



The history, present and future of Pharmaceuticals

Pharmaceutical propaedeutics

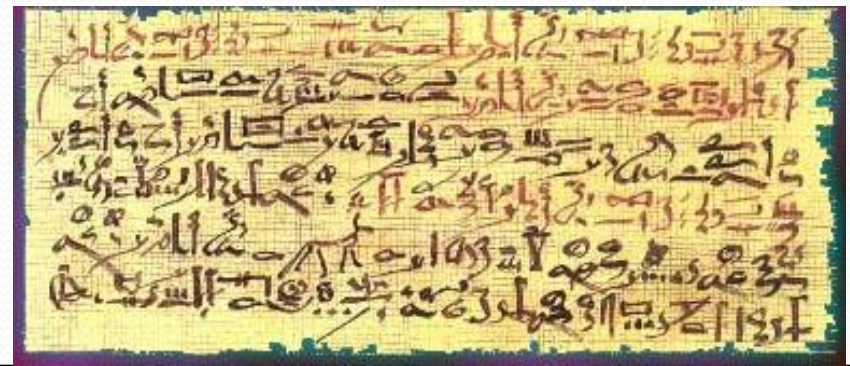
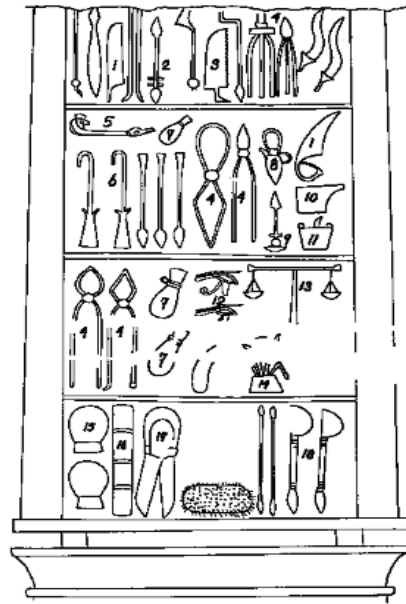
**Institute of Pharmaceutical Technology and
Biopharmacy**

The Egyptian Culture

Papyrus Ebers has been found in Luxor in 1862 and written in 1600 B. C. contains 877 prescriptions, medical advices and prayers.

Georg Ebers
German Egyptologist

E.g.: Antinociceptive,
contraceptive
medications



Powder of Mummy

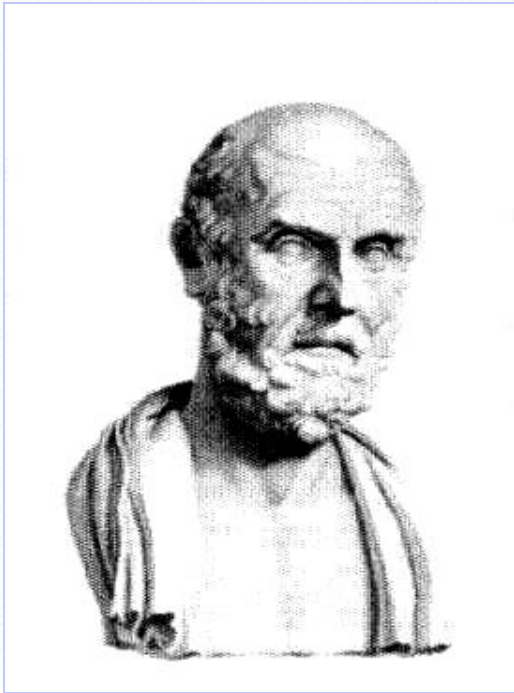


Powder of Mummy

‘Take a redhead youngster, feed him until the age of thirty, then fill a stone scoop with honey and spices, and put the youngster in it. Close the scoop and after 120 years the Mummy of the youngster is ready to use!’



The Greek culture



Hippocrates

Hippocrates was born on the Greek Island of Cos in 460 B.C. derived himself from Asclepius and tried to find the causes of diseases and the operation of the body. The religious healing was developed to scientific medicine in Asclepius by him.

