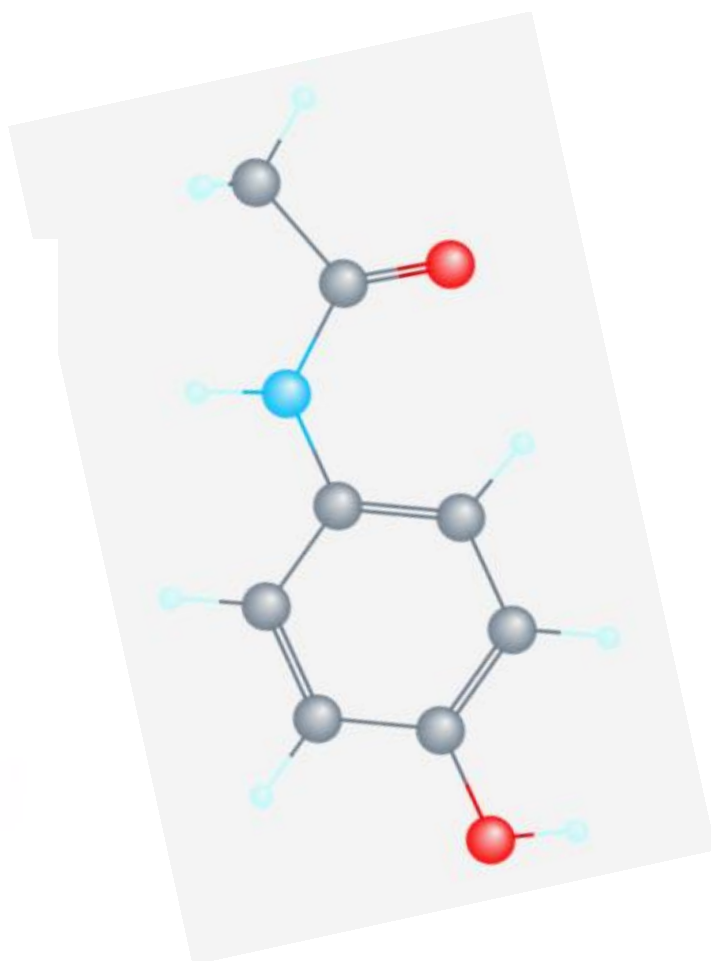




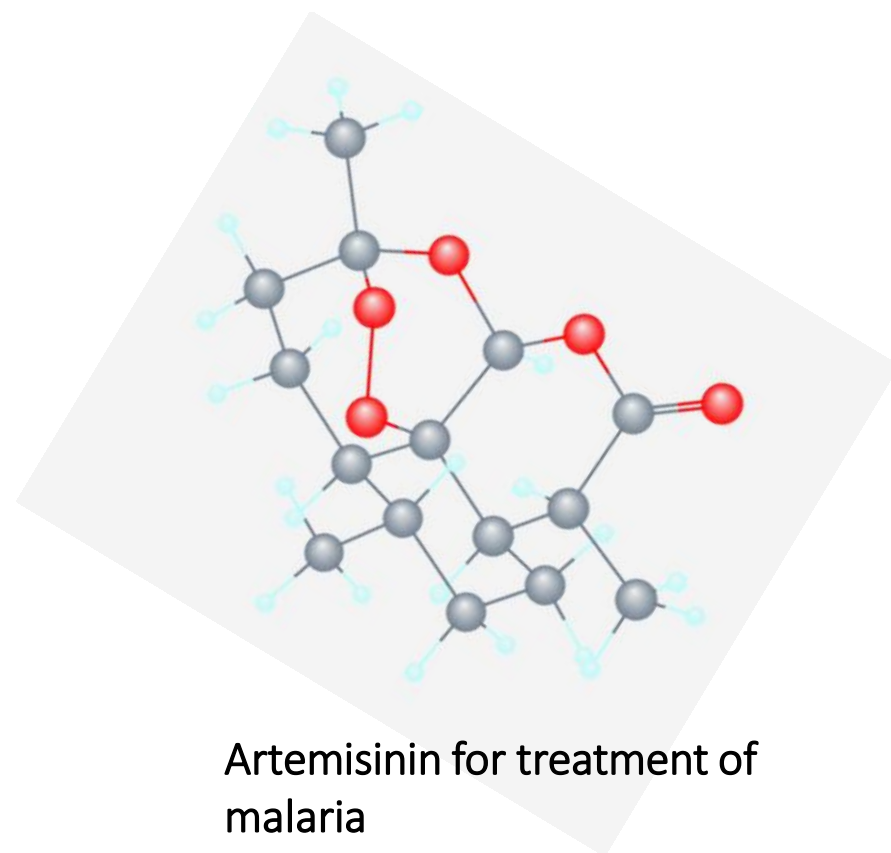
OÉ Gaillimh
NUI Galway



Gleevec: A Life Saving Drug for Leukemia
made possible by Medicinal Chemistry



