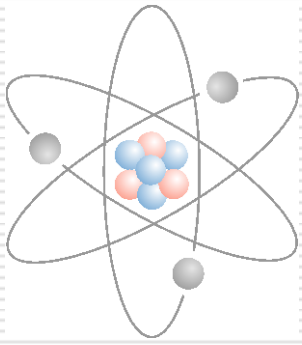


# **RUĐER MEDIKOL CYCLOTRON**

Hrvoje Prpić, dr. med.  
Board President  
RMC Ltd.



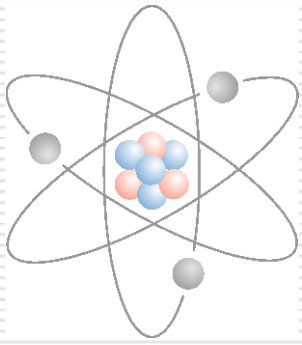
# PET/CT Diagnostics

- Lungs 3.000
- Colorectal 1.250
- Lymphoma 450
- Melanoma 590
- Head and neck 530
- Oesophagus 220
- Breast 2.330
- Thyroid 420
- Ovarium and cervix uteri 800

**9.590**

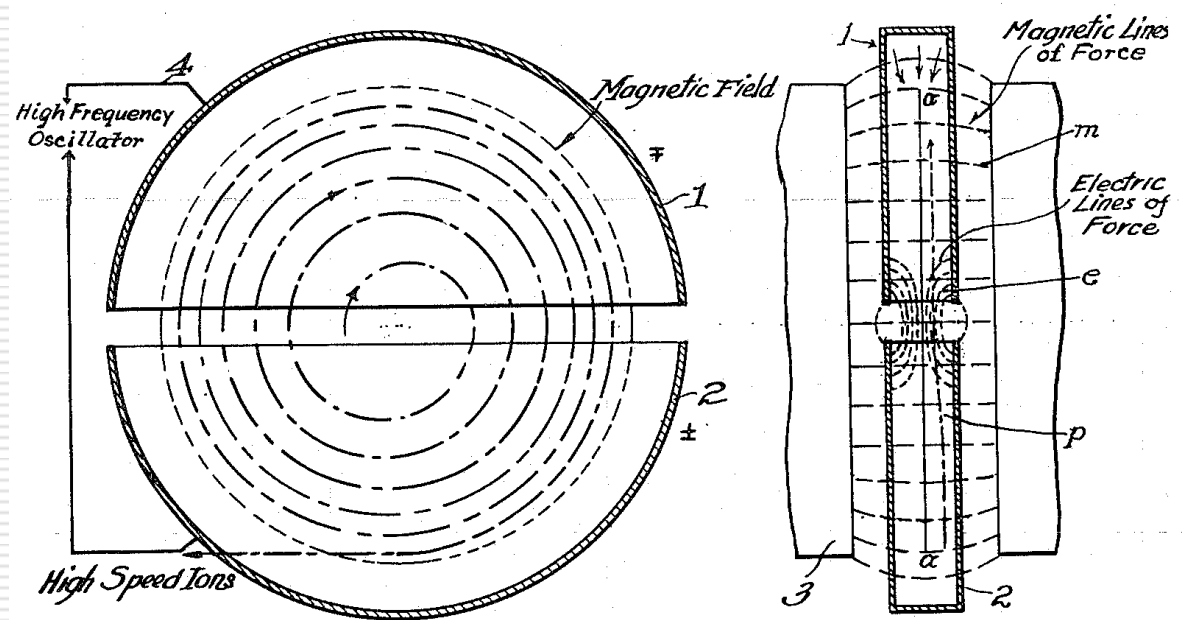


**FDG**



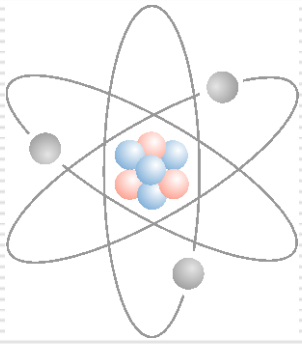
# Positron Emitting Radionuclides - CYCLOTRON

- A high-frequency alternating voltage applied across the "D" electrodes (also called "dees") alternately attracts and repels charged particles.
- In the cyclotron, energy is applied to the particles as they cross the gap between the dees and so they are accelerated.



