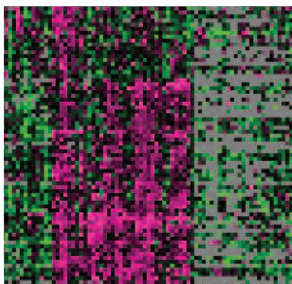
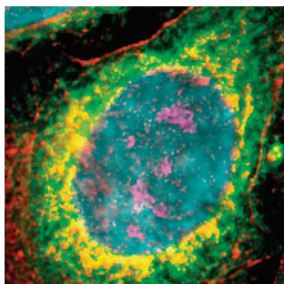
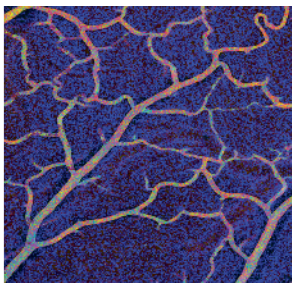
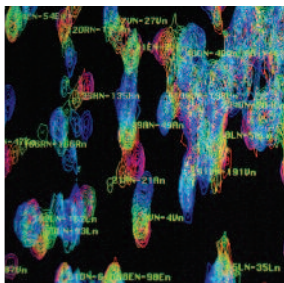
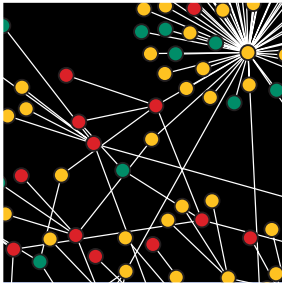
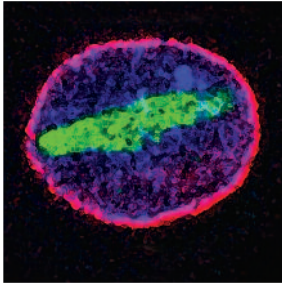
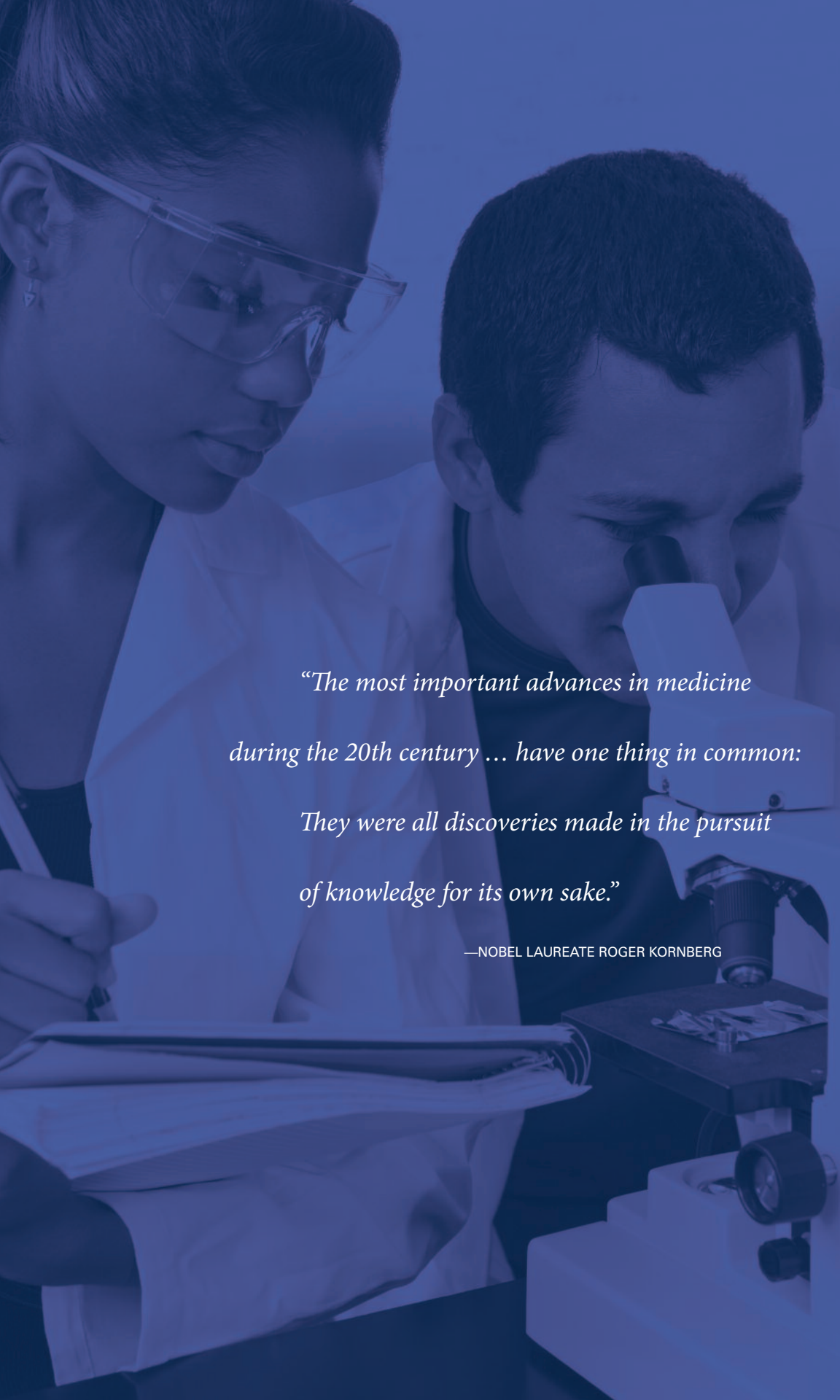