Paracetamol

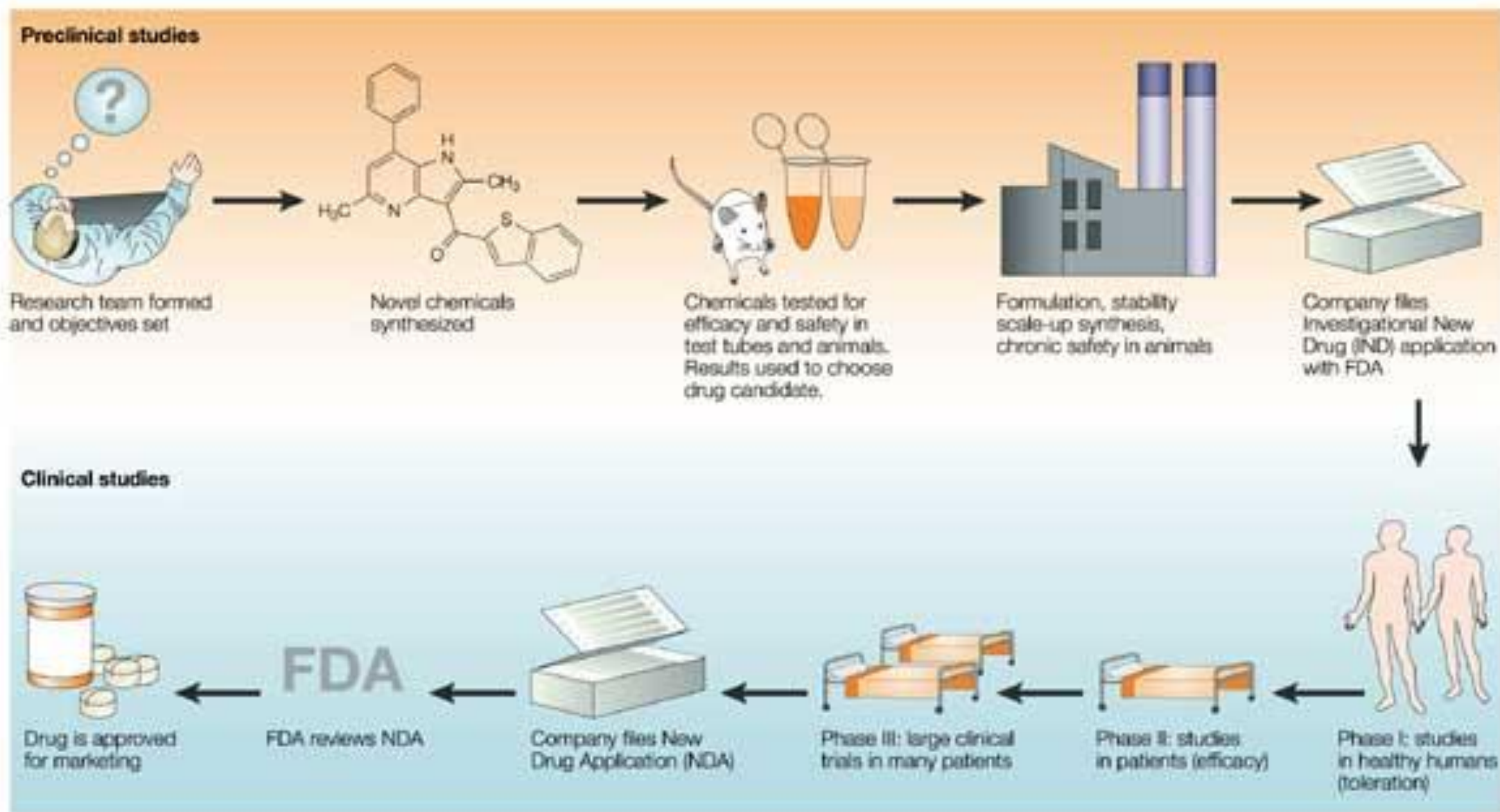


Artemisinin for treatment of
malaria

Medicinal Chemistry – New Pathway Opens in September 2017 for Year 2 Science Students