Medications made of plants and special diets were used for healing. (Surgery without pain relief)

He stayed clear of the nondescript, harmful interventions.

The Roman Empire



Claudius Galenus
(A.D. 129-199)

Medical doctor and pharmacist, the most famous one of the ancient Greek-roman school.

Only 80 of his more than hundreds books remained, which are anatomical, physiological, internal medicine and pharmacological books.

He introduced drug mixtures and galenicals.

He wrote the *production method* of certain preparations and the necessary tools.

Persian culture



Avicenna

(Abu Ali al-Husain ibn Abdallah ibn Sina)

(980 -1037)

Persian medical doctor and pharmacist.

In his five books containing several volumes (Canon medicinae), there are lots of drugs, which were used for centuries.

- **His books contains more than 800 healing material including herbal, animal and mineral ones**
 - **And health protective instructions**



European culture



Paracelsus

Theophrastus Philippus Aureolus

(1493-1541)

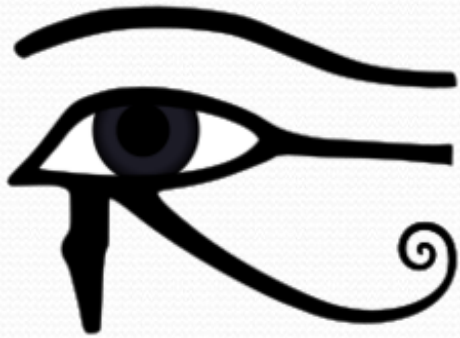
With a new approach he made a system for the medical-pharmaceutical science. He thought, that chemistry should not be used for making gold but preparing drugs.

Only one part of herbs is effective, which is called „quinta essentia”.

Order with a stick



Story of 'Recipe'



24



Rp.



Rx

Development of Pharmaceutical Industry





Darmstadt
„Angel” pharmacy

Merck (1884),
one of the largest
ingredient and
pharmaceutical
company of the world



**Friedrich Jacob
Merck**

Angel Pharmacy,
Darmstadt



MERCK, Darmstadt

Preparations manufactured by Merck company:

- Metformin,
- Bisoprolol,
- Levothyroxine,
- Nasivin.



Not only the first industrially manufactured drug, but it also belongs today to the medications produced the greatest volume as well.

Bayer was founded by Friedrich Bayer and Friedrich Weskott

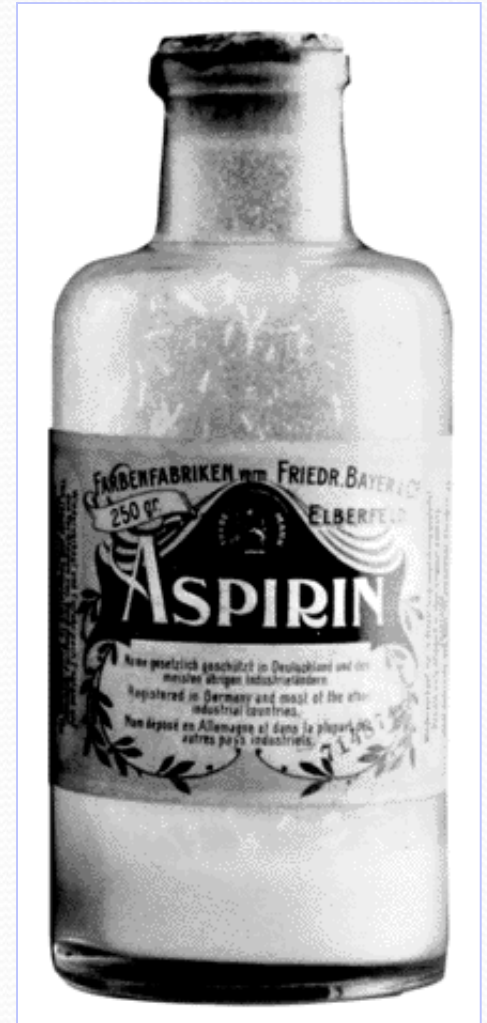


From its patenting in 1899 one trillion pieces (10^{12}) of Aspirin tablets were used.

