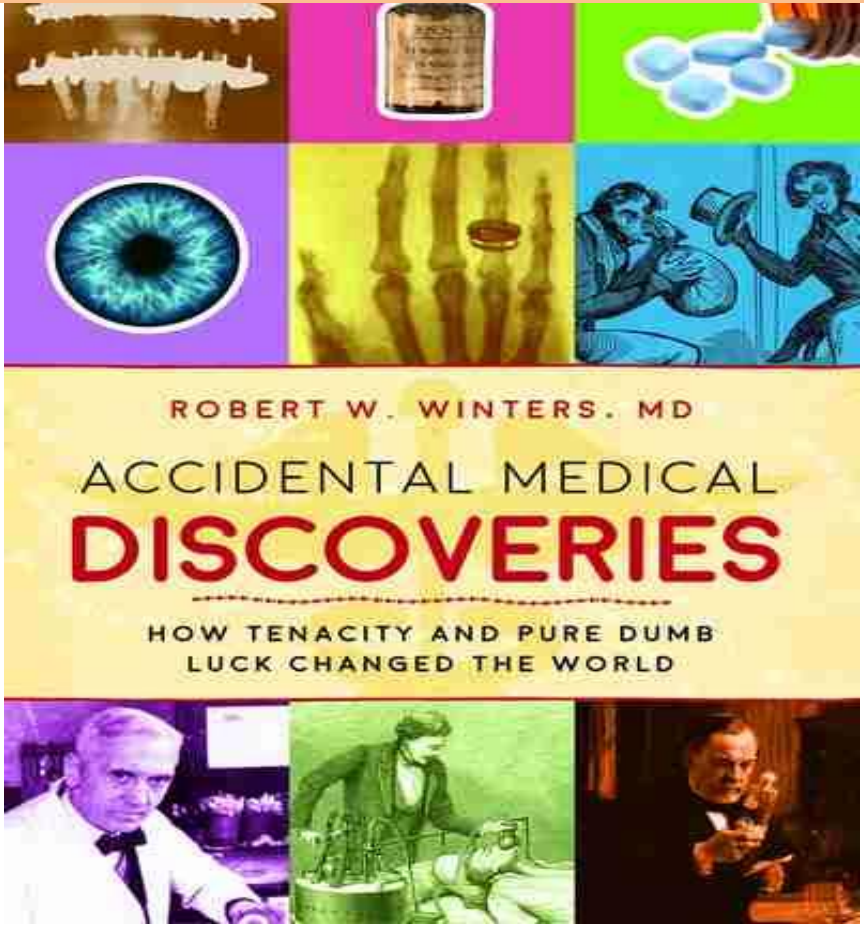
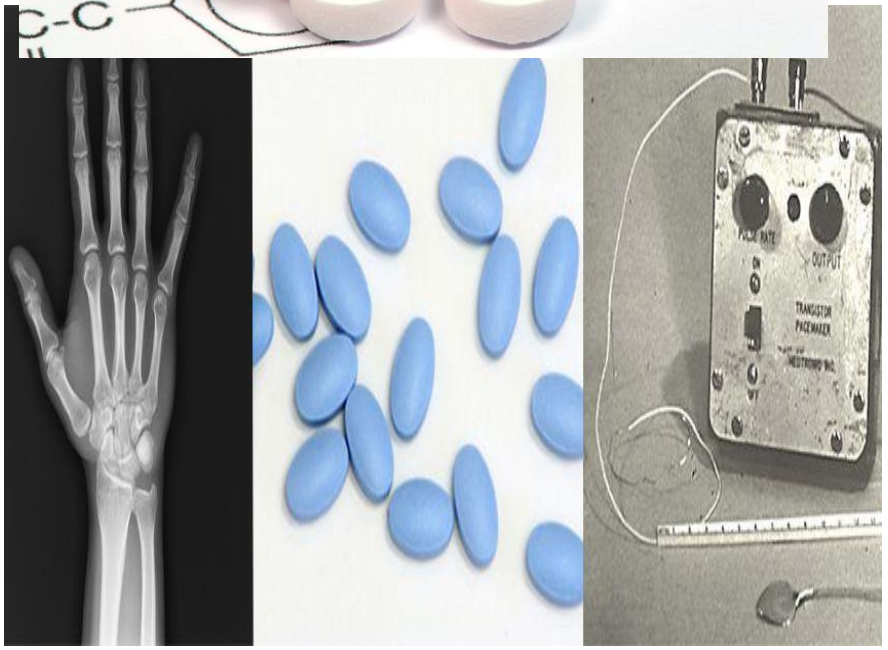
MOST IMPORTANT ACCIDENTAL DISCOVERIES IN MEDICINE

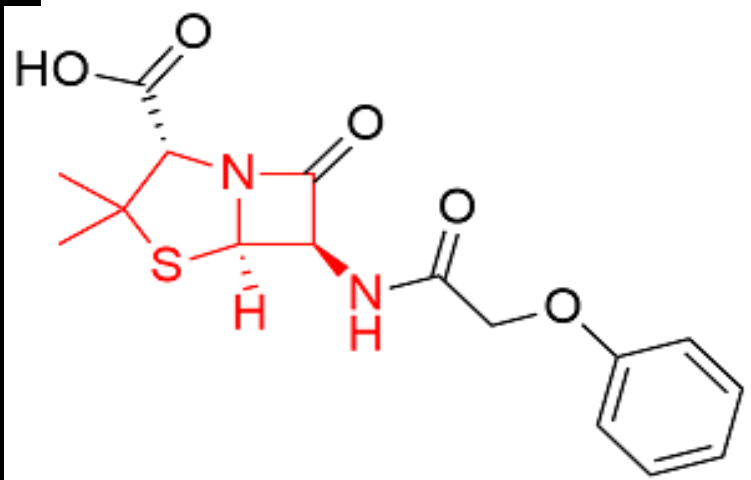
Rubin Gulaboski

Goce Delcev University, Stip, Macedonia





Alexander Flaming
-Penicillin-first antibiotic



Penicillin V

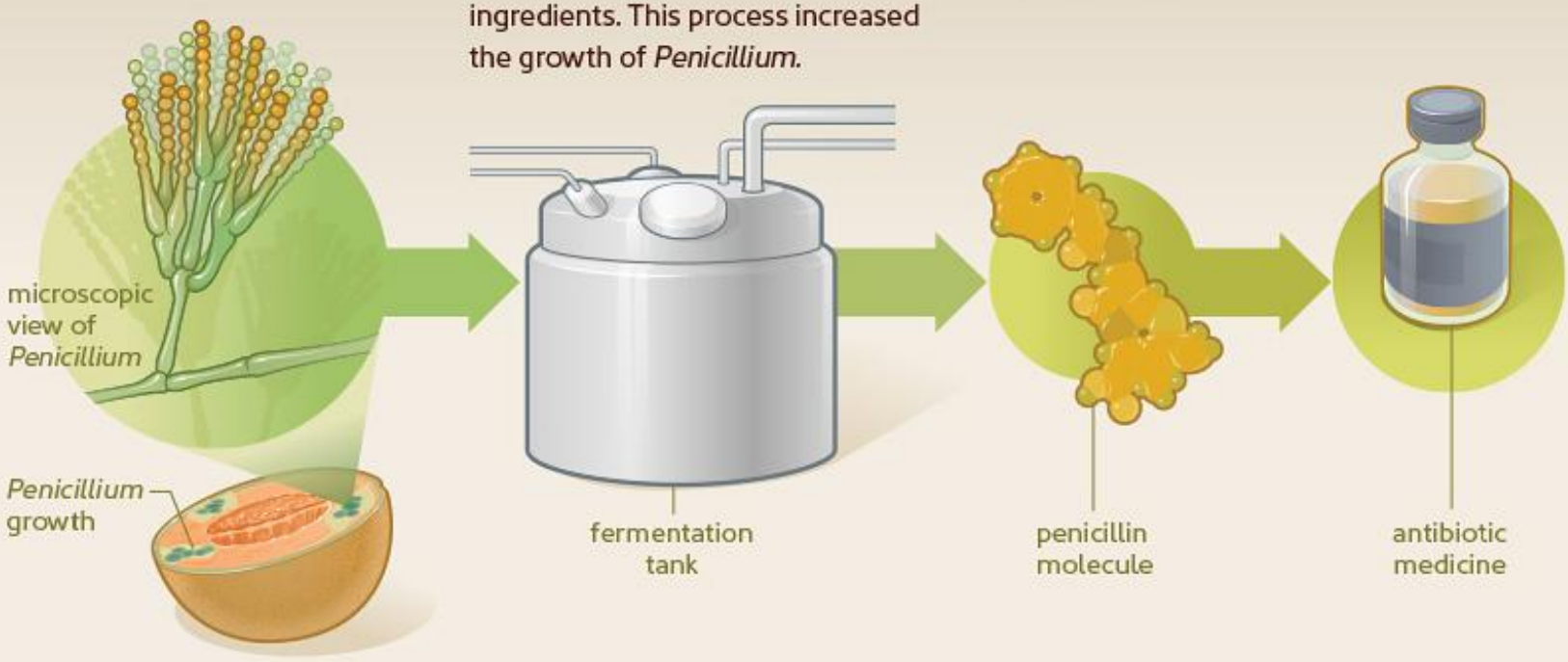
The Discovery of Penicillin: One of the Most Important Events in Medical History

