The Maurice 'Mo' Mullet, MD
Medical Student/Alumni Forum

- Health commissioner of Holmes County, Ohio for 30 years
- Nationally-recognized leader among local health officials and in public health.
- President of the Ohio Association of Health Commissioners, and was a charter scholar of the Public Health Leadership Institute.
- A seminal, influential thinker and leader in national efforts to define public health functions and establish national policy in disease prevention and health promotion.

Maurice ‘Mo” Mullet, MD, 1963
Science: The Endless Frontier

or

How The U.S. Developed Preeminence In Science And Technology
Status of the US in Biomedical Research and Innovation:

• The U.S. share of global biomedical research spending fell from 51 percent ($131 billion) in 2007 to 45 percent ($119 billion) in 2012 while European spending held steady.

• Asia increased its share of biomedical R&D from 18 percent to 24 percent, and both China and Japan increased spending — by $6.4 billion and $9 billion, respectively.

• Previously, the U.S. share of research spend was as high as 80 percent. Asia's apparent commitment to biomedical R&D growth could be a threat to the U.S.'s longstanding prominence in the area.

Source: N Engl J Med 2014; 370:3-6
A Report to the President by Vannevar Bush, Director of the Office of Scientific Research and Development, July 1945

Key Points:

• Scientific Progress is Essential

• Science is a Proper Concern of Government

• Government Has The Unique Ability To Support Some Types Of Research and Must Do So In The Future

• Freedom of Inquiry Must be Preserved, especially for “basic research”
Birth of “Basic Research” 1945

- The development of the atomic bomb, radar, and penicillin meant that Vannevar Bush’s declaration that “scientific progress is essential” to public welfare found a receptive audience.

- Bush broadened the meaning of the phrase ‘basic research’, therefore, meeting the demands of policy-makers for practical innovation and to the interests of scientists in curiosity-driven enquiry.

- Engineer Vannevar Bush’s proposals led to the creation of the National Science Foundation in 1950 and later the NIH.
Proposed both Who and Where Research Should be Conducted

- It should take place in universities and research institutes
- The best, most creative research should be funded
- It will be judged and selected by peers (peer review)
- It should be unfettered, encouraging young scientists to explore the frontier
The success of these ideas lead to not only great discoveries but also “Cities of Knowledge” around our great academic research centers.
But research has always required champions for its support because of competing needs for resources and lack of understanding by many legislators.
“If you think research is expensive, try disease”

Mary Lasker
Mary Lasker, Philanthropist

- Joined the American Society for the Control of Cancer and transformed it into the American Cancer Society.

- The ACS with her support also fought lung cancer through prevention via anti-smoking campaigns and was so effective the tobacco companies voluntarily stopped advertising on TV.

- She played major roles in promoting and expanding the National Institutes of Health, helping its budget expand by a factor of 2000 times from $2.4 million in 1945 to $5.5 billion in 1985.

- The Lasker Award is considered the most prestigious American award in medical research. Eighty-one Lasker laureates have gone on to receive a Nobel Prize.
Charles Doan, M.D., 1896-1990

• M.D. in 1923 at The Johns Hopkins Medical School

• Rockefeller Institute with Florence Sabin, M.D. from 1925 to 1930.

• Joins The Ohio State University as Professor of Medicine and Director of the newly established Department of Medical and Surgical Research, 1930.
  – Professor and Chairman, Department of Medical and Surgical Research, 1930 – 1936
  – Professor of Research Medicine, 1936 – 1961
  – Professor of Medicine, 1936 – 1961
  – Chair, Department of Medicine, 1936 – 1944
  – Dean, College of Medicine, 1944 – 1961
  – Physician-in-Chief, Starling Loving and St. Francis Hospitals, 1936 – 1944
  – Director of University Hospital and Health Center, 1951 – 1961
  – Chief of Division of Hematology, 1952 - 1966.

• Encouraged the development of the College of Nursing.

• Helped established blood banking and Red Cross volunteer donor program

• He published more than 250 scientific articles.
DR. BERTHA BOURONCLE


• Great teacher and clinician- a common theme for OSU physician scientists

• Passionate about her work
Team Science: Inspiration 1970

   **Effects of Corticosteroids on Human Monocyte Function**
   John J. Rinehart, Stanley P. Balcerzak, Arthur L. Sagone and Albert F. LoBuglio

   **Effects of Corticosteroid Therapy on Human Monocyte Function**
   John J. Rinehart, M.D., Arthur L. Sagone, M.D., Stanley P. Balcerzak, M.D., G. Adolph Ackerman, Ph.D., and Albert F. LoBuglio, M.D.