Medicinal Chemistry

Chemistry of Drug Discovery



There are different focuses between the MedChem (undenominated) and Biopharmaceutical Chemistry (BPC, denominated) pathways

Medicinal Chemistry: designed and synthetic compounds, often small molecules, synthetic peptides, complex natural compounds or chemical derivatives; this pathway includes drug discovery research project

Biologics/Biopharmaceuticals are defined as drug products produced by biotechnology. They are proteins/glycoproteins, usually large biomolecules; includes 6 month work placement option in industry

Nobel Prize 1945 Medicine



Sir Alexander Fleming
Prize share: 1/3

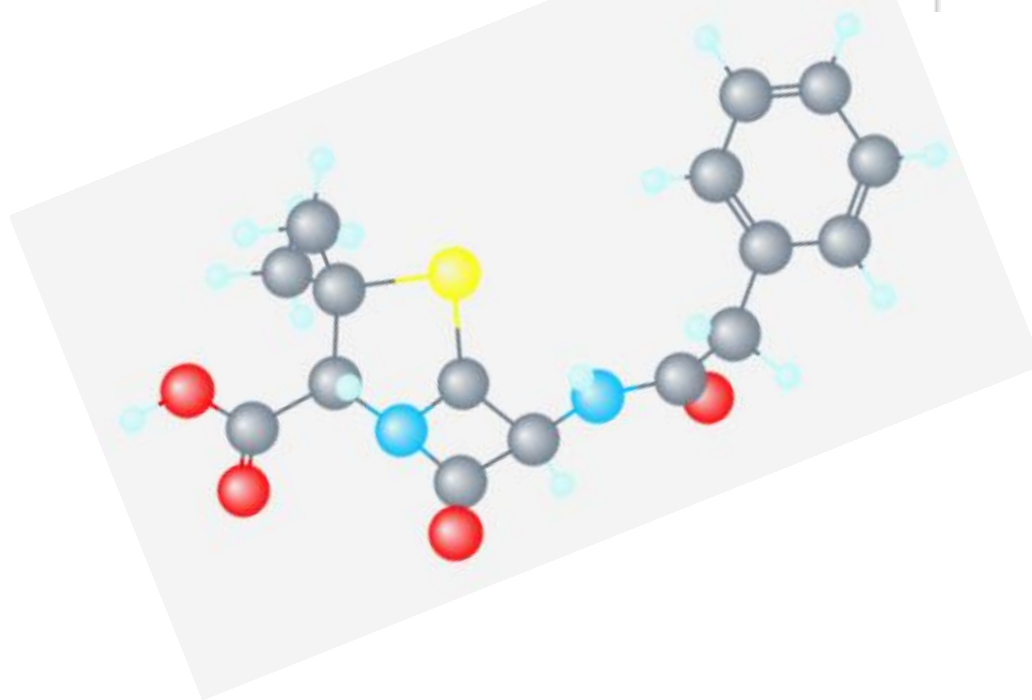


Ernst Boris Chain
Prize share: 1/3



Sir Howard Walter Florey
Prize share: 1/3

The Nobel Prize in Physiology or Medicine 1945 was awarded jointly to Sir Alexander Fleming, Ernst Boris Chain and Sir Howard Walter Florey *"for the discovery of penicillin and its curative effect in various infectious diseases"*.