The most known medication arises from the ancient treatments, during which patients were cured with herbs containing salicylates.

Willow leaf was suggested for eye diseases and reducing labor-pains by Hippocrates in 400 B.C.

The first bottle, in which aspirin was released in 1899.



Hungarian pharmaceuticals

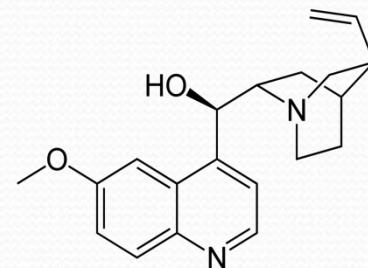


MATHIAS ROZSNYAY
(1833-1895)

Pharmacist, Pharmacy owner in Arad.
He had researches in his pharmacy and taught practitioners.

He processed a method for producing Chininum tannicum (with non-bitter taste), which had a great importance especially in pediatrics.

Several of his works has been remained, he wrote the first chess book as well. Annually, there is a scientific conference called Rozsnyay's Memorial Contest, where young pharmacists can demonstrate his research results.





GEDEON RICHTER (1872-1944)

After graduating he has known the potential of pharmacological therapy on his European study trip. He realized that drug preparing in the pharmacy could not satisfy the requirements and industrial production should be more efficient. He was the founder of the Hungarian pharmaceutical company.

After coming home from his European study trip he began his experiments and pharmaceutical manufacturing in Sas pharmacy of Budapest. The aims of these works were to produce pharmaceutical preparations from animal organs at first time. Later Richter Gedeon Company was developed from this pharmacy, which sooner became known worldwide.

Kalmopyrin patented in 1912 was the first major success of the Company, Hyperol, an antiseptic tablet, had important role in the First World War.