- For the first time, doctors had a way to treat infections and miraculously save lives
- Prior to the discovery of penicillin patients often died from trivial injuries or infections
- Today in the United States, deaths by infectious bacterial diseases are **one-twentieth** what they were in 1900

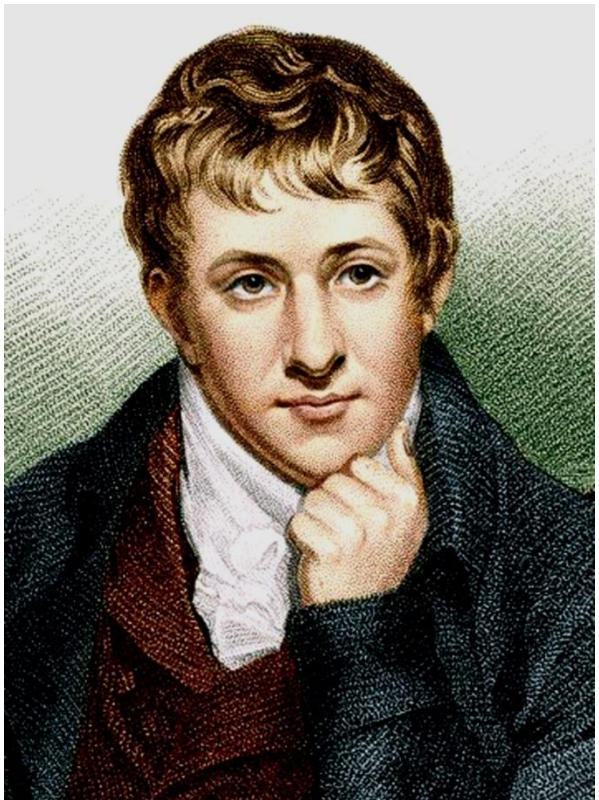
HOW DID THEY MAKE PENICILLIN?

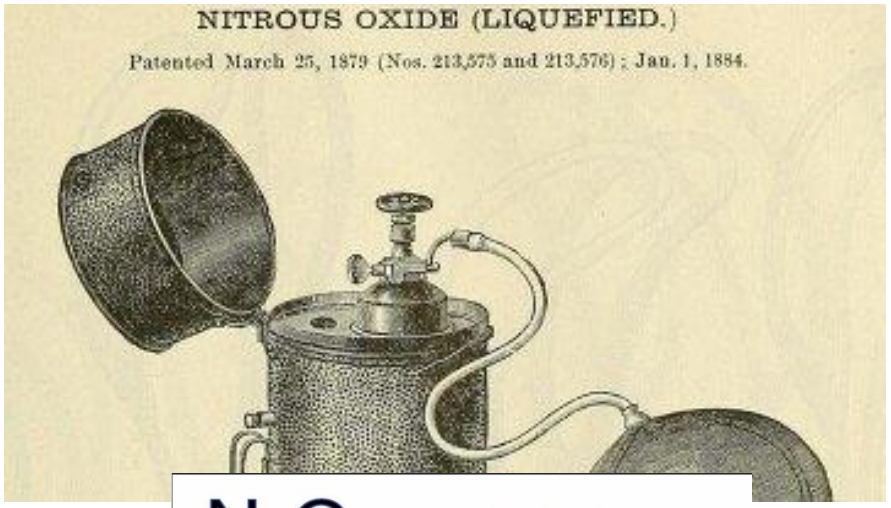
FOR MANY YEARS, scientists knew that certain molds killed some bacteria. However, researchers needed to understand how to harness this antibacterial microbe and to manufacture enough of the substance before they could make a useful medicine.

1. *Penicillium* mold naturally produces the antibiotic penicillin
2. Scientists learned to grow *Penicillium* mold in deep fermentation tanks by adding a kind of sugar and other ingredients. This process increased the growth of *Penicillium*.
3. Then, scientists separated the penicillin product from the mold.
4. Finally, penicillin is purified for use as an antibiotic medicine.

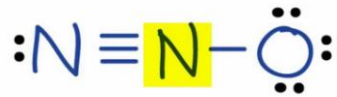


Humphry Davy (in 1799, English), started a very radical self- experimentation to get insight into the effects of inhaling N_2O **nitrous oxide**, better know as "Laughing Gas". He **heated crystals of ammonium nitrate**, collect the gas released in a green oiled-silk bag, pass it through water vapour to remove impurities and then inhale it through a mouthpiece. The effects were superb. Of these first experiments he described giddiness, flushed cheeks, intense pleasure, and "sublime emotion connected with highly vivid ideas".



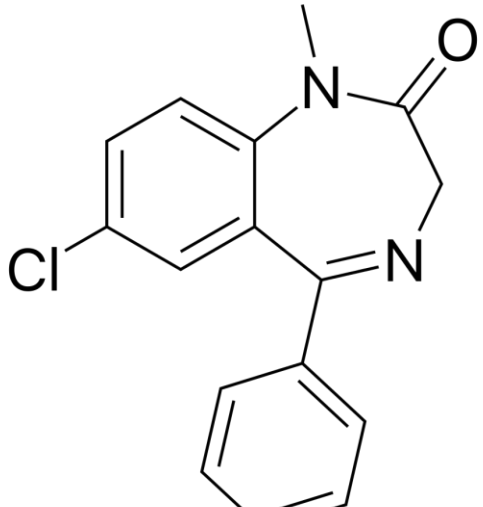


N_2O Polarity



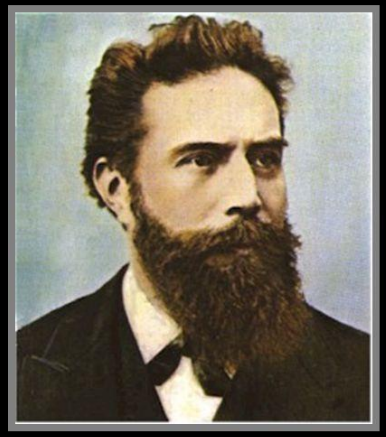
***VALIUM*-LEO STERNBACH 1959-→ tested several tricyclic compounds isolated from dyes-stuff---studied tens of different compounds that tourned to be biologicallyinactive!. VALIUM was thrown away in the Lab and it was found accidentally to show tranquilizing relaxing effects**

Dr. Leo Sternbach gave the world Librium (1960) and Valium (1963). He doesn't like popping "mother's little helper" himself. He said it makes him feel a tad depressed.

