
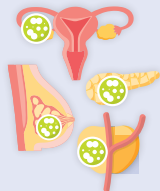
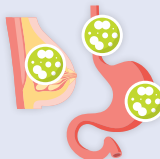




WHAT IS BASIC RESEARCH AND HOW DOES IT DRIVE PROGRESS AGAINST CANCER?

The National Institutes of Health (NIH) defines basic research as “the systematic study directed toward fuller knowledge or understanding of the fundamental aspects of a phenomenon and of observable facts without specific applications toward processes or products in mind.” Basic research, however, has broad implications because it is fundamental to our understanding and treatment of human diseases, including cancer. The NIH spends more than half of its budget supporting basic research. NIH-supported basic research projects significantly contribute to novel target identification and drug development.

Selected examples of basic research discoveries and their transformative impact on cancer treatment are:

Basic Research	Clinical Advance	Current Status
<p>1960 Philadelphia chromosome is identified in patients with chronic myelogenous leukemia (CML).</p> <p>1987 Bcr-Abl protein is identified as a possible cause of CML.</p>	<p>2001 The FDA approved imatinib, a targeted therapeutic against Bcr-Abl, for the treatment of patients with CML.</p> <p>2006 Dasatinib is approved by FDA for the treatment of patients with CML who are resistant to imatinib.</p>	<p>2021 There are four Bcr-Abl targeted therapeutics approved by FDA for the treatment of patients with CML.</p> 
<p>1977 PARP-1 protein is purified.</p> <p>1990 BRCA1 gene is discovered.</p> <p>1994 BRCA2 is discovered.</p>	<p>2014 A PARP inhibitor, olaparib, is approved by FDA to treat women with advanced ovarian cancer who inherited a BRCA1/2 mutation.</p>	<p>2021 There is at least one PARP-targeted therapeutic for the treatment of breast, ovarian, pancreatic, and prostate cancers.</p> 
<p>1984 HER2 gene is discovered.</p>	<p>1998 Trastuzumab, the first targeted therapeutic against HER2 protein, is approved by FDA for the treatment of women with HER2-positive metastatic breast cancer.</p>	<p>2021 HER2-targeted therapeutics are approved by FDA for the treatment of breast and gastric (including gastroesophageal) cancers.</p> 
<p>1989 VEGF-A, a regulator of normal and pathological angiogenesis and a major drug target, is identified.</p>	<p>2004 VEGF-A targeted therapeutic, bevacizumab, is approved by the FDA for the treatment of colorectal cancer.</p>	<p>2021 More than 10 antiangiogenic therapeutics have been approved by FDA to treat multiple cancer types.</p> 
<p>1992 PD-1 gene is discovered.</p> <p>2000 Protein that binds to PD-1, PD-L1, is discovered.</p>	<p>2014 First PD-1 targeted checkpoint inhibitor, pembrolizumab, is approved by FDA for treatment of melanoma.</p>	<p>2021 Seven PD-1/PD-L1 targeted checkpoint inhibitors have been approved by FDA to treat multiple cancer types.</p> 
<p>1982 T cell receptor is discovered.</p> <p>1984 T cell receptor is cloned.</p>	<p>2017 The first chimeric antigen receptor (CAR) T-cell therapy is approved by FDA.</p>	<p>2021 Five different CAR T-cell therapies have been approved by FDA to treat multiple cancer types.</p> 