Nobel Prize 1964 Chemistry



Dorothy Crowfoot Hodgkin
Born: 12 May 1910, Cairo, Egypt
Died: 29 July 1994, Shipston-on-Stour, United Kingdom

Affiliation at the time of the award: University of Oxford, Royal Society, Oxford, United Kingdom

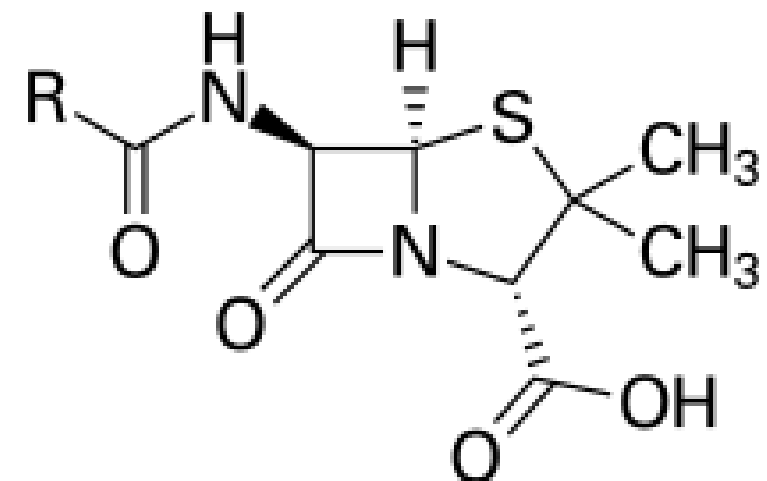