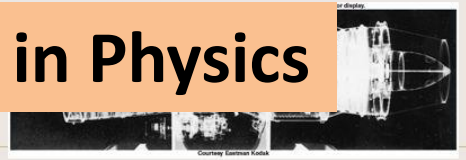


History of X-rays

- Accidentally discovered in 1895
- William Roentgen takes credit for discovery

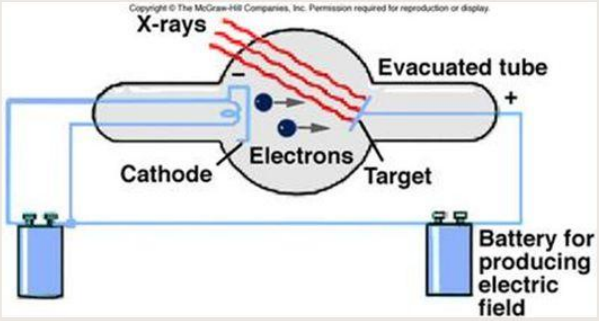


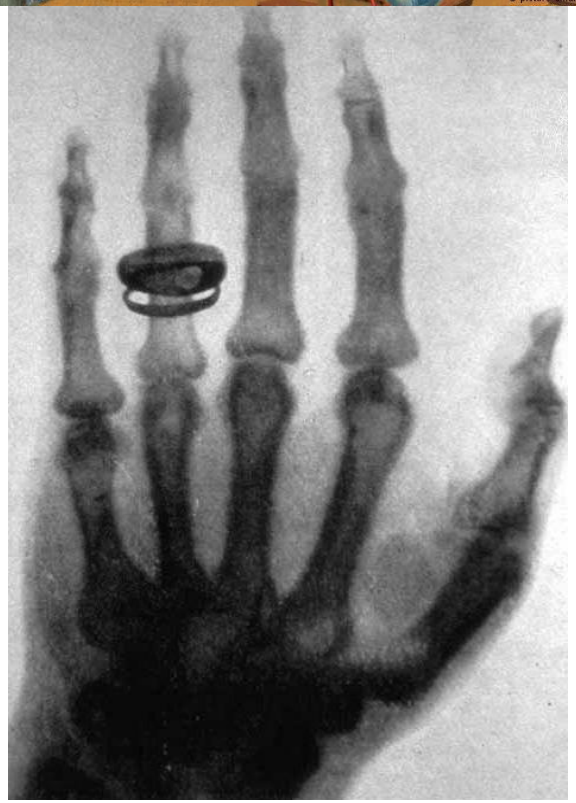
1901-Nobel in Physics

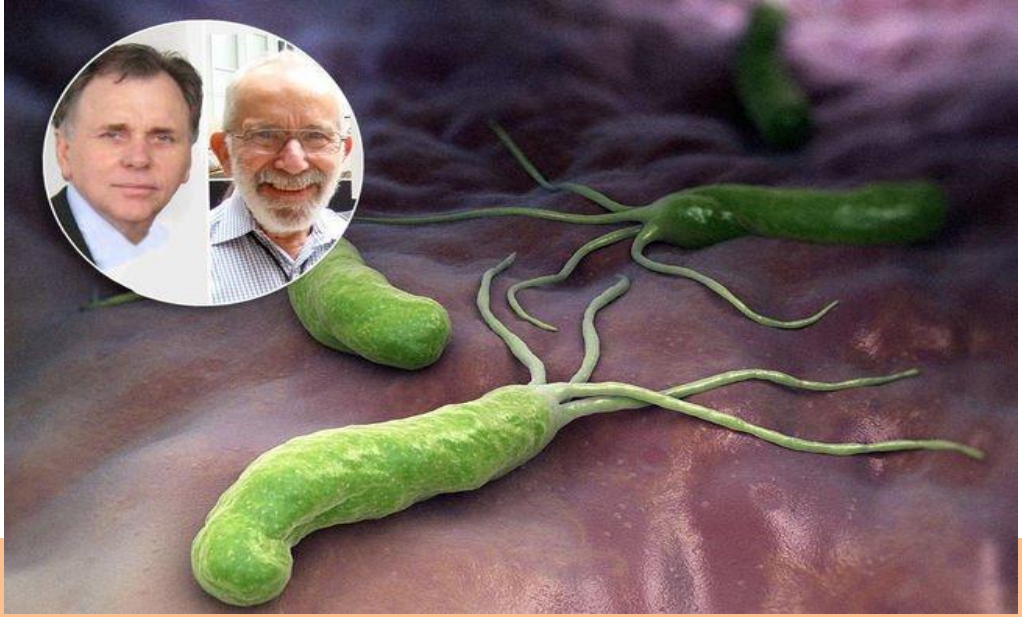


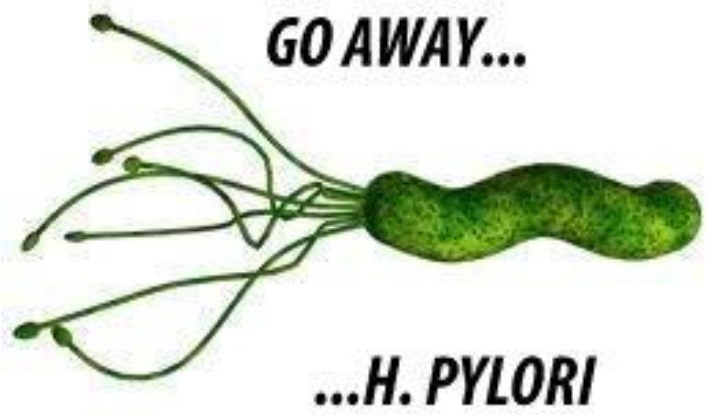
Wilhelm Roentgen accidentally discovered **x-rays** in 1895. In 1912, Max von Laue showed that x-rays are extremely high frequency EM waves. X-rays are produced by high energy electrons that are stopped suddenly; the electron KE is transformed into photon energy.

Wilhelm Roentgen
(1845-1923)







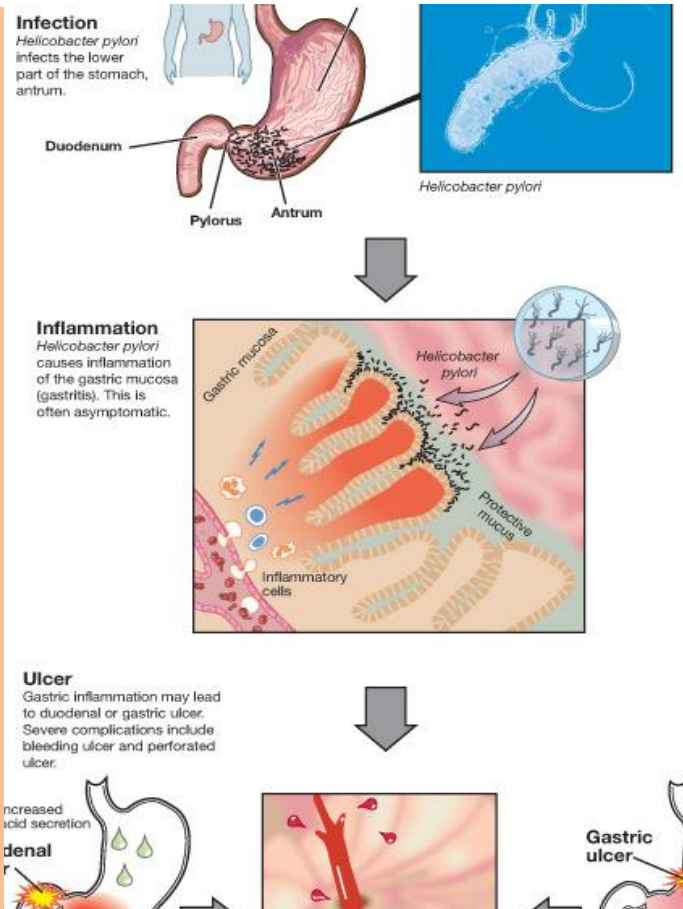


Barry Marshal and Robyn Warren-Discovery of Helicobacter Pylori...

left the agar plates much longer to incubate ....new bacteria identified....