The present



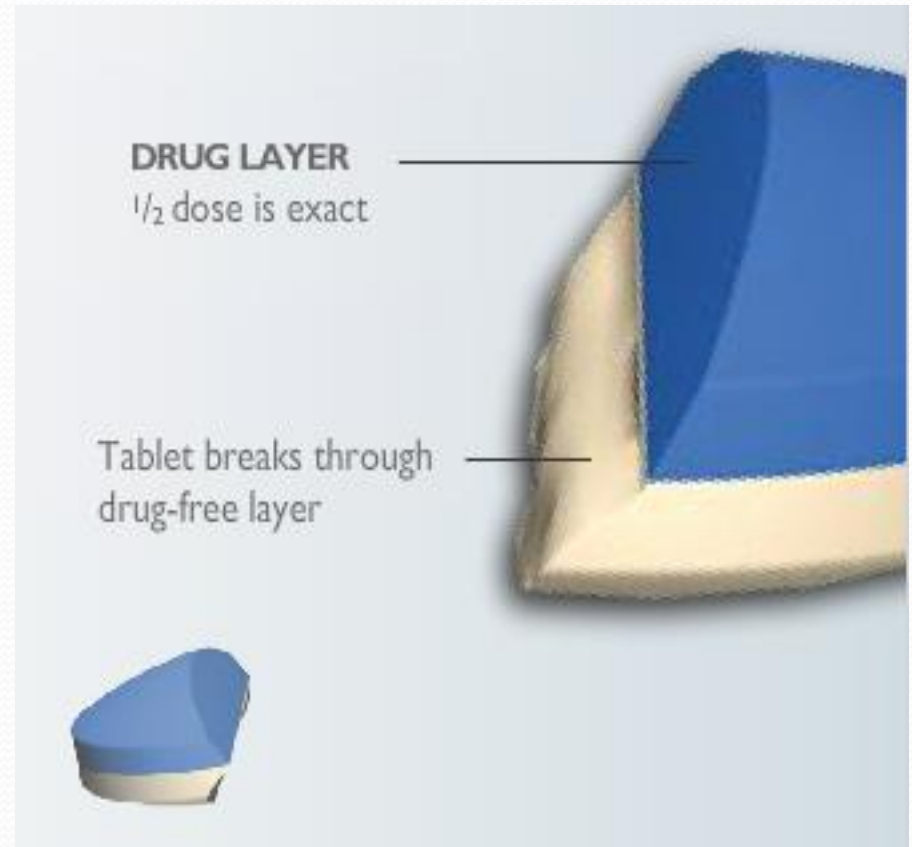
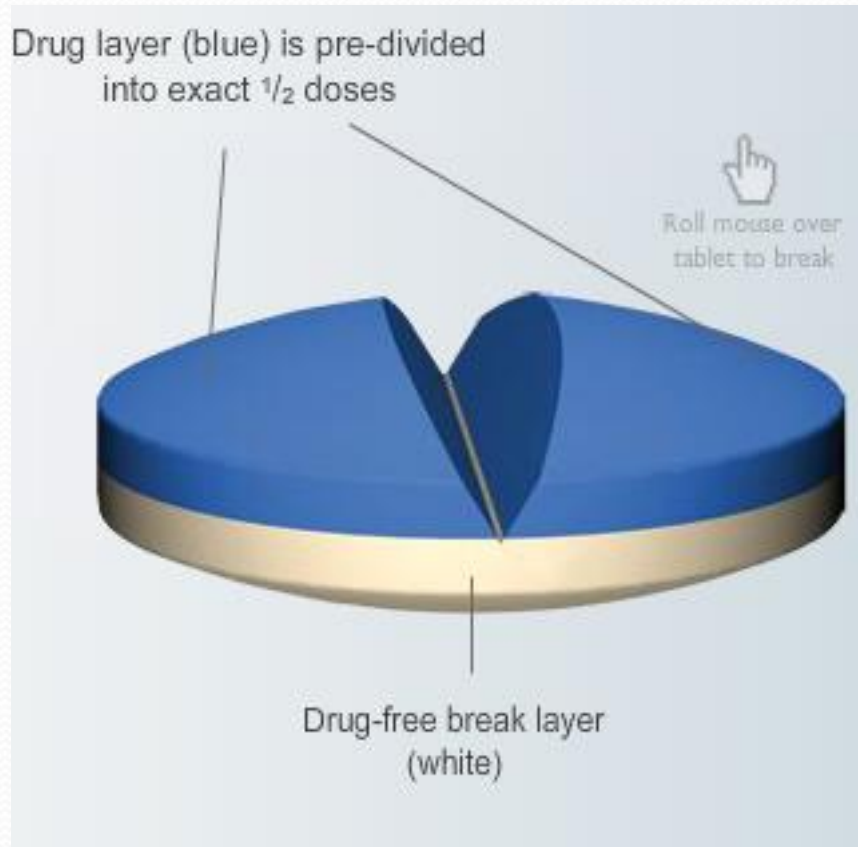
Brand names and abbreviations