Lawrence's 1934 patent

*Cyclotron beams can be used to bombard other atoms to produce short-lived positron-emitting isotopes suitable for PET imaging.*

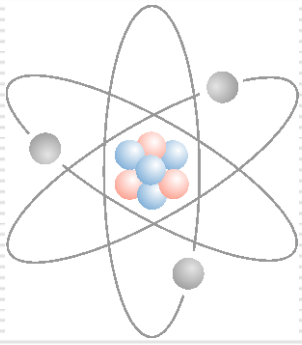


## Positron Emitting Radionuclides - CYCLOTRON

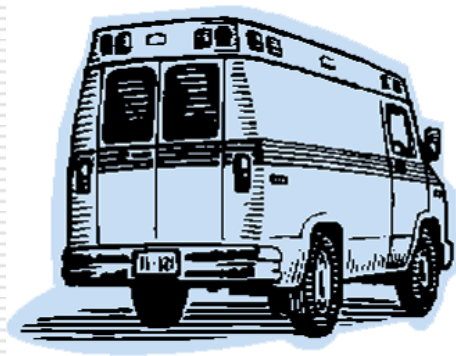
Radioisotope	Reaction	T1/2 (min)
$^{18}\text{F}$	$^{18}\text{O} (\text{p}, \text{n}) ^{18}\text{F}$	110
$^{15}\text{O}$	$^{14}\text{N} (\text{p}, \text{n}) ^{15}\text{O}$	2
$^{13}\text{N}$	$^{16}\text{O} (\text{p}, \alpha) ^{13}\text{N}$	20
$^{11}\text{C}$	$^{14}\text{N} (\text{p}, \alpha) ^{11}\text{C}$	10

The bombarding proton or deuteron is absorbed in the target nucleus forming a compound nucleus which subsequently decays by positron emission.

Different targets are required in order to produce different radioisotopes.