Nobel prize in 2005

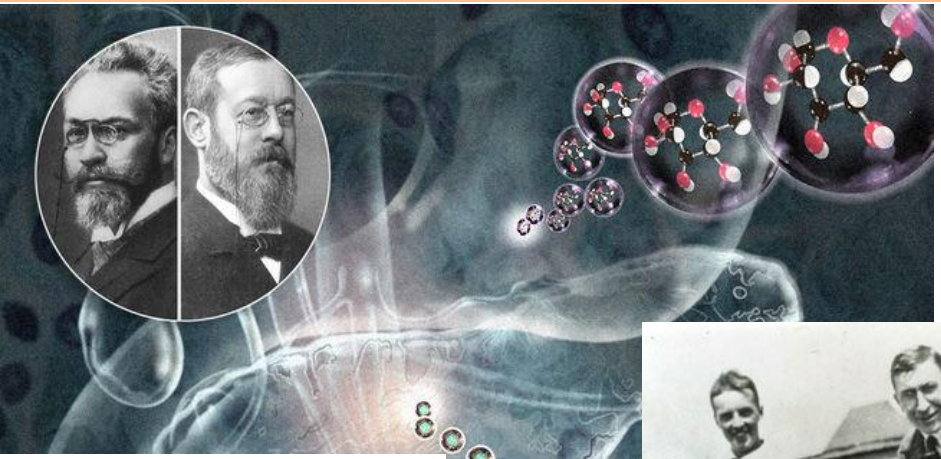
in Physiology and Medicine

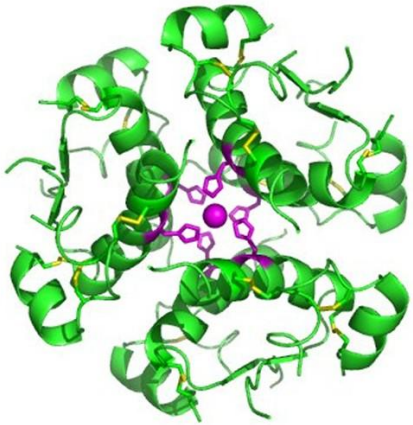


OSKAR MINKOWSKI and ***JOSEPH vom MERING-1889***

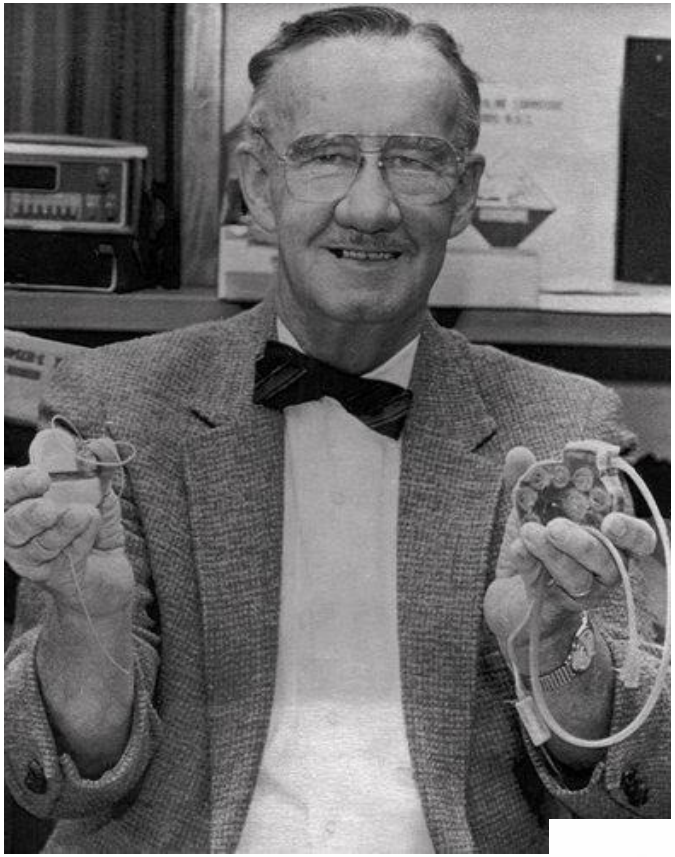
Pancreas and Diabetes Connection…

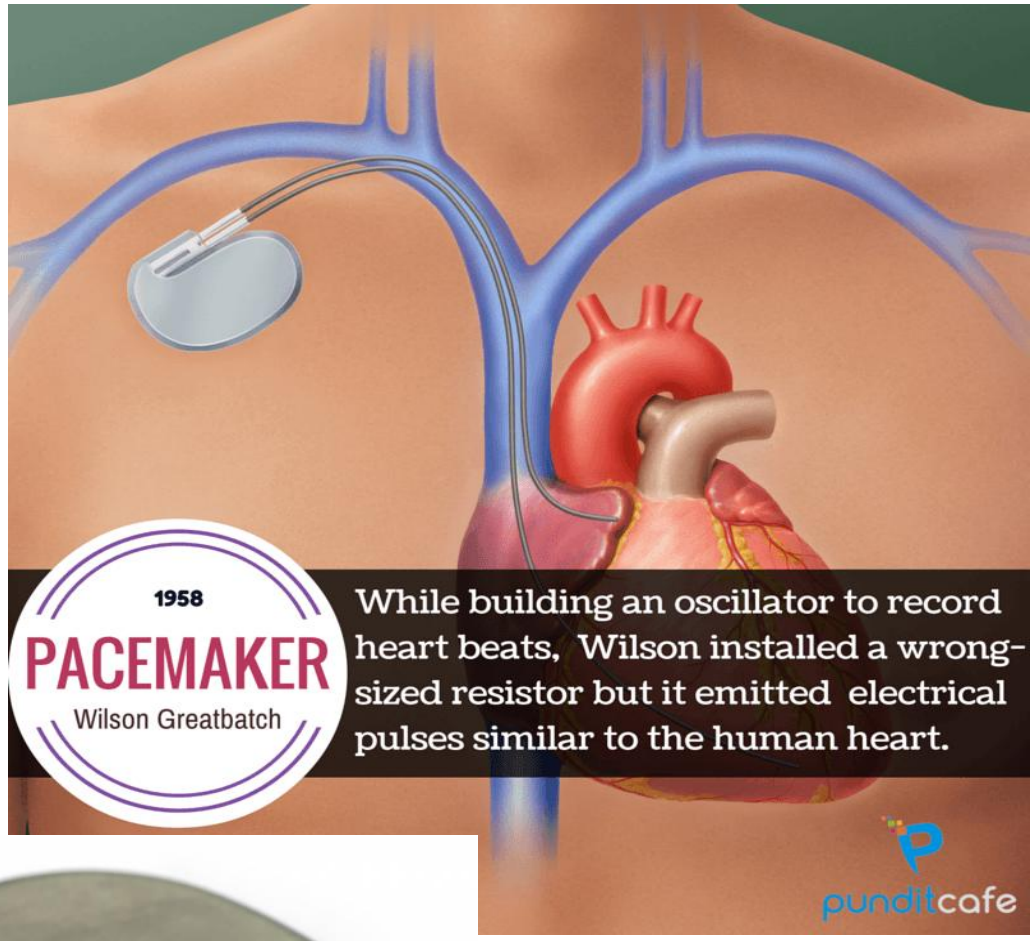
paved the way to identify **INSULIN…pancreas removed from a healthy dog and flies started drinking urine of the dog**