Osmotic Release Oral Tablet



Halving of tablets – new invention

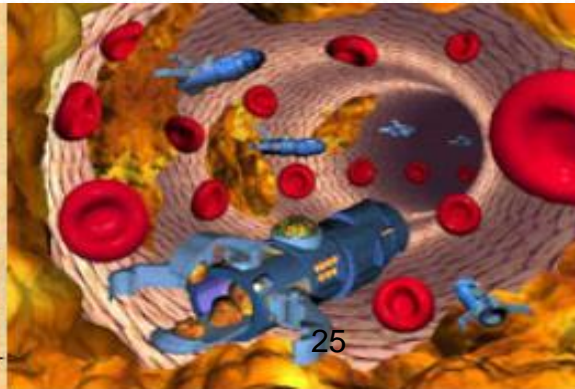
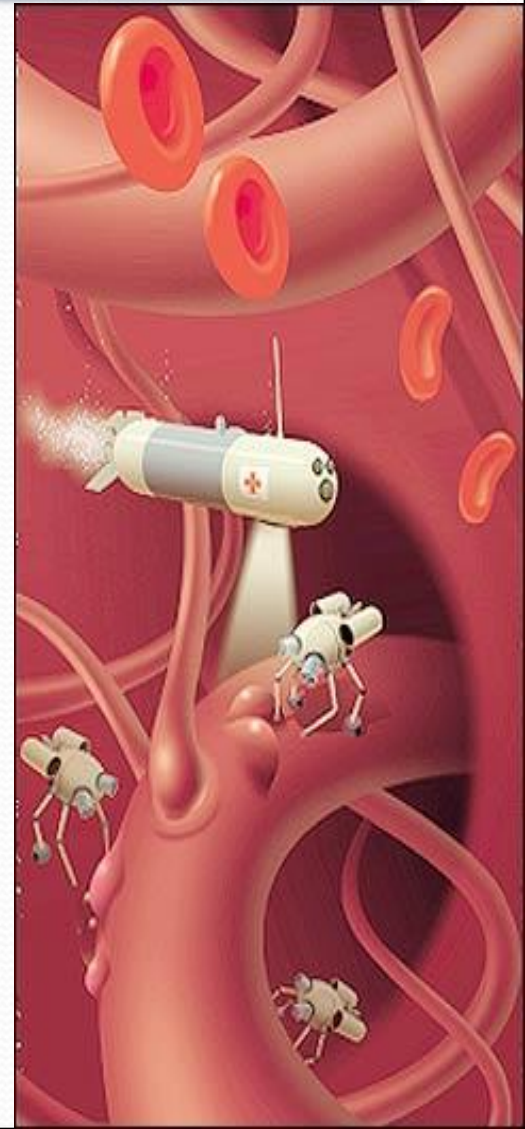
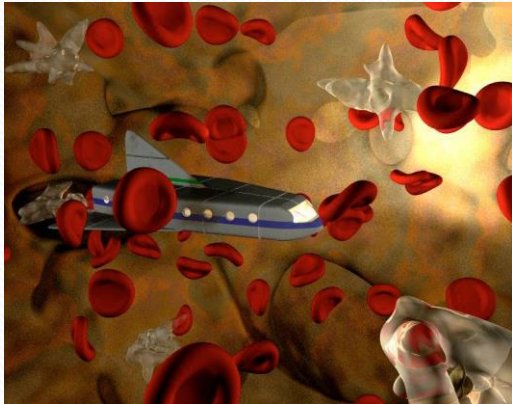
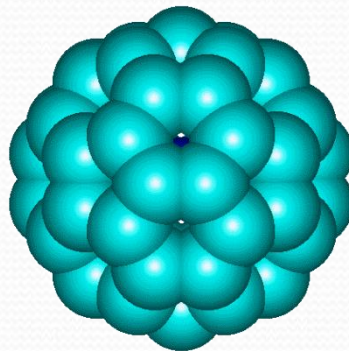
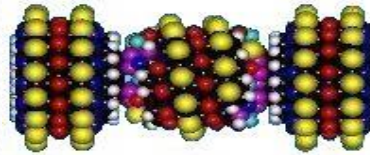
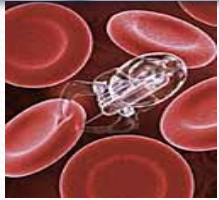


3D printing technology in the pharmaceuticals

MJ Cima, JS Haggerty, EM Sachs, PA Williams. Three-dimensional printing techniques. US patent 5,204,055, **1993**.



