SCIENCE PHILANTHROPY ALLIANCE

Advancing basic science—The foundation of our future

FACTS ABOUT BASIC SCIENCE AND THE NEED FOR FUNDING

WHY BASIC SCIENCE IS IMPORTANT

Basic science can answer the deepest, most fundamental questions we have about the world. It can also lead to wide-ranging applications and tremendous benefits and value.

Following are some examples of basic science research without which our lives would be different today:

- A discovery made in the late 1960s by microbiologist Hamilton Smith and his colleagues of a protein called a restriction enzyme that can slice DNA sparked the growth of **the biotech industry**, which in 2012 accounted for revenues in the United States alone of $324 billion. (Science Philanthropy Alliance, 2015)

- Albert Einstein's work on relativity led to the development of the atomic clock, which provides precision time-keeping necessary to the **Global Positioning System** (GPS). (Discover Magazine, 2014)

- Charles Townes and Arthur Schawlow's work on masers led to the discovery of **lasers**, used today in medical treatment, industry, and science. They are an integral part of such familiar devices as bar-code scanners used in supermarkets, scanners, laser printers, and compact disc players. (Bell Labs website, 2016)

- Marine coral research has expanded surgeons' reconstructive toolbox. Coralline material is now used as **bone reconstruction material** in dental implants, facial reconstruction, spinal fusion, and fracture repair. (Science Philanthropy Alliance, 2015)

- **Microprocessors** have emerged from basic materials research to provide smaller and faster components for computers, cell phones, and other electronics industries. (Materials Research Society, 2015)

- According to the NIH, research on how electric fields affect bacteria led to an important **cancer medicine**: cisplatin. Another cancer drug, Velcade™, grew out of studies on a cellular garbage disposal system.

- Other basic research spinoffs are nonmedical, such as:

    - **Freeze-drying**, which was created to concentrate and preserve laboratory samples,

- Laundry stain removers, meat tenderizers, and other products that came from studies of digestive enzymes, and
- Improved paternity testing and criminal **forensics** using a technique developed to mass-produce specific pieces of DNA for study. (NIH, 2016)

THE NEED FOR BASIC SCIENCE FUNDING

- The federal government has long been the largest funder of U.S. basic research, but its proportion has declined, from 70% in 1980 to 53% in 2012. (Association of American Universities, 2015)
- Federal funding of research and development at higher education institutions has fallen over 11% since 2011, representing the longest multiyear decline in federal funding for academic R&D since data collection began in 1972. (NSF, 2016)
- Only 2% of 3700 scientists surveyed could find private funds to make up for the loss of federal grants. Half reported that they had laid off researchers. (American Society for Biochemistry and Molecular Biology, 2016)
- 88% of AAAS scientists say that lack of funding for basic research is a serious problem, substantially more than any of seven other potential issues presented to them. (Pew Research Center, Jan 2015)
- Researchers spend 40% of their time writing grant proposals. (Scientific American, 2011)

Contact
Ruby Barcklay
rbarcklay@sciphil.org
www.sciphil.org

7.05.16