Prize motivation: "for her determinations by X-ray techniques of the structures of important biochemical substances"

Field: biochemistry, structural chemistry

Prize share: 1/1

Penicillin 1946

Vitamin B12 in 1956



Nobel Prize 2015 Medicine

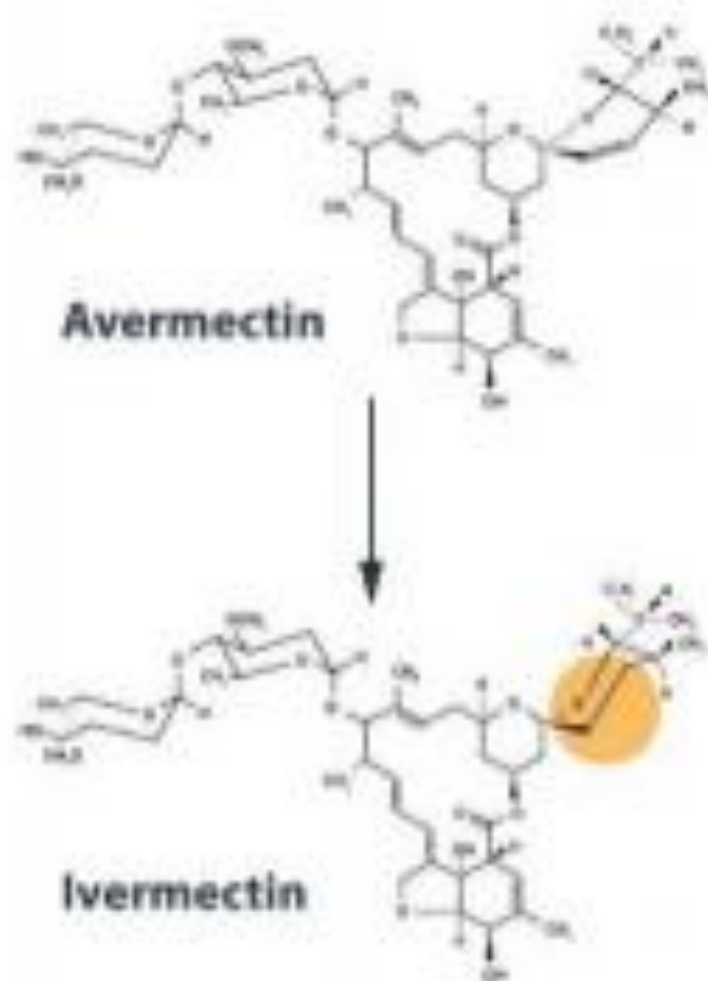
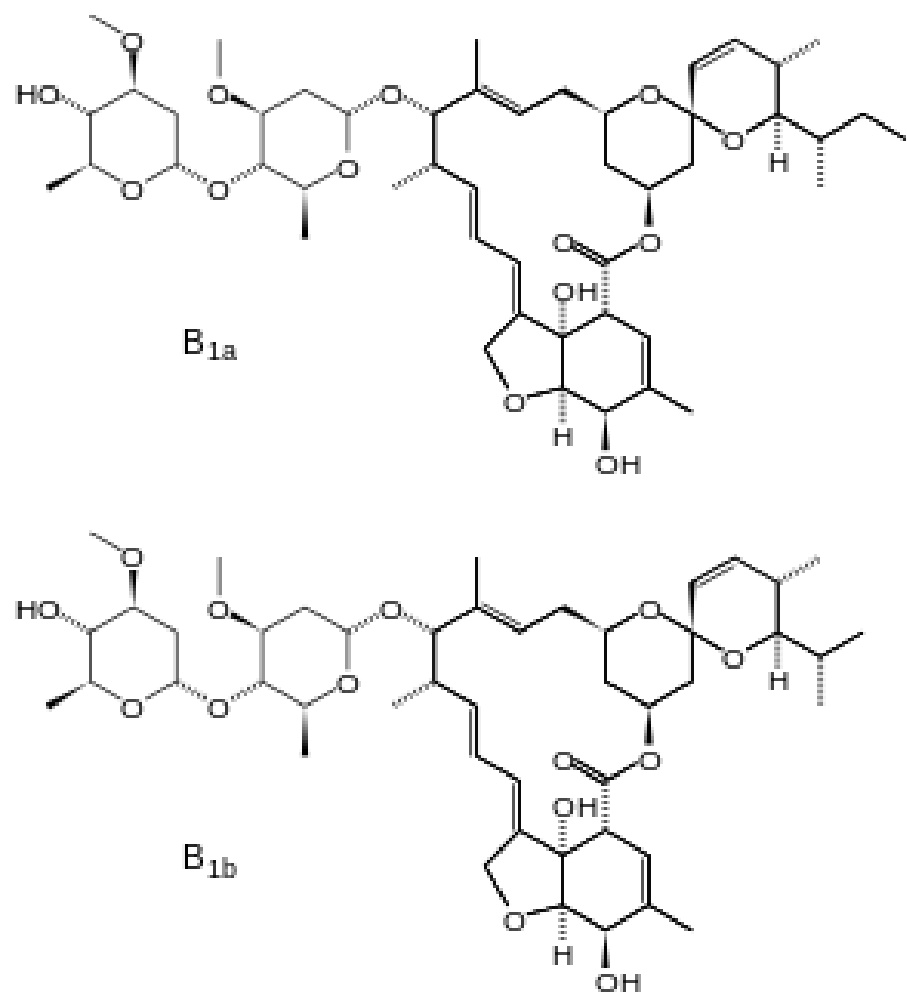


