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I'd like to start by congratulating the graduate students in the class of 2011 who are the central focus of today's celebration. I'd also like to acknowledge the nurses, postdoctoral fellows, faculty, physicians, and physician-scientists who have already been recognized just a few minutes ago. Your accomplishments and your dedication are inspiring to all of us here today, including your colleagues and your friends and family members, many of whom traveled from afar to celebrate with you.

It's a particular pleasure to be introduced by Craig, as we're close friends and both relatively new at our jobs. As Craig said, I arrived in New York just two months ago to serve as President of The Rockefeller University. In that short period it's already clear that Rockefeller is everything I'd hoped for and more, as I've been impressed with the quality of the scientists and their research, the quality of the staff, the collegiality, and above all, the culture, which drives people to attempt truly transformative science. I'm hugely excited about the opportunities for building Rockefeller further.

And although I've been in California, I've also watched with admiration the tremendous growth of Memorial Sloan Kettering in the last decade, including beautiful, new state-of-the-art research facilities, the recruitment of dozens of world-class scientists, and the establishment of the Gerstner Graduate School. [Former Memorial Sloan Kettering President] Harold Varmus, [Sloan Kettering Institute Director] Tom Kelly, [Memorial Hospital Physician-in-Chief] Bob Wittes, and their colleagues deserve great credit for making your superb institution even stronger.

For Rockefeller, I believe an essential element in our success going forward will be close interactions with Memorial Sloan Kettering. Craig and I have already begun to discuss how we can build on the foundation that's been given to us by our predecessors, [former Rockefeller University President] Paul Nurse and Harold Varmus, to further strengthen the already strong links between our institutions. It's a point I'll come back to later.

I've also been impressed with the collaborative atmosphere that exists among the three institutions that share this corner of York Avenue. Indeed, there is a robust and refreshing spirit of cooperation in general among the biomedical research institutions throughout New York City, and this makes me very optimistic about the future of biomedical research in New York.

Now some of you may be surprised by my optimism. After all, there are plenty of reasons for caution and despondency, if not downright pessimism.

As biomedical researchers, we're faced with the growing specter of reduced federal funding for our research.

As citizens and residents of this country, we're faced with an uncertain economic climate that affects everything from the price of gas and food to housing and tuition, and which has robbed many of their jobs.

And as citizens of the world, we're faced with environmental challenges stemming from climate change and unwise use of natural resources.

But alongside these challenges, there are also enormous opportunities, many brought about by scientific and technological advances. Perhaps because I've spent the last two decades in Silicon Valley, I believe that with the right focus we can mine these opportunities to innovate our way out of many of the problems confronting us. In my remarks today, I'd like to elaborate on these opportunities and what I believe it will take from us as a nation, as biomedical research institutions, and as individuals — including from you as freshly minted PhDs — to innovate and exploit these opportunities in full.

For this, let's focus on what those assembled here today know best: biomedical research.

For biologists — and for the graduating class — this is truly a golden age of basic research, disease research, and translational medicine. As a result of the biological revolution over the past two decades, we can look forward to understanding with a resolution that was unimaginable just a few years ago how the cell works and how the brain works, and how an organism develops, fights infection, regenerates itself, and ages.

This revolution has also stimulated a new convergence of science and medicine, because the powerful tools that have been developed make it possible to tackle disease processes with the same rigor we use to address basic biologic processes. Nowhere is this convergence between science and medicine more evident than in cancer research. As described eloquently by Craig, the targeting of cancer drivers and blood vessel growth factors that were identified in the '90s and the 2000s, and the recent harnessing of the immune system to reject tumors, has led to a first wave of targeted therapies that are showing significant benefits in cancers as diverse as leukemia, breast cancer, lung cancer, and melanoma — and many of these advances have occurred here at Memorial Sloan Kettering.

These advances are just the beginning, as we can expect that the knowledge that's gained, both from the clinic and from further basic research, will fuel the development of even more-potent and more-selective drugs. And so we can expect that the face of cancer treatment will be profoundly transformed in the next two decades, with significantly prolonged survival for many cancers and even cures for some. For the members of the graduating class, there is no better time to be embarking on a research career. The opportunities to do exciting science and simultaneously to have a tangible impact on human health have never been greater.

These exciting developments illustrate the progress we've made in addressing one urgent societal need, but what do they tell us more generally about tackling the many big problems confronting society? I think they tell us several things.

That big advances can only be built on deep knowledge of the root causes of the problem — in this case, cancer - and that advances will therefore be possible only if we invest in understanding the causes;

That big advances require constant experimentation and a willingness to take calculated risks — for example, when a company invests tens or even hundreds of millions of dollars in a dozen years to test a speculative theory about cancer;

That big advances usually occur through a series of many small steps, punctuated by only occasional leaps forward;

That big advances therefore require passion, focus, persistence, and even tenacity in the face of setbacks;

And that big advances require collaboration and the pooling of efforts of people and institutions with diverse backgrounds and complementary expertise - in this case, scientists who have insight into the molecular biology of cancer, physicians who understand the course of the disease, drug-discovery professionals who know how to make and formulate drugs, and scores of others with expertise in pharmacology, toxicology, and clinical trial design.

These lessons, evident in the example of cancer research, also apply more generally to individuals, institutions, and nations alike. At the national and institutional levels, we have the opportunity to make great advances — in tackling cancer and Alzheimer's disease, in dealing with energy shortages and climate change — but only if we continue to invest in generating the knowledge that's needed to enable these advances. The solutions to these problems will also require collaboration between diverse institutions and individuals in both the private and the public sectors to bring together complementary skills and to create economies of scale, which is why I'm so enthusiastic and passionate about building further ties between our institutions. It will also require determination and focus, and persistent and patient resolve.

