

# The National Institutes of Health: Working with Academia and the Private Sector to Save Lives

*The taxpayer-supported NIH provides funds to hospitals, universities, small businesses, independent research institutions and government labs that strive to understand the biology and risk-factors of disease. Companies leverage NIH-funded research and technology into new therapies. Together they develop innovative, life-saving treatments, cures and prevention strategies.*

## The Impact of Research

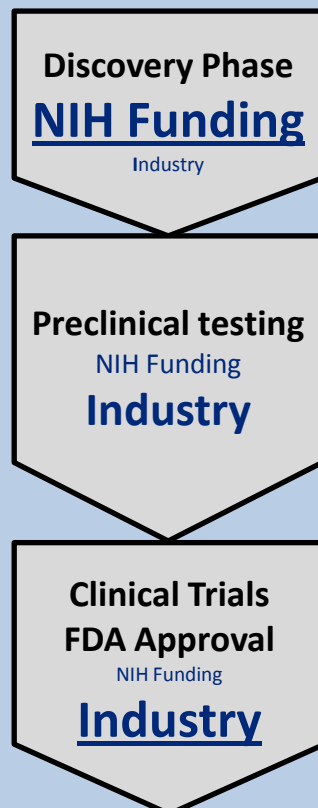
- Deaths from heart disease have decreased 50% over the last 40 years
- Childhood cancer is now a treatable disease, not a death sentence
- A person diagnosed with HIV today can expect to see their 70<sup>th</sup> birthday
- Between 1995 and 2005, the stroke death rate fell 30 percent
- New imaging technologies allow for earlier Alzheimer's diagnosis and treatment
- Vaccines prevent hospitalizations from the flu and dangerous flu-related infections
- New technology allows real-time tracking of food-borne and contagious illness
- 12 million cancer patients are alive today because of advances in medical science

## A Typical Drug Discovery Pipeline

A potential cause of disease is identified. The majority of research at this stage is publicly funded by NIH, which awards research grants to more than 2,300 institutions across the U.S.

Once a disease target is identified, drugs are designed and tested. Both public and privately funded research are involved.

Human trials are completed for Food and Drug Administration (FDA) approval. Industry is ultimately responsible for bringing a drug to market.



## Zelboraf: Personalized Medicine Delivers on Cancer

- In 2002, [NIH-funded researchers](#) contributed to the identification of a protein mutation present in over 60% of melanoma skin cancers
- In 2009, [Plexicon](#) designed Zelboraf to treat cancers that have the mutated protein
- Before treatment, patients are diagnosed with a first-of-its-kind test to verify that they will respond to Zelboraf
- Zelboraf reduces the risk of death by 63% and has a median survival time 3 times that of standard treatment
- In 2011, Zelboraf and its companion diagnostic test were approved for sale in the U.S.
- Zelboraf is a promising example of the power of personalized medicine

Tsai et al. PNAS 2009. Heakel et al, Annals of Pharmacotherapy 2011

# Examples of Landmark Research Supported by the NIH

## The Framingham Heart Study, 1948-on going

- In 1948, citizens of Framingham, MA joined an **NIH-funded** study to identify causes of cardiovascular disease (CVD)
- Linked smoking, hypertension, high cholesterol, and obesity with CVD
- These findings led to pharmaceutical industry development of therapies to manage hypertension and high cholesterol to prevent heart attacks
- From 1996-2005 hospitalizations from heart attacks decreased 25%
- Now enrolling grandchildren of the original participants, this study is still identifying new risk factors that contribute to heart disease

The Framingham Heart Study. CDC MMWR Report Oct 7 2011. NHLBI 2010 Fact book CDC MMWR Report July 6 2007.

## Diabetes Prevention Program (DPP), 1998-2010

- The **NIH-sponsored** DPP evaluated two different ways (medication or weight loss) to reduce the risk of Type 2 Diabetes
- Participants who took a medication to control blood sugars reduced their risk by 31%
- Participants who restricted calories and increased exercise reduced their disease risk by 58%
- Participants over 60 who made lifestyle changes saw a 70% reduction in risk
- Ten years later, lifestyle changes and medication still show a significant decrease in diabetes risk
- Shows that it is possible to delay or prevent the onset of diabetes through low-cost lifestyle changes

National Diabetes Information Clearing House

## Gleevec: Pioneering a New Method of Drug Design

- 40 years of research, **supported in part by the NIH**, culminated in the identification of an aberrant protein that causes Chronic Myelogenous Leukemia (CML), a type of cancer that affects blood cells
- In 2001 the FDA approved Gleevec, an inhibitor designed to precisely target the aberrant protein, developed by a collaboration between **Oregon Health and Science University** and **Novartis**
- Before Gleevec, the 5-year survival rate for patients with CML was 27%. Now the 5-year survival rate is over 95%
- Old cancer therapies were extremely toxic due to lack of tissue specificity. Gleevec showed that it was possible to specifically target tumor tissue and reduce toxicity

AACR Cancer Progress Report 2011. Brenner et al, Hematologica 2008.

## AZT: Tackling the HIV/AIDS Epidemic

- In the 1960s, **NIH-funded researchers** developed AZT (zidovudine) as a cancer therapy, but it was ultimately unsuccessful
- In the 1980s, researchers at **NIH and Burroughs-Wellcome** found that AZT is an effective treatment against HIV, the virus that causes AIDS
- A person diagnosed with HIV today can live up to 30 more years; triple the life span in the 1980s

NY Times Sept 20 1986. NIAID News Release May 12, 2011. The AIDS Beacon Oct 19, 2011