Figure 3: William C. Campbell discovered that one of Ōmura's *Streptomyces* cultures was very effective in killing off parasites and the active compound, Avermectin, was purified. Avermectin was further modified to Ivermectin, which turned out to be highly effective in both animals and humans against a variety of parasites, including those that cause River Blindness and Lymphatic Filariasis.

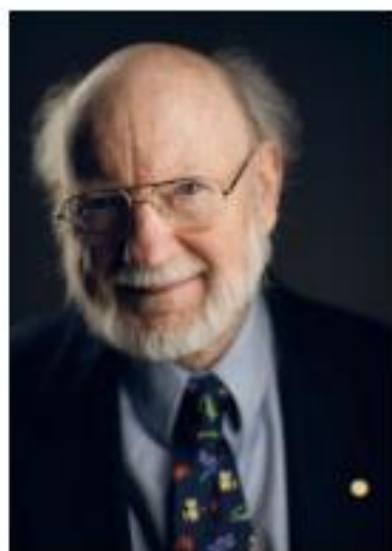


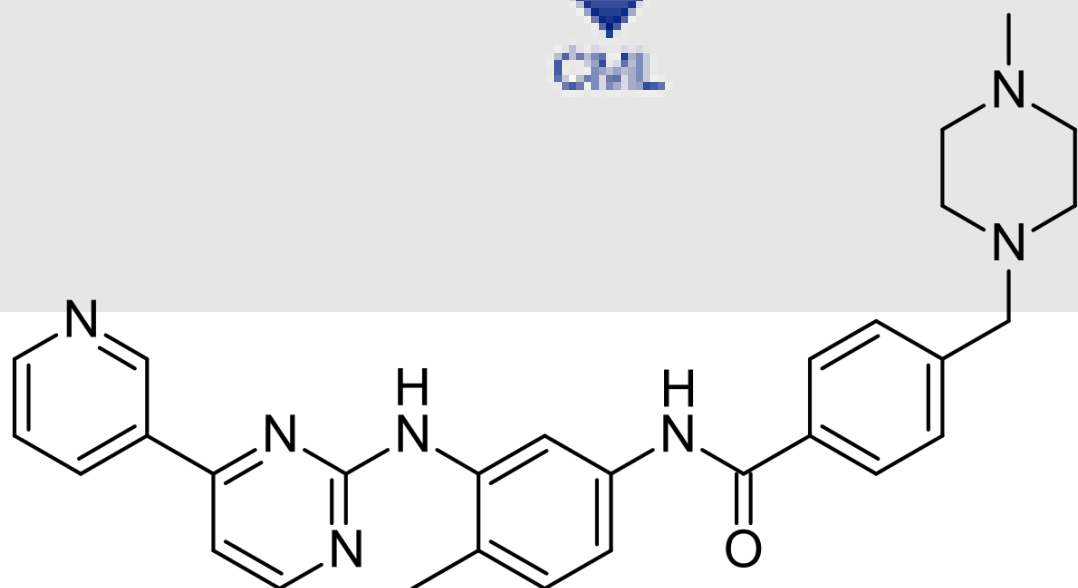
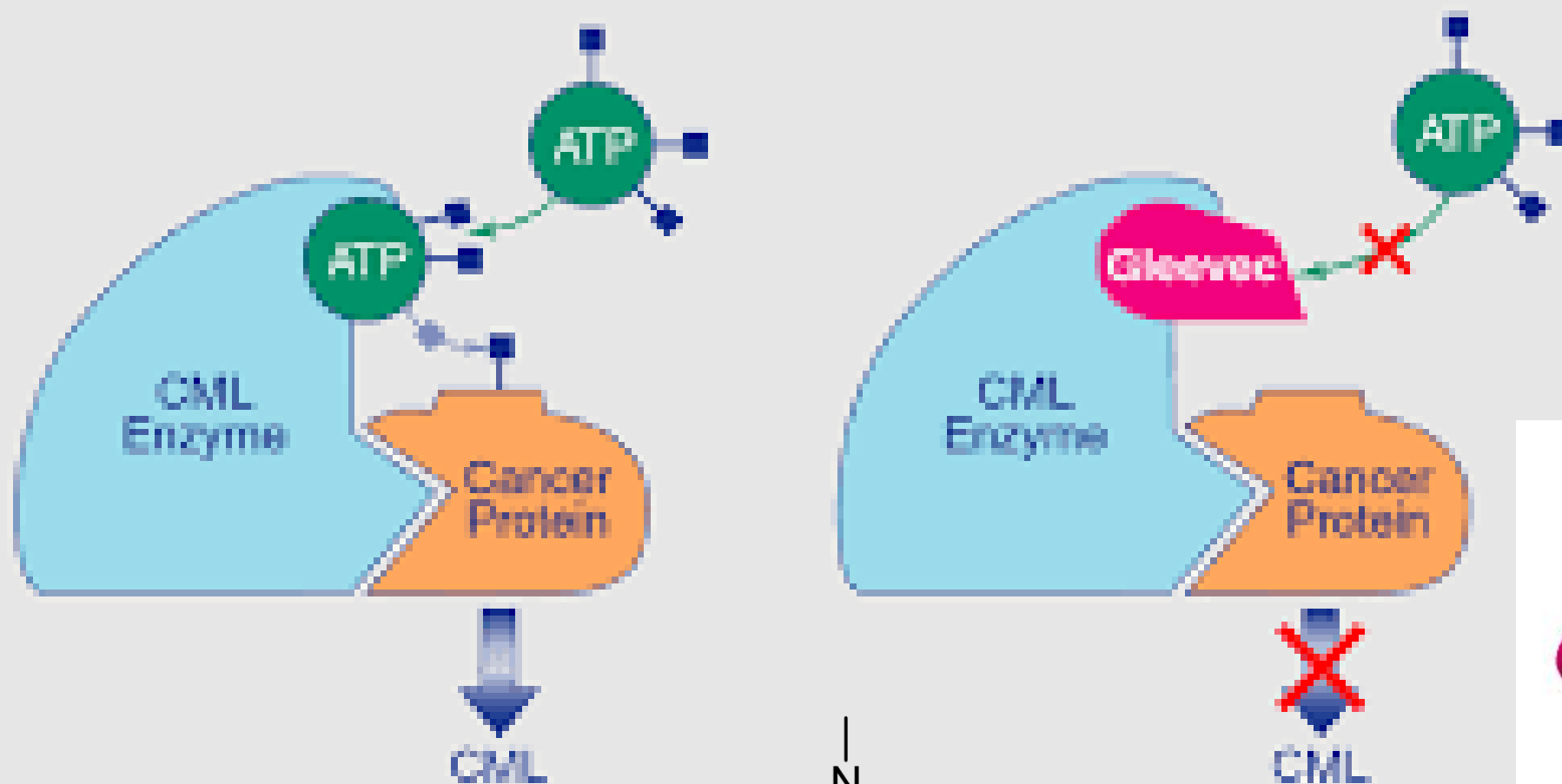
Photo: A. Mahmoud
William C. Campbell
Prize share: 1/4



