

2018
—Tang Prize—
BIOPHARMACEUTICAL SCIENCE



•• Tony Hunter ••• Brian Druker ••• John Mendelsohn ••

Bridging science and clinical applications



Tony Hunter

His seminal discovery that **tyrosine kinases (TKs)** are oncogenes

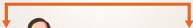
put forth the possibility **TKs** could be targeted to inhibit cancer cell function. The current success of **targeted therapy** owes a great deal to him.

What is targeted therapy?

In the past, cancer drugs attacked both cancer cells and normal cells, while targeted therapy directly blocks or controls the growing and spreading abilities of cancer cells through molecular biotechnology. It can precisely hit cancer cells and avoid harming normal cells at the same time.



Hunter's revelation of the **TK pathway** made possible the success of the following two awardees in developing the first drugs that target **TKs**, leading to successful targeted therapies.



Brian Druker

Developed the first tyrosine kinase-targeted therapy by **small molecule inhibitors—Gleevec®**

Gleevec®, a small molecule that blocks the tyrosine kinase of an oncogene, marked the beginning of the targeted therapy era and has become the paradigm for chronic myelogenous leukemia treatment.



John Mendelsohn

Developed the first tyrosine kinase-targeted therapy using an **antibody—Erbstatin®**

Erbstatin® was the first antibody to inhibit the tyrosine kinase activity of EGFR for cancer treatment. It was successfully applied for the treatment of colon cancer and head/neck cancer.

Tony Hunter

Discovered **tyrosine kinase** and opened up a **new field** of cancer research



His discovery of protein **tyrosine phosphorylation** and **tyrosine kinases (TKs)** in 1979 shed light on the signaling mechanisms which cancer cells depend upon and set the foundation for the development of over **29 TK inhibitor** cancer drugs.



Brian Druker

Turned a chronic **cancer** into a **treatable disease**



- 1 Druker participated in the development and led the successful clinical trial of the miracle drug, Gleevec®, which is a targeted therapy that can effectively treat **chronic myelogenous leukemia** (CML), turning a fatal cancer into a treatable disease.
- 2 CML used to be incurable and most patients died within two years. Gleevec® increased survival rate from 50% to 90%.
- 3 Gleevec® is known as the **most successful targeted cancer therapy in the 21st century** and was approved for clinical use by the US FDA in 2001.



Led the successful development of antibody-based EGFR therapy



- 1 Mendelsohn and his team developed the first clinically approved cancer therapy using an **antibody** (Erbix[®]) to target the TK of an **epidermal growth factor receptor (EGFR)**.
- 2 In liver metastases from colorectal cancer, the 3-year survival rate of patients receiving Erbix[®] plus chemotherapy treatment is **41% compared with 18%** for those receiving chemotherapy alone.
(Ye et al., JCO. 2012)
- 3 EGFR plays a critical role among many cancers, such as breast, lung, colorectal, ovarian, bladder, esophageal, head and neck cancer, etc. Many other successful targeted therapies now focus on EGFR.

