CHALLENGES

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