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The University of Pittsburgh is an affirmative action, equal opportunity institution.

Members of our Class of 2004 are settling in, beginning the grand journey toward becoming physicians. It's a journey that will lead to uncharted territory for them, and the rest of us as well. For centuries, medicine has been population based. We give all adults the same dose of penicillin, and we consider everyone equally vulnerable to radon exposure. Yet human beings are not uniform in their ability to absorb and metabolize drugs, nor in their susceptibility to disease, to name just two of the important ways in which we differ. In the wake of the Human Genome Project—as we undertake the daunting challenge of illuminating the structure, function, and interactions of proteins (the ultimate expression of our 100,000 genes)—basic research will restock the physician's "black bag." We will be equipped for prevention, diagnosis, and treatment as never before. Understanding a patient's genetic makeup will allow us to select the drugs most effective for a particular form of a disease (for example, the many variants of lymphoma) as well as the appropriate dose for optimal therapy and minimal risk. Along the way, we should not lose sight of the enormous roles that environment, behavior, and diet play in affecting our lives, albeit within the context of our genetic heritages.

This new frontier also will lead us to a range of profound ethical dilemmas, many of which we have considered before, yet only sporadically and for limited sets of people. (Consider how you go about defining "preexisting condition" in an era when a risk can be identified genetically at birth—long before one presents clinical symptoms.) How do we balance individual privacy and freedoms with society's desire to advance public health and reduce the economic burden of disease? We need to be exceedingly sophisticated, sensitive, and fair-minded when dealing with these extraordinarily challenging issues. It will be effort and energy well spent.

Advances in genetics and its concomitants (molecular, structural, cell, developmental, and computational biology) are auspicious for our quality of life in other areas as well: Consider the economic promise. The biotech industry now employs 150,000 nationally and generates \$21 billion annually. More than 270 million people have been treated with the 100 biotech products available. Though there are about 300 known molecular targets for drugs in our cells, it's thought there are as many as 5,000 to 10,000. Each of these targets will fuel biotechnology-driven drug development; and in terms of industry growth, my bet is biotech will dwarf e-commerce, given time. As this industry grows in southwestern Pennsylvania, it could likely prove tantamount to what steel once meant here.

At Pitt, we are positioning ourselves to lead the way. Our knowledge of the human genome will revolutionize the practice of medicine, but this knowledge is even more important: Genetics has much to teach us about our relationship to life on this planet, the astonishing degree of genomic universality in all living creatures, the variations that contribute to our diversity and survival—as well as to disease—and the uniqueness to which each of us lays claim. Few other discoveries have been more important, in this or any other time.



JULIA MAROUS STRAUT

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