# PET/CT Diagnostics

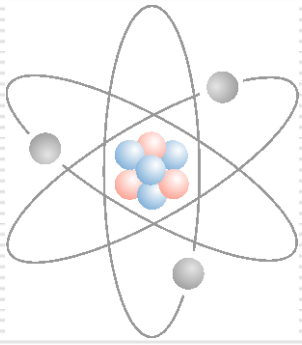


**FDG**



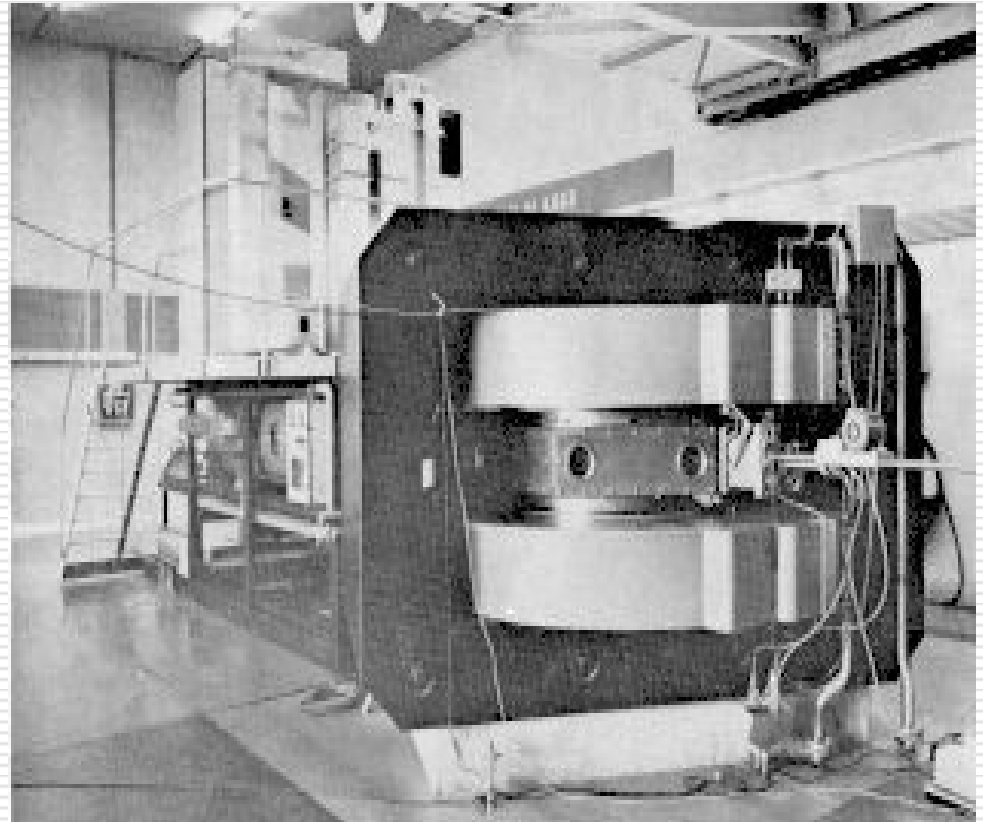
**Austria - Zagreb**

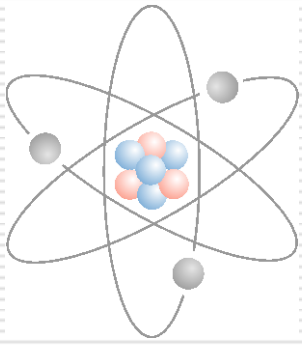




# Positron Emitting Radionuclides - CYCLOTRON INSTITUTE RUĐER BOŠKOVIĆ

- start-up 1962
- Gallium
- Crypton
- 80's
- 90's

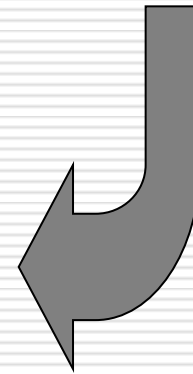




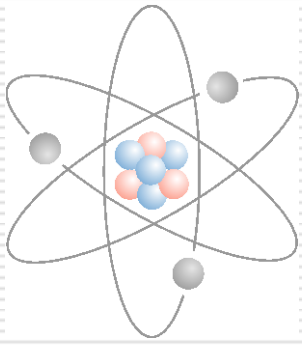
**INSTITUTE  
RUĐER  
BOŠKOVIĆ**

**MEDIKOL  
Ltd.**

**RUĐER  
INNOVATION  
Ltd.**



**RUĐER MEDIKOL CYCLOTRON Ltd.**

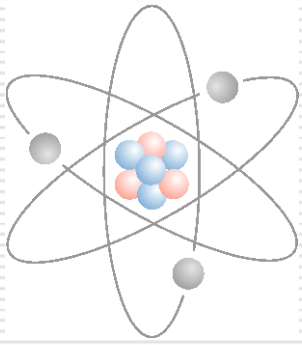


# Project development (2007-2009)

- **SEI** – May 2008
- **Location permit**  
July 2008
- **Construction permit**  
December 2008
- **Beginning of construction**  
January 2009
- **Cyclotron installation**  
27 April 2009
- **End of construction**  
July 2009
- **Start-up of the production**  
End of 2009

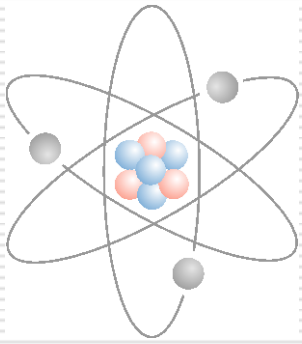






# Production

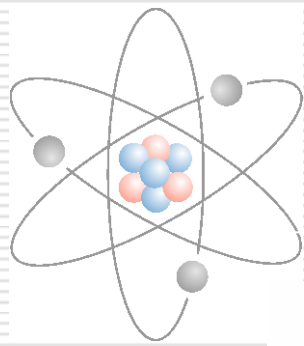
- $^{18}\text{F}$ -FDG – for number of oncology patients - diagnostics and the follow-up of: lungs, colorectal, head and neck, breast, lymphomas, melanomas, thyroid...
- $^{18}\text{F}$ -Choline – prostate cancer
- $^{18}\text{F}$ -DOPA – neuroendocrine tumors
- $^{18}\text{F}$ -Thymidine – brain tumors