INVESTING IN DISCOVERY

AN OVERVIEW OF THE
National Institute of
General Medical Sciences



U.S. DEPARTMENT OF
HEALTH AND HUMAN SERVICES
National Institutes of Health
National Institute of General Medical Sciences



*“The most important advances in medicine
during the 20th century ... have one thing in common:
They were all discoveries made in the pursuit
of knowledge for its own sake.”*

—NOBEL LAUREATE ROGER KORNBERG



The Dance of Life

RIGHT NOW, BILLIONS OF MOLECULES are coiling, oozing or vibrating throughout your body, all part of the carefully choreographed dance of life.

Understanding those molecules, along with the cells and systems in which they function, is the mission of the National Institute of General Medical Sciences (NIGMS), a part of the National Institutes of Health.

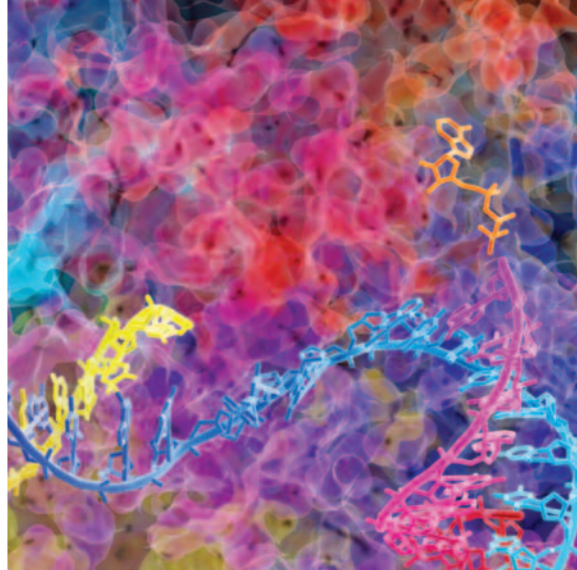
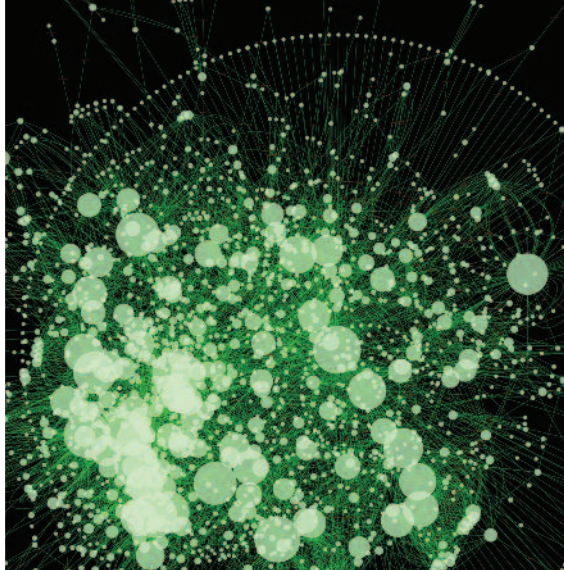
NIGMS uses the vast majority of its \$2.4 billion annual budget to support the research of thousands of scientists across the country who seek to understand the basics of how life works.