Photo: A. Mahmoud
Satoshi Ōmura
Prize share: 1/4

Example of a designed /synthetic anti-cancer compound for chronic myeloid leukemia (a blood cancer)

Gleevec: HOW IT WORKS



There will be 20 places available for 2BS students in September 2017

35 ECTS Core for MedChem Pathway – these modules are required if you choose this pathway

CH202 - Organic Chemistry (Sem 2 - 5 ECTS)

CH203 - Physical Chemistry (Sem 1 - 5 ECTS)

CH204 - Inorganic Chemistry (Sem 1 - 5 ECTS)

CH2101 - Medicinal Chemistry (Sem 2 - 5 ECTS) – New Module

BO201 - Molecular and Cell Biology (Sem 1 - 5 ECTS)

PM208 - Fundamental Concepts in Pharmacology (Sem 1 – 5 ECTS)

PM209 - Applied Concepts in Pharmacology (Sem 1 - 5 ECTS)

Students with this option will also still be able to take CH205 Analytical and Environmental Chemistry (Sem 2 – 5 ECTS) by choosing the Chemistry pathway (includes CH202/CH203/CH204) along with Medicinal Chemistry

There will be still a wide 2nd year subject choice still available (e.g. Chemistry, Biochemistry, Microbiology, Zoology, Pharmacology, Anatomy, Botany, Physiology, Mathematics etc.) subject to space availability. Medicinal Chemistry and Physics is unlikely to be available due to timetable restrictions.

3 subject options still available include but are not limited to:

Medicinal Chemistry, Pharmacology, Biochemistry

Chemistry, Medicinal Chemistry, Pharmacology

Medicinal Chemistry, Pharmacology, Microbiology

Chemistry, Medicinal Chemistry, Biochemistry

Medicinal Chemistry, Pharmacology, Zoology

Medicinal Chemistry, Pharmacology, Mathematics + others

Year 3 'Medicinal Chemistry' (60 ECTS) (Draft, subject to change in 2018)

Drug Design & Discovery (10 credits, Sem 1)
Computers and Chemical Research (10 credits, Sem 2)
Introduction to Toxicology (PM311, 5 credits, Sem 1)
Plant Natural Products (BPS3105, 5 credits, Sem 2)
Physical Chemistry (5 Credits, Sem 2)
Organic Chemistry (5 Credits, Sem 1)
Inorganic Chemistry (5 credits, Sem 2)
Analytical Chemistry and Structure Determination (5 Credits, Sem 1)
Experimental Chemistry 1&2 (10 credits)



Year 4 'Medicinal Chemistry' (Draft, subject to change in 2019)

Medicinal Chemistry Project (20 ECTS)
Medicinal Chemistry Special Topics (10 ECTS)

Any 30 ECTS from

Pharmacology (10 ECTS)
Analytical and physical methods (5 ECTS)
Selective synthesis and organometallic chemistry (5 ECTS)
Biophysical Chemistry (5 ECTS)
Bioinorganic and Inorganic Medicinal Chemistry (5 ECTS)
Bioorganic Chemistry (5 ECTS)
Advanced Organic Chemistry (5 ECTS)
Bioorganic Chemistry (5 ECTS)