IMPLANTABLE PACEMAKER-Wilson Greatbatch





VIAGRA-----The fastest-selling drug in history was discovered

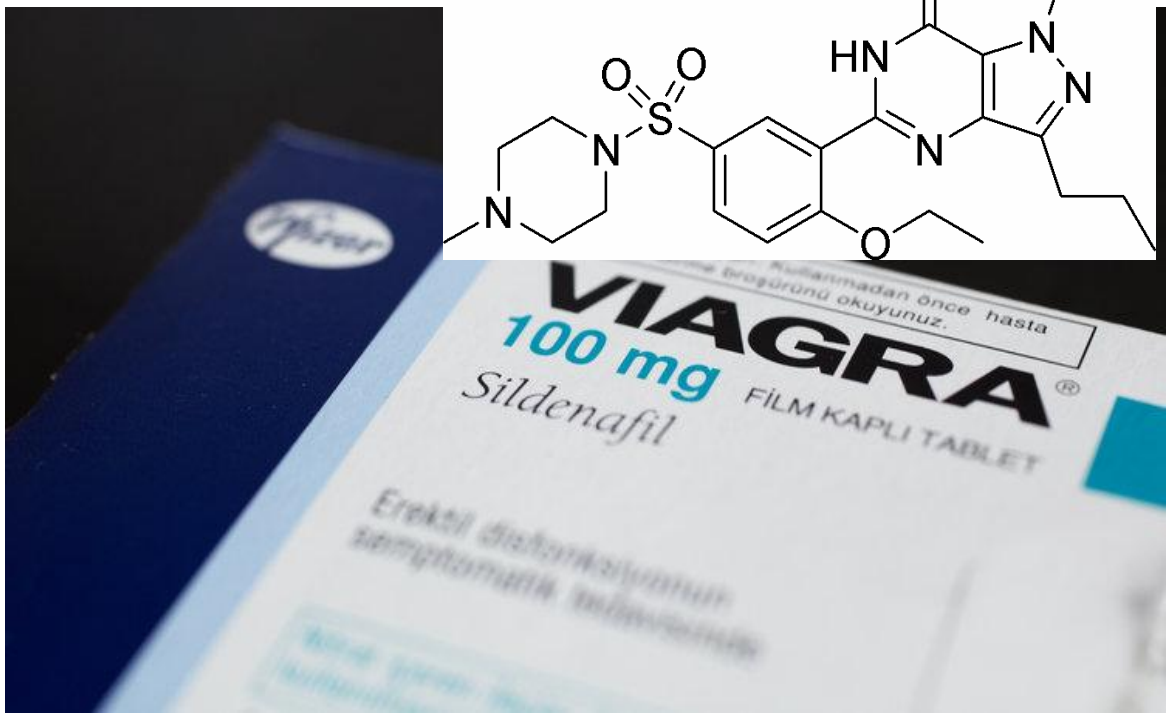
without its makers knowing what it would be used for. In the small English town of Sandwich, Pfizer researchers were working on a drug they hoped would relax blood vessels.

The objective was to find a treatment for angina.

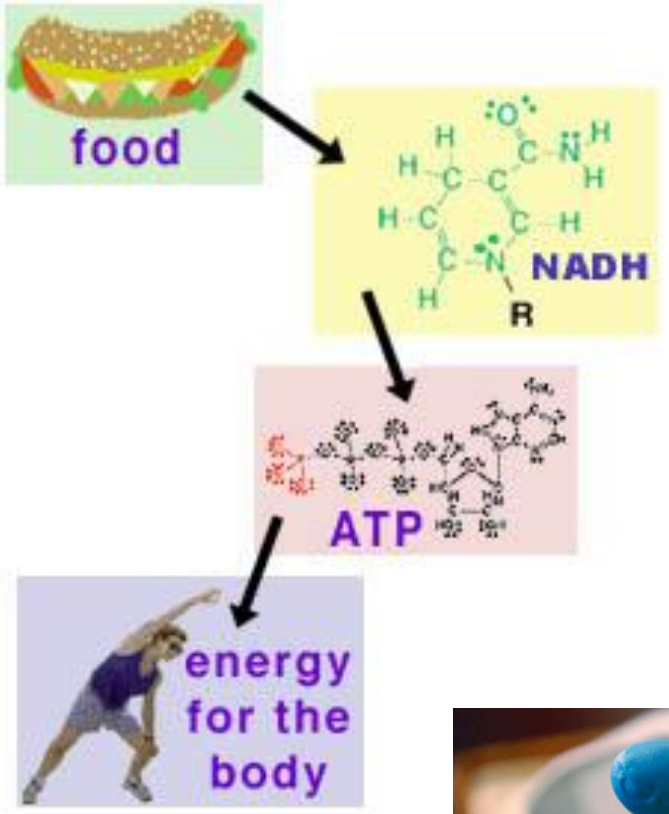
Researchers tested some 1,500 compounds before they found the one they thought they were looking for. To their dismay, initial trials showed that the drug was ineffective.

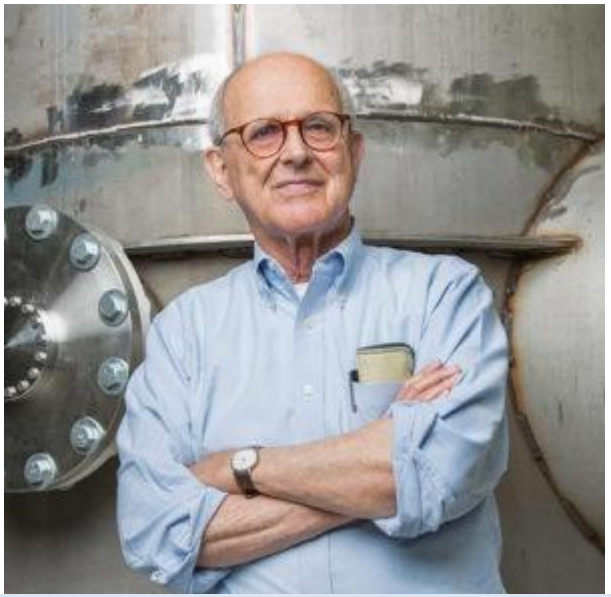
…the doctor in charge pointed out a curious side effect:

Many of the men participating in the trial reported penile erections.