Knowledge gained from these investigations lays the foundation for new ways to predict, prevent, diagnose and treat disease.

The NIGMS investment also benefits local economies, fuels biotechnology and other industries, and helps the U.S. maintain its global competitiveness.

The Institute funds a broad spectrum of research, handled administratively by the divisions described in this brochure.

More information about NIGMS research funding opportunities is available at **<http://www.nigms.nih.gov/research>**.



The Division of Biomedical Technology, Bioinformatics, and Computational Biology supports the discovery, development and use of new biomedical research and computing technologies, especially those relevant to the study of complex biological systems.

This division focuses on questions like:

- How do cells, human populations and other complicated biological systems behave under a variety of different conditions?
- What tools do researchers need in order to organize, share or visualize biological data?
- How can scientists adapt techniques and approaches from computational science, mathematics and engineering to accurately simulate, model and understand life processes?
- What improvements in technology could help reveal the inner workings of healthy and diseased cells, tissues and organs?

The division also supports the Models of Infectious Disease Agent Study, which develops computational models to study how emerging infectious diseases might spread and be contained.

More information about this division is available at <http://www.nigms.nih.gov/about/overview/bbcb.htm>.

The Division of Cell Biology and Biophysics

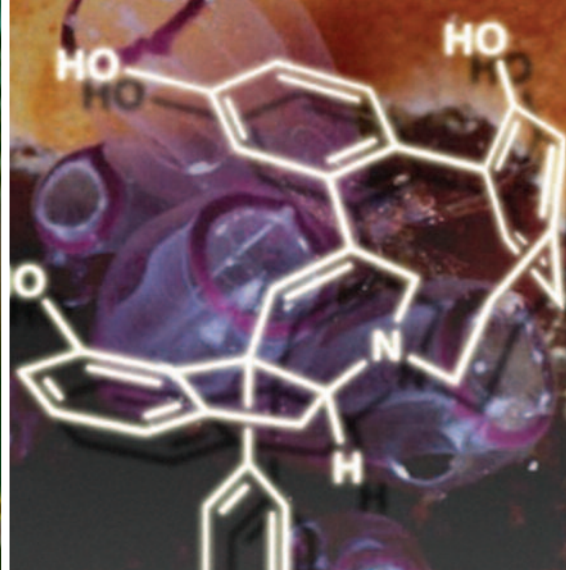
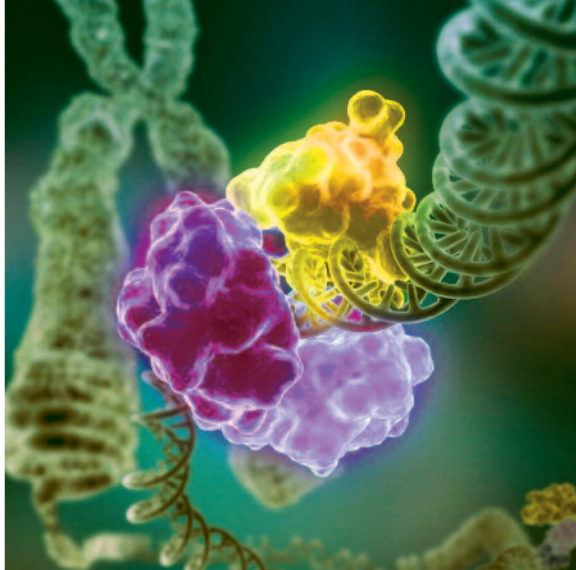
supports studies of the structure and function of cells and the molecules within them. Such investigations help scientists understand cellular activity in health and disease.

This division focuses on questions like:

- How do cells move, divide, communicate and sense changes in their environment?
- How are cell membranes made and maintained?
- How do viruses infect cells, develop and replicate inside them, and exit to infect other cells?
- What kinds of tools can researchers develop to visualize individual molecules and analyze biological processes in living cells?
- How can scientists use their knowledge of protein structures to develop drugs for diseases like AIDS?

The division is also responsible for directing the Protein Structure Initiative, which examines the shapes that proteins and other molecules take in order to function.

More information about this division is available at <http://www.nigms.nih.gov/about/overview/cbb.htm>.