   **A Comparison Of The Metabolic Response To Phagocytosis In Human Granulocytes And Monocytes.**
   A Sagone, G W King, and E N Metz
The Importance of Role Modeling

“Role modeling isn’t one way we learn behavior, it is the only way.”
The Evolution of Scientific Research Surges with the Confluence of Technologies

1980: Recombinant DNA technology, monoclonal antibodies and genetic modification of animals

2000: Human Genome, Robotics/Chem Biology, and Computational Biology

2014: Convergence of engineering, chemistry, and biology; nanoscale science and microenvironment; neuroscience; massive sequencing, and epigenetics
Scientific Research 2015-Forward

• Team science
• Big data science
• Further convergence of scientific fields
• Institutions must focus and make large investments in technology
• Need for institutional partnering, including international programs
What Knowledge, Values And Skills Will Be Required Of New Scientists

Personal Values

• Passion
• Conviction
• Curiosity
• Courage
• Discipline
• Hard work
• Sacrifice

Strategic Skills

• Train at the Frontier
• Select a great mentor
• Know yourself
  – Hedgehog or Fox?
  – Bookcases vs. Doors
• Develop a network of colleagues
• Be prepared to work in teams but be a master of something
The Tension between Individual and Team Research

Structure of DNA

"We wish to discuss a structure for the salt of deoxyribose nucleic acid (D.N.A.). This structure has novel features which are of considerable biologic interest."

Rosalind Franklin

Rotavirus Vaccine

Team of Clark, Plotkin and Offit
The Challenges Associated with Team Research

• Personal Recognition
• Academic Promotion
• Access to and control of resources
• Compensation
• Intellectual Property
• Loss of autonomy and control of direction of research
• Lack of Independence
The Wistar Institute was the first independent basic biomedical research institute (1892) and was in the first group of NCI designated cancer centers. Its scientists work under academic model.
Mission

The Wistar Institute is a leading independent center of biomedical research focused on advancing cancer and vaccine science for the benefit of humanity.
Historical Achievements

- The Wistar Rat
- Cellular senescence- Hayflick
- Development of vaccines used worldwide: Rabies, Rubella, Rotavirus- Koprowski and Plotkin
- Leukemia genetics and oncogenes- Croce and Reddy
- Integrin biology- Clayton Buck
- Cytokine IL-12- Trinchieri
- Development of monoclonal antibodies for cancer therapeutics and diagnostics- D. and M. Herlyn
- Melanoma
Research Institutes

- Outstanding scientists focused on independent research
- Strong research infrastructure
  - Strong Core Facilities
- Collaborative research
- Smaller and nimble
Our Guiding Principles

The pursuit of knowledge must be unfettered and requires, in the scientists, intense dedication, passion, discipline, and commitment to their work.

“We wish to discuss a structure for the salt of deoxyribose nucleic acid (D.N.A.). This structure has novel features which are of considerable biologic interest.”

Rosalind Franklin
Our Guiding Principles

A fundamental discovery can lead to a great breakthrough in disease mechanism/therapy: STELARA®
Our Guiding Principles

Our scientists must work collaboratively and support the work of their colleagues by providing advice and sharing of resources:

Developers of Rotateq

Team of Clark, Plotkin and Offit
Faculty View of the World:
A community of unique individuals
Assistant Professor View of World
Need for Collaboration
Wistar Model Promotes Both Outstanding Basic Research Discoveries And Development Of Commercial Products
Basis of Our Success

• Recognizes and supports both basic and translational research
• Investments in infrastructure and technology
• Support for teams and team infrastructure while recognizing individual contributions
• Very strategic but has ability to make quick decisions
• Intensely support new faculty: Tradition!
2012 Commercial Successes
Licensing Income and Number of Startups

1. City of Hope MC/ Beckman Research Institute: $224.4 million; startups: 1
2. Memorial-Sloan Kettering Cancer Center: $143.2 million; startups: 2
3. Mount Sinai School of Medicine: $76 million
4. Mayo Foundation for Education and Research: $28.75 million; startups: 5
5. **Wistar Institute:** $17.76 million; 1 startup
6. Cedars Sinai Medical Center: $17.2 million; startups: 1
7. Fred Hutchinson Cancer Research Center: $10.4 million; startups: 1
8. Boston Children’s Hospital: $10.2 million
9. Brigham and Women’s Hospital: $8.9 million; startups: 7
10. Baylor College of Medicine: $8 million; startups: 4
Many High Value Assets in the Licensing Pipeline

- Many PIs working on Early-phase Drug Discovery
- Defined Translational Opportunities
  - EBNA-1 Inhibitors
  - HPV Vaccine
  - HIV Vaccine
  - Targeted HSP-90 Inhibitors
  - HSP-70 Inhibitors
  - Novel Molecules That Regulate Telomerase
  - Small Molecule Inhibitors of MicroRNA miR21
  - HPV (E6/E7)
  - Lung Cancer Diagnostics
  - Ovarian Cancer Therapies
"Logic will get you from A to B. Imagination will take you everywhere."
- Albert Einstein

Science is an Endless Frontier!!