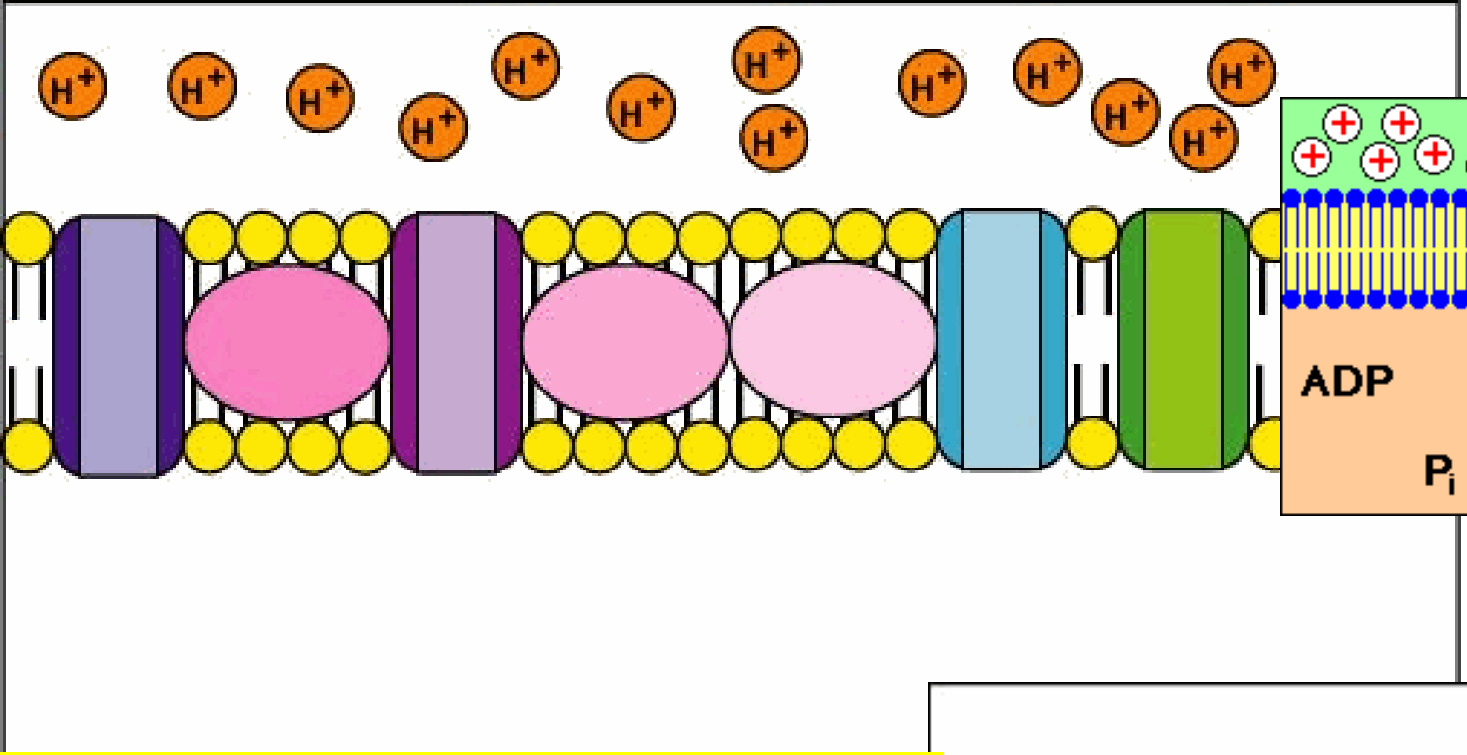


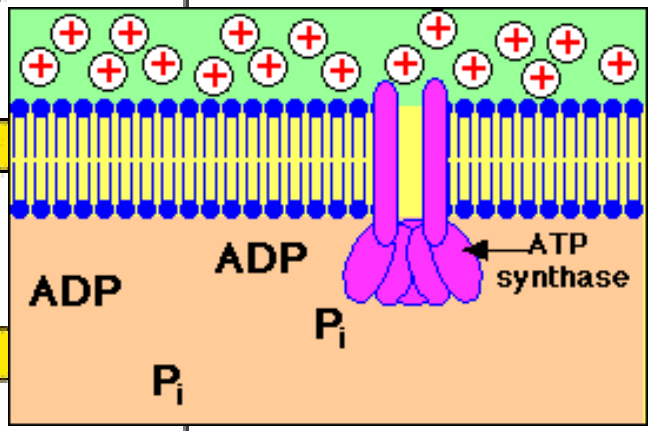
MITOCHONDRIAL ELECTRON TRANSFER CHAIN---------- from Food to Energy----------



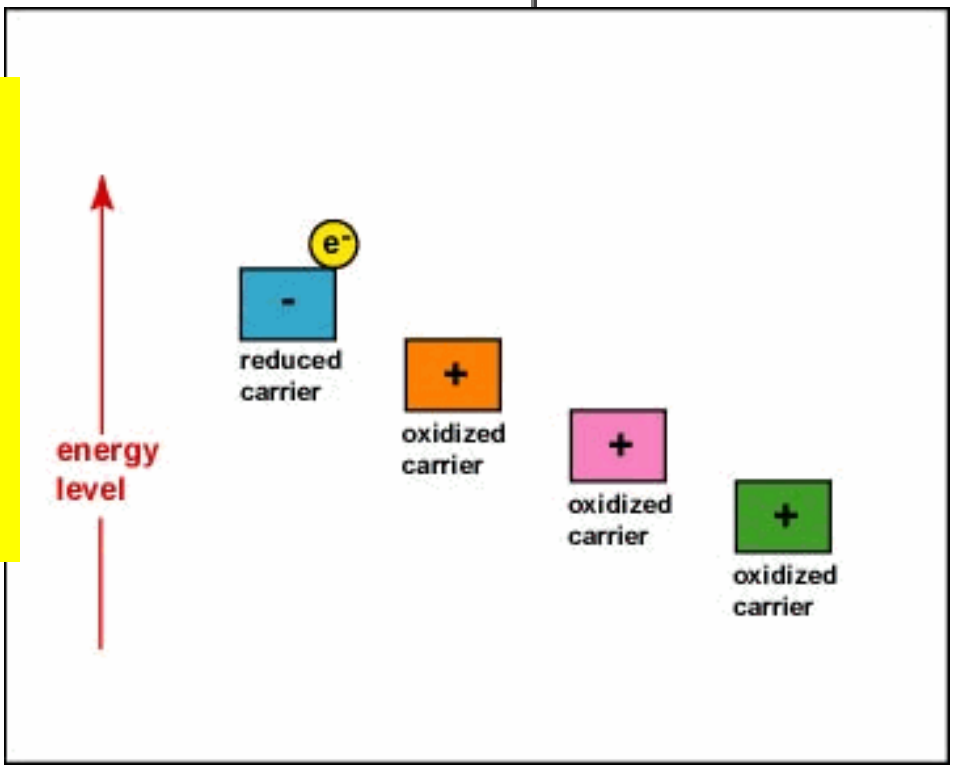


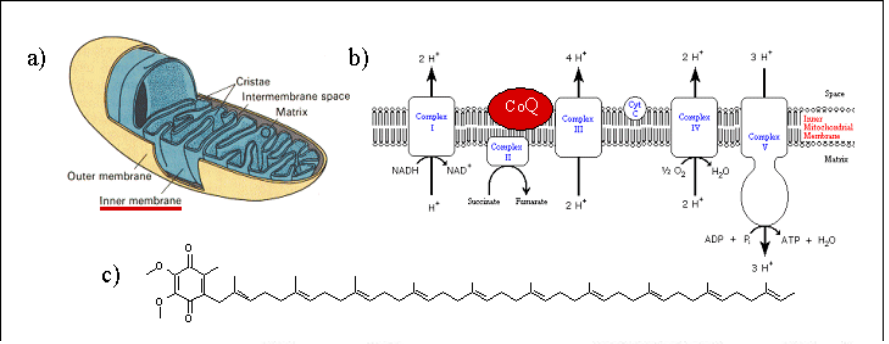
Peter Mitchel-Nobel Prize In 1979



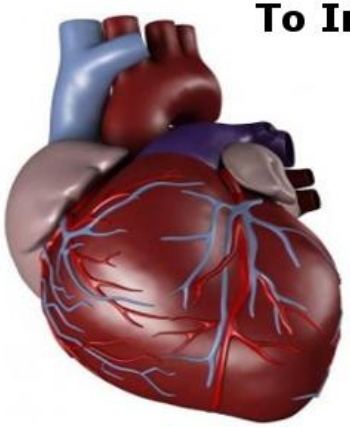


The Electron Transport Chain
CREATION OF ATP
From FOOD is, indeed
the most important
Electrochemical process
in living systems



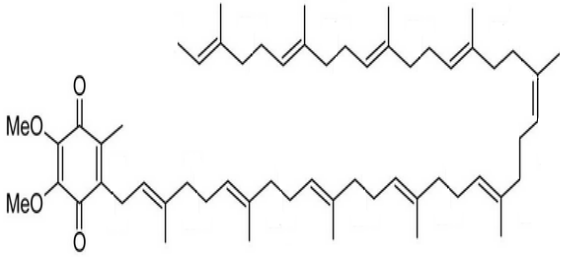


How Coenzyme Q10 Can Help To Improve Cardiac Functions

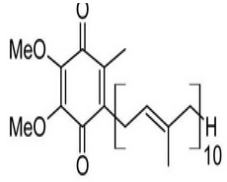


Coenzyme Q10 performs the following major functions:

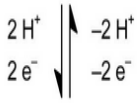
1. It is involved in the release of energy from ATP.
2. It is involved in the mobilization of fats from the adipose tissues.
3. It helps to lower the LDL levels in blood.
4. It acts as an antioxidant.