The Division of Genetics and

Developmental Biology supports research on the structure of genetic material, including how that material functions, governs development, underlies inherited traits, influences behavior and affects susceptibility to diseases.

This division focuses on questions like:

- How do cells, including various kinds of stem cells, become specialized?
- How do genes control the life and death of cells and the daily (circadian) rhythms of organisms?
- How do organisms use proteins and small RNA molecules to regulate the activity of genes?
- What can we learn about human development, health and disease by studying organisms like bacteria, yeast and fruit flies?
- How and why has the genetic material of human populations changed over time?

The division also supports the Human Genetic Cell Repository, which houses a collection of carefully maintained human cell lines for use in biomedical research.

More information about this division is available at <http://www.nigms.nih.gov/about/overview/gdb.htm>.

The Division of Pharmacology, Physiology, and Biological Chemistry

supports studies in pharmacology, physiology, biochemistry and chemistry that deepen understanding of biology. This includes research on trauma, burn injury, sepsis, wound healing and the effects of drugs and anesthesia on the body.

This division focuses on questions like:

- What physiological changes occur immediately and over time when a person is critically ill or injured?
- How do enzymes generate energy and facilitate myriad other chemical reactions in our bodies?
- How do carbohydrate molecules influence the action of cells?
- How can scientists harness molecules from nature to use as drugs?
- How are medicines processed inside the body?

The division is also responsible for directing the Pharmacogenomics Research Network, a nationwide collaboration of scientists studying how genes affect the way different people respond to medicines.

More information about this division is available at <http://www.nigms.nih.gov/about/overview/ppbc.htm>.



The Division of Training, Workforce Development, and Diversity supports programs that train tomorrow's scientists and develop a strong and diverse biomedical and behavioral research workforce. It funds:

- Undergraduate student training and development.
- Post-baccalaureate research education.
- Predoctoral research training.
- Postdoctoral research training, development and transition to independence.
- Clinician-scientist research training and career development.
- Faculty research development.
- Workforce development research.
- Capacity-building research and resources in states that have historically not received significant levels of NIH research funding.

Through these efforts, NIGMS helps assure the continued vitality and productivity of the research enterprise.

More information about this division is available at <http://www.nigms.nih.gov/about/overview/twd.htm>.

Strengthening public understanding and appreciation of science is a key NIGMS goal. As part of its efforts, the Institute publishes science education materials in several formats online.

These free resources include:

- Award-winning publications on topics like cell biology, genetics, chemistry, pharmacology, computational biology and structural biology.
- *Findings*, a twice-yearly magazine that showcases vibrant and diverse scientists who do cutting-edge research and lead interesting lives.
- Interactive games and crossword puzzles that teach science.
- Scientific image galleries containing downloadable photos, illustrations and videos.
- A monthly electronic newsletter that highlights recent scientific advances.
- Articles and fact sheets on areas of science within the NIGMS mission.

Browse, download and use these free resources at <http://publications.nigms.nih.gov/epublications.htm>.



This microscopic swimmer called *Tetrahymena* helped Carol Greider and others examine chromosome tips (telomeres). Their work was honored with the 2009 Nobel Prize in physiology or medicine.

Greider is pictured at top with fellow Johns Hopkins University scientist—and Nobel laureate—Peter Agre.

Supporting high-quality research is a defining characteristic of NIGMS. Many of the Institute's grantees earn prestigious awards, including the Nobel Prize, the highest honor bestowed in science. Over its 50 years, NIGMS has funded the Nobel Prize-winning work of 74 scientists. Among their discoveries:

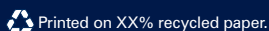
- Translating the genetic code and explaining how it functions.
- Defining the internal organization of cells using electron microscopy and other techniques.
- Finding that RNA can act as a catalyst, controlling and directing cellular functions.
- Discovering restriction enzymes, which cut DNA at precise locations and are a cornerstone of the biotechnology industry.
- Identifying proteins that trigger a cell's response to outside signals and are involved in normal activities as well as diseases like cancer, cholera and diabetes.

A complete list of NIGMS-funded Nobelists is at <http://www.nigms.nih.gov/GMNobelists.htm>.



National Institute of
General Medical Sciences

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If you have questions or comments about this publication, you can use the same contact information to reach the writer, Alisa Zapp Machalek.

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