But I'd like to focus more on the lessons that apply at an individual level, to the members of the graduating class. I spoke about the revolution in understanding and treating cancer. As students in this institution, you're fortunate not only to have witnessed, but also to have participated in this revolution. And as you are assembled here today to receive your diplomas, you've proven that you have the creativity needed to advance our knowledge and the persistence to see your project through to completion.

As you prepare for the next step in your careers, my advice to you echoes the themes that I've already sketched out.

First, whether you choose to continue in scientific research or to embrace one of the many other exciting paths that are open to you as scientists in, for example, medicine, law, or business, choose one that you're passionate about and focus and dig deep into your subject matter. As you've already learned in your PhD studies, mastery of your field provides the necessary substrate for creativity and real advance. Conversely, as stated in characteristically blunt fashion by Lou Gerstner [Louis V. Gerstner, Jr., Vice Chairman of the Memorial Sloan Kettering Boards of Overseers and Managers and Chairman of the Sloan Kettering Institute's Board of Managers], the patron of your new graduate school and one of America's great business leaders, "Lack of focus is the most common cause of (...) mediocrity." So focus. Be rigorous. Don't settle for half measures. Above all, strive for excellence.

As well, most of you should expect that your future activities will require working closely and often daily with other professionals. This is certainly true in any type of business, but it's also true if you're a clinician, and even if you remain a bench scientist. Most biological problems today can be tackled only through the use of complex technologies, many of which can be accessed only through collaboration, and many problems require multiple approaches that can't all be mastered by a single individual. Yet in training our scientists, we don't necessarily do a good job of teaching them how to function effectively in a highly collaborative environment. Most of our training focuses on the lone-wolf scientist, but even those who end up being lone wolves will need to be skilled at collaboration with colleagues in their departments and institutes, and with students and postdoctoral fellows. So be respectful of your colleagues and make a point of focusing on how to interact productively with them as you advance your own career. Don't assume that this is something that comes naturally to most people. For many, it's a learned skill and one you should certainly cultivate in yourself.

And don't allow setbacks to discourage you. The distinguished Princeton geneticist David Botstein likes to say that a strong predictor of an individual's long-term failure in science is success that comes too early - which is then taken for granted, leading to frustration and disenchantment when, inevitably, setbacks occur. This statement is a bit hyperbolic, of course, as David intended it to be, since there are many scientists whose early success persists throughout their careers. But the point he's making is correct: Expect setbacks, embrace setbacks, and persist in spite of them.

A healthy attitude toward setbacks is also needed if you're to take the calculated risks that are required not just for success, but also, I believe, for personal fulfillment. I'm not talking about being reckless, but rather embracing a path that's exciting or potentially

transformative and seems within your reach, yet which is nonetheless outside your immediate comfort zone, and where the outcome is less assured than if you were to stick with the status quo:

The risk to tackle big problems in science rather than just incremental advances;

The risk to go from more basic research to more patient-oriented research if the science is leading you in that direction;

The risk to change the way your team or institution is structured in order to run more effectively or to reach a greater goal;

The risk to change career paths more dramatically when the opportunity seems right;

The risk to put your family life ahead of your career even when the opposite might seem to be expected of you at the time.

In Silicon Valley, risk taking is part of the fabric, and failure that results from a good risk — but not a bad risk — is seen as a badge of honor. My own career has involved a series of calculated risks. After studying physics, I took the risk to reorient my research to study the brain. When I launched my independent laboratory, I took the risk not to publish anything for three years so I could focus fully on a big goal at the time: isolating brain-wiring factors. I later left the familiarity and comfort of academic life to take a position in industry when I saw the opportunity to have a bigger impact on human health. And just when I'd become comfortable in my position there, I was offered the position at Rockefeller, which I accepted as I became convinced that here I could make an even bigger contribution to advancing the science needed for the next wave of therapies for poorly treated diseases, such as Alzheimer's disease.

Taking these risks wasn't easy. In each case, I did so with trepidation, as I had to step away from what I was already good at and had to start digging deep again in a new area without a guarantee that it would work out. But in each case, my lack of direct experience was offset by the experience I brought from other fields, and in each case it enabled me to enter a new period of personal growth. When taking a big step, I've also learned to encourage myself with the thought that even if things don't work out, the experience is nonetheless likely to be profoundly enriching.

It's been said that "experience is what you get when you don't get what you wanted." If I can leave you with one message today, it's to encourage you to embrace calculated risk taking, knowing that you will reap the reward — or at least the experience. I promise you will find personal growth and fulfillment if you do.

And so I'd like to close with two writings from Anaïs Nin, the Cuban-French-American author, that have inspired me and that, I hope, will resonate with you as well.

"Life expands or shrinks in proportion to one's courage," she said, referring to the courage to seize opportunities as they present themselves. I hope you will cultivate and nurture that courage in yourselves.

And she explains the fulfillment that comes from this type of calculated risk taking in a poem simply titled "Risk":

*And then the day came,
when the risk
to remain tight
in a bud
was more painful
than the risk
it took
to Blossom*

As you move forward in your lives and your careers, and you feel the pain of remaining tight in a bud, have the courage to allow yourselves to blossom.

Congratulations on your great accomplishment, Class of 2011. We're excited to watch as you embark on what we trust will be — for each of you — a productive and fulfilling future.

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