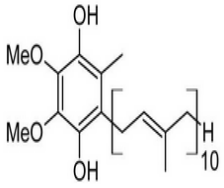


Co Enzyme Q10 (CoQ10)



Oxidized form of CoQ10 (Ubiquinone)





Reduced form of CoQ10 (Ubiquinol)

CO-ENZYME Q_{10}

Co-enzyme Q10 is also Known as C_oQ_{10} or Ubiquinone.

C_oQ_{10} was originally discovered in 1957, but its unique functions within the body weren't founded until 1961 by Scientist and Nobel Prize winner **Peter Mitchell.**

C_oQ_{10} is found in the **Mitochondria,** which is the organelle responsible for producing energy in the cell. Specifically it is found in the electron transport chain.

C_oQ_{10} is found in every single cell of the human body.

The body is able to produce this substance from dietary amino acid Tyrosine. Tyrosine can be found in **Mackerel, Cheese, Broccoli and Spinach.**

Some studies have found that people in the late stages of **AIDs, Parkinson's Disease,** and MS have low C_oQ_{10} levels.

Reverse the clock! Scientists have predicted that typical symptoms of ageing aren't just that, but a deficit of C_oQ_{10}. As we age the body becomes **Less Efficient** at making it.

It can make you drop pounds. C_oQ_{10} is associated with energy production and metabolism. A distinct lack of it is thought to be the reason some people are unable to lose weight. It's thought naturally supplementing you body's ability to make C_oQ_{10} can boost the **Metabolism, And Encourage Weight Loss.**

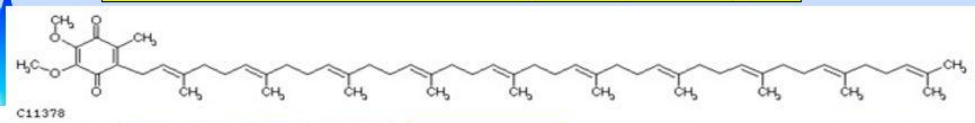
It is one of the rare supplements that can be taken to aid the symptoms of **Tinnitus.** German doctors administered C_oQ_{10} for 4 months to find that it vastly improved irritating symptoms.

People who take statins for cholesterol reduction desperately need Co-Q10. Statins are an **Inhibitory Medication** which not only prevents cholesterol production but Co-Q10 too.

Symptoms of heart failure are life changing and very debilitating. It was found that doses of **100-200mg**/day were effective in reducing symptoms of heart failure including **Breathing Difficulties, Sweating, Arrhythmias, Palpitations And Insomnia.**

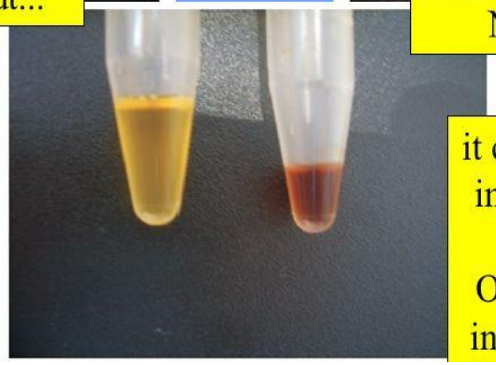
Advantage	Manufacturer	Certificat
• GAP	•10 Extractiontank	• GMP
• Stability	•SGS Tested	• ISO

EXPERIMENTS with Coenzyme Q10-CoQ10

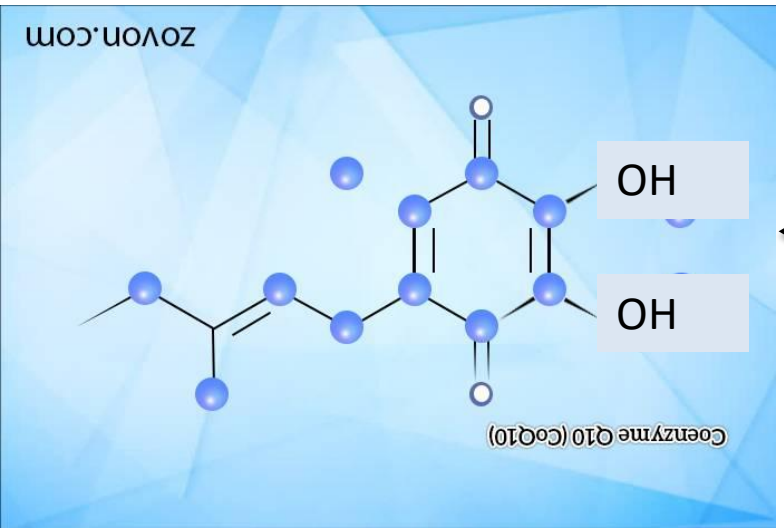


Native CoQ10 is absolutely insoluble in water, but...

it can be dissolved in NaOH...and

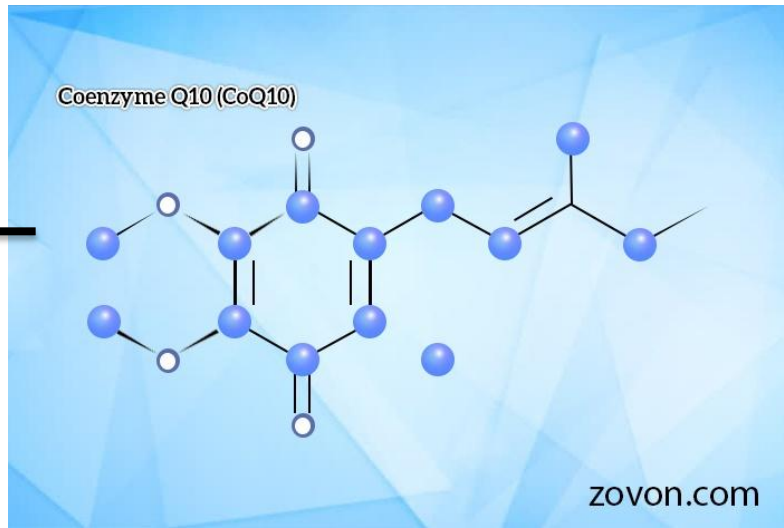


it can be transformed into a new form in presence of OH^- anions present in the organic phase