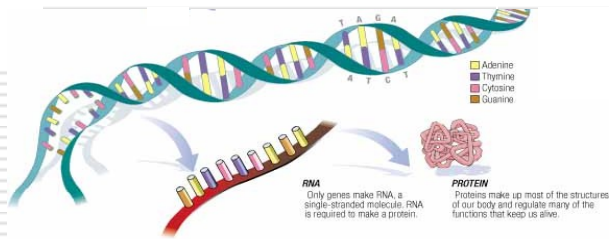
# Market



# R&D – Molecular imaging



## Genomics Development



### Human Genome Discovery

'88-'00: Mapped  
'98-'10: Analyzing SNP's

### Human Proteome Discovery

'00-'20: Discovering Protein Relationships to Genes

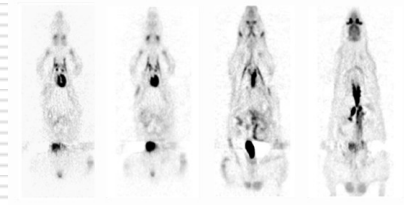
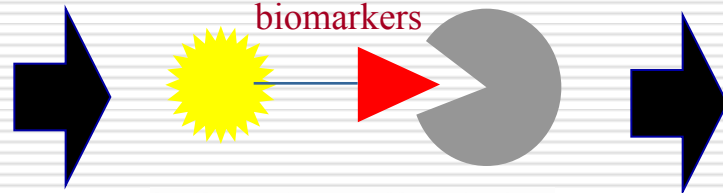
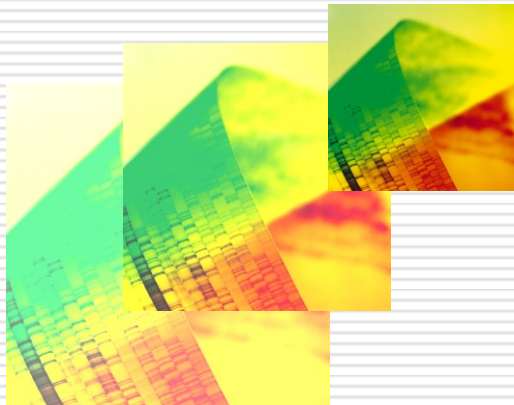
## Preventive medicine

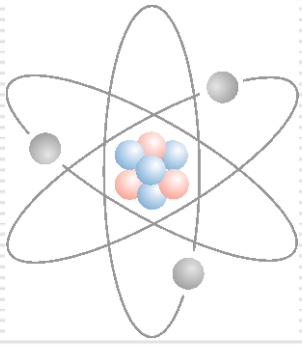
- Detect Life Threatening Disease Before Symptoms Appear...Ex. Parkinson's
- See Drugs Hitting Their Targets Almost Instantaneously
- Determine Patient Candidacy for Drugs
- Bring to Market Life Saving Drugs Tailored to Individual's Genetic Make-up Faster

**Disease Biomarkers**  
identified from studies of the Human Genome & Proteome

**Targeted Chemistry**  
Targeted chemistry that binds to and highlight biomarkers

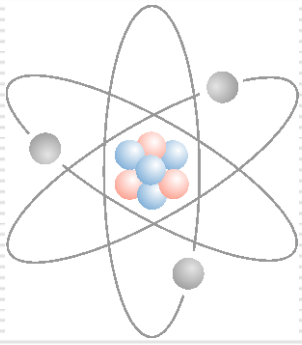
**Imaging Technologies**  
High-sensitivity, high-resolution scanners





# RMC goals

- **Medikol**
  - assure the production of radiopharmaceuticals for the Croatian and neighboring markets
- **IRB**
  - commercialize the knowledge and the research
  - achieve additional revenues
  - R&D activities and the application for future FP and other international projects
- **RI**
  - achieve additional revenues for future financing of the start-up companies on IRB
- **COMMON**
  - achieve **EXTRA PROFIT** from the possible synthesis of the new radiopharmaceutical



**Thank you**

*dr. Hrvoje Prpić*  
*Board President*



**RUDER MEDIKOL CYCLOTRON Ltd.**