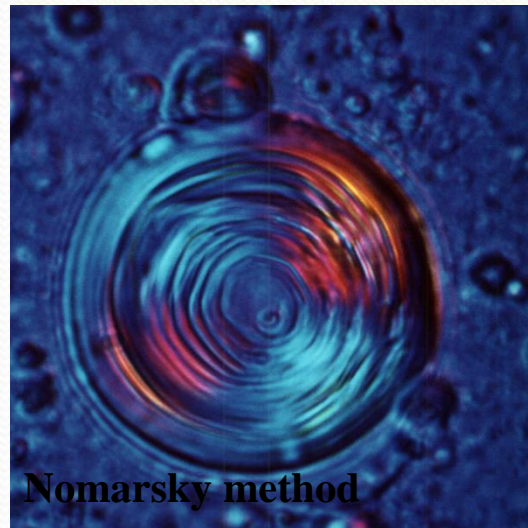
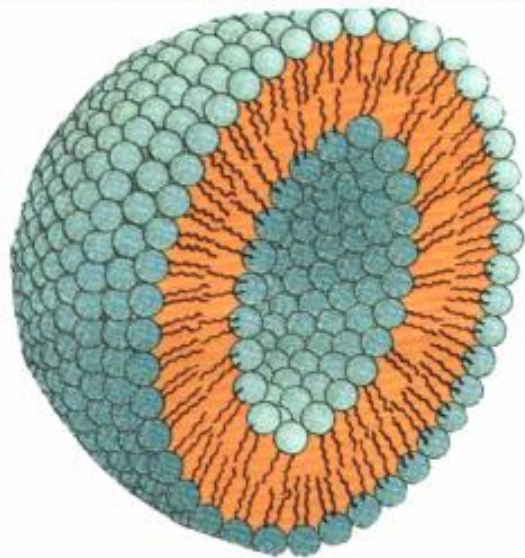
Nanomedicine, nanopharmaceuticals ...



Nanotechnology

- Possibilities:
 - Bioavailability of drug can be improved, which can result in higher patients' compliance
 - API molecule can be bound to carrier molecule having ligand, which can connect with a receptor of cell
 - **Example:** Titanate gel developed by Hungarians, can be easily applied on surfaces, and keeps the beneficial effect of titan dioxide

Liposomes



Nomarsky method



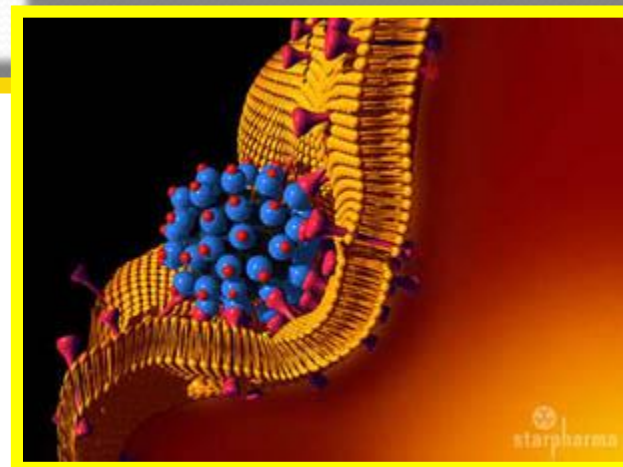
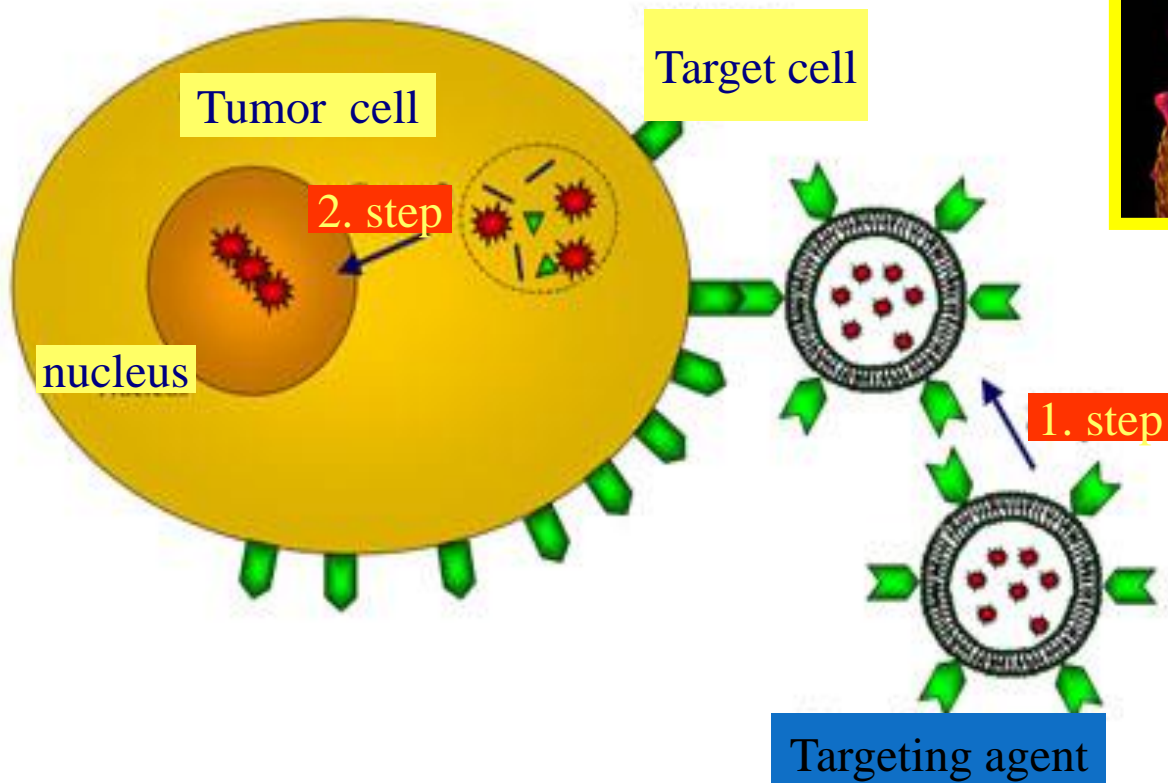
electron microscopical
examination