NaOH

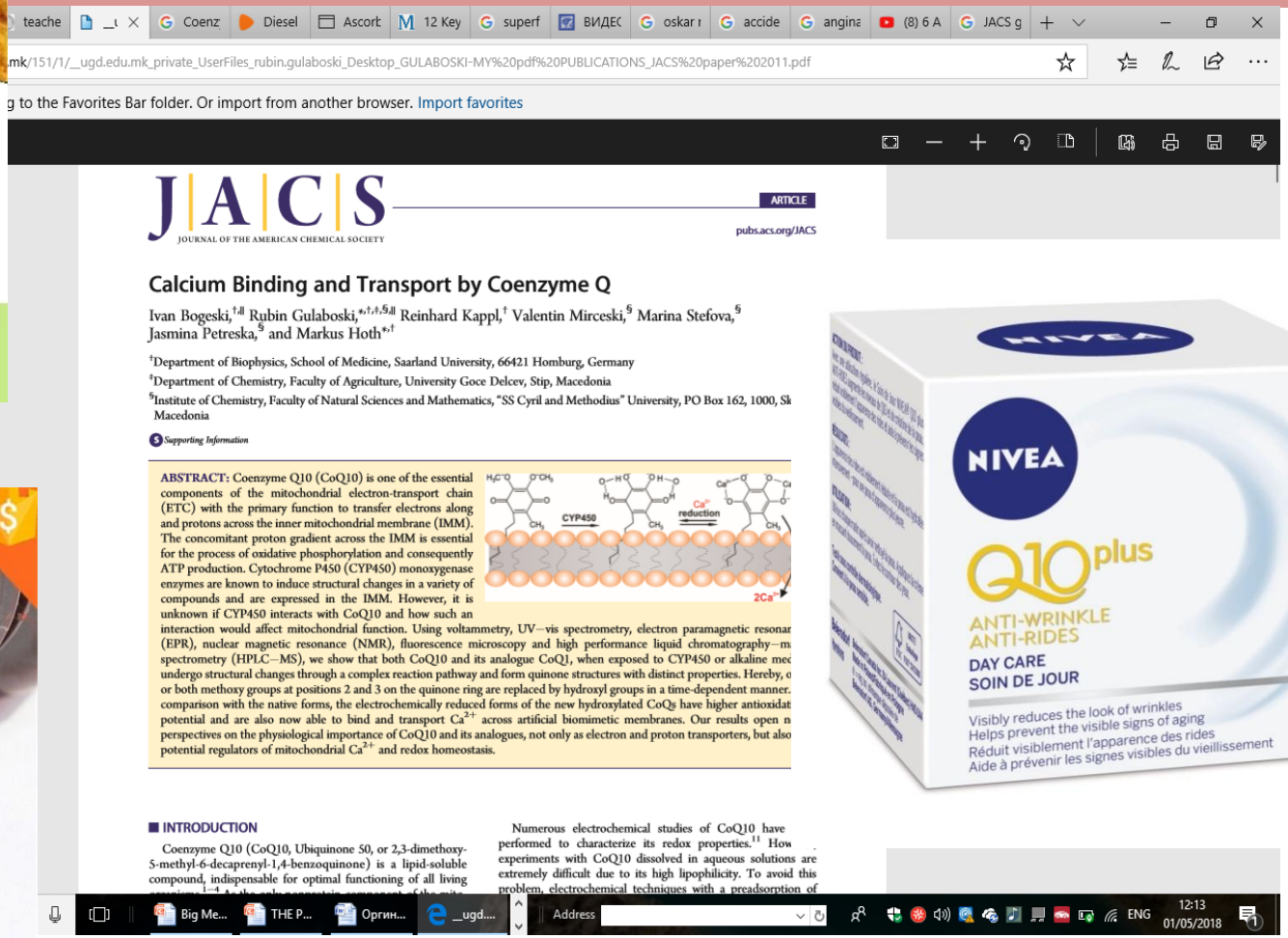
Cyt P450



NEW FOR of Coenzyme Q10 was discovered with unknown properties

-Very Strong Antioxidant

-Strong Ligand for Binding Ca2+, Mg2+, Fe3+, Fe2+…



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Calcium Binding and Transport by Coenzyme Q

Ivan Bogeski,[†,∥] Rubin Gulaboski,[*,†,‡,§,∥] Reinhard Kappl,[†] Valentin Mirceski,[§] Marina Stefova,[§] Jasmina Petreska,[§] and Markus Hoth[*,†]

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[§]Institute of Chemistry, Faculty of Natural Sciences and Mathematics, "SS Cyril and Methodius" University, PO Box 162, 1000, Sk Macedonia

Supporting Information

ABSTRACT: Coenzyme Q10 (CoQ10) is one of the essential components of the mitochondrial electron-transport chain (ETC) with the primary function to transfer electrons along and protons across the inner mitochondrial membrane (IMM). The concomitant proton gradient across the IMM is essential for the process of oxidative phosphorylation and consequently ATP production. Cytochrome P450 (CYP450) monoxygenase enzymes are known to induce structural changes in a variety of compounds and are expressed in the IMM. However, it is unknown if CYP450 interacts with CoQ10 and how such an interaction would affect mitochondrial function. Using voltammetry, UV−vis spectrometry, electron paramagnetic resonar (EPR), nuclear magnetic resonance (NMR), fluorescence microscopy and high performance liquid chromatography−m spectrometry (HPLC−MS), we show that both CoQ10 and its analogue CoQ1, when exposed to CYP450 or alkaline mec undergo structural changes through a complex reaction pathway and form quinone structures with distinct properties. Hereby, or both methoxy groups at positions 2 and 3 on the quinone ring are replaced by hydroxyl groups in a time-dependent manner. comparison with the native forms, the electrochemically reduced forms of the new hydroxylated CoQs have higher antioxidat potential and are also now able to bind and transport Ca^{2+} across artificial biomimetic membranes. Our results open n perspectives on the physiological importance of CoQ10 and its analogues, not only as electron and proton transporters, but also potential regulators of mitochondrial Ca^{2+} and redox homeostasis.

INTRODUCTION

Coenzyme Q10 (CoQ10, Ubiquinone 50, or 2,3-dimethoxy-5-methyl-6-decaprenyl-1,4-benzoquinone) is a lipid-soluble compound, indispensable for optimal functioning of all living

Numerous electrochemical studies of CoQ10 have performed to characterize its redox properties.[11] How experiments with CoQ10 dissolved in aqueous solutions are extremely difficult due to its high lipophilicity. To avoid this problem, electrochemical techniques with a preadsorption of

teachers.ugd.edu.mk/pArea/p X
EP2332898A1 - Benzoquinone- X
https://patents.google.com/patent/EP2332898A1/fi
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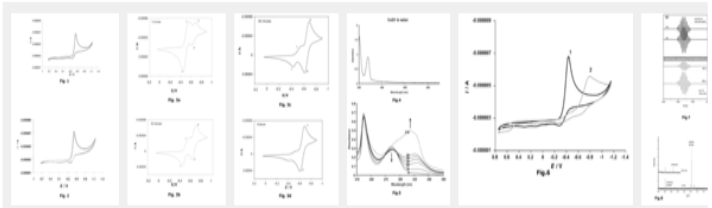
Benzoquinone-based antioxidants

Images (19)



Classifications

A61Q19/08 Anti-ageing preparations

View 3 more classifications

EP2332898A1

EP Application

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Other languages: German, English, French

Inventor: Rubin Gulaboski, Ivan Bogeski, Reinhard Kappl, Markus Prof. Hoth

Current Assignee : Universitat des Saarlandes DE , UNIVERSITAET DES SAARLANDES

Original Assignee: Universitat des Saarlandes DE, UNIVERSITAET DES SAARLANDES

Priority date : 2009-12-10

Family: EP (1)

Date	App/Pub Number	Status
2009-12-10	EP20090178735	Withdrawn
2011-06-15	EP2332898A1	Application

Info: Patent citations (2), Non-patent citations (2), Cited by (1), Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, EPO GPI, EP Register, Global Dossier, Discuss

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"Never give up, for that is just the place and time that the tide will turn."

- Harriet Stowe

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