Treatment of Kaposi sarcoma:

Doxil® (doxorubicin HCl liposome injection)

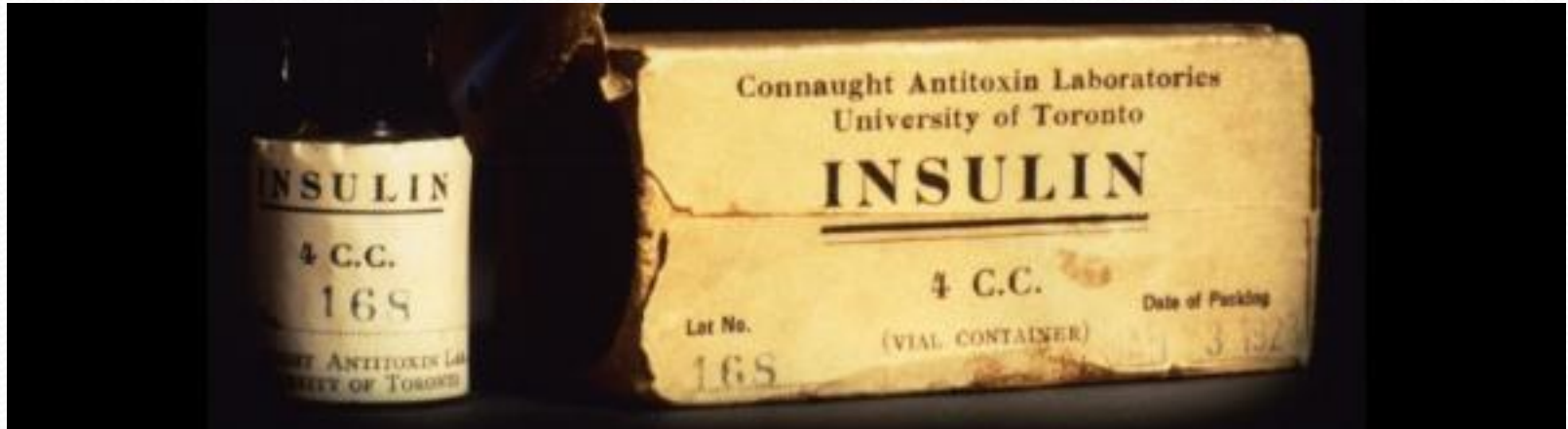
Targeted, prolonged and stabile.

Targeted Drug Therapy



Active/passive
targeting

Entry of Biotechnology - 1978



**Insulin
degludec** | A new-generation
ultra-long-acting
basal insulin





**Thank you for
your attention!!!**