



Biotechnology, Health- and Environmental protection (BEK) priority research area

Assigned to: Faculty of Chemical technology and Biotechnology



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**Dep. of Applied
Biotechnology and
Food Science**

**Fermentation Pilot
Plant Laboratory**

<http://f-labor.mkt.bme.hu>

Budapest University of Technology and Economics

In focus: Biotechnology

- **Interdisciplinary science**
(Biochemistry, Microbiology, Engineering Science)
- „Not only Bio but technology” → **basic research + applied research**
- **Several sub-area:**
 - Red Biotech. (Medical)
 - White Biotech (Industrial)
 - Green Biotech (Agro, and Envir.)
 - Blue Biotech (Marine)
 - Gold Biotech (Bioinfo, nanobio)
 - ...
- **History:** –classic biotechnology (natural microbiology basis)
–modern biotechnology (molecular biology, system biology etc.)





Similar structure of Research Univ. Priority Research Area

BIOTECHNOLOGY

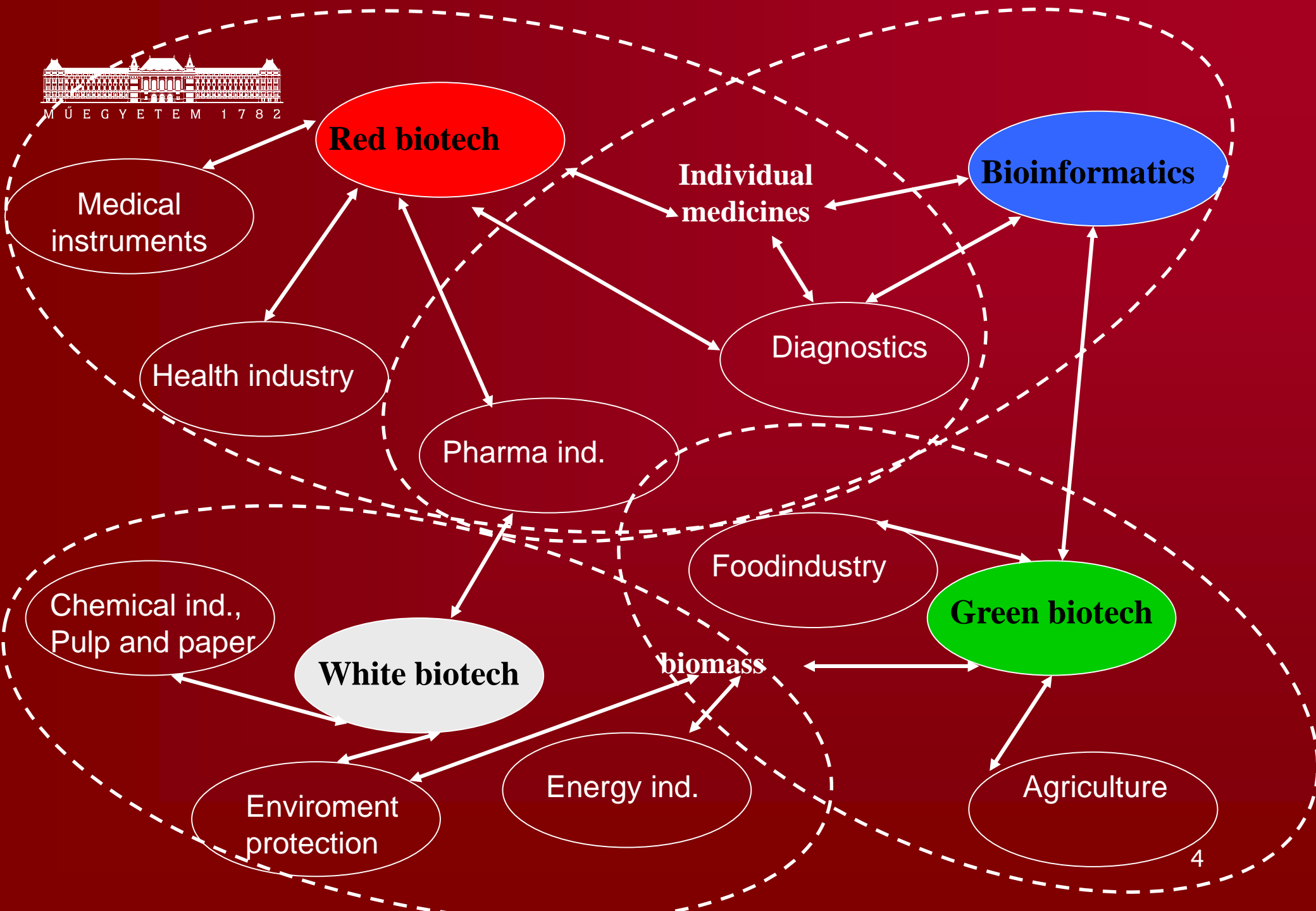
1. Medical and molecular biotechnology
2. Food, agricultural and industrial biotechnology
3. Bioinformatics

ENVIRONMENT PROTECTION

4. Environment friendly technologies
5. Recovery of environment pollution, wastewater treatment

HEALTH PROTECTION

6. Integrated medical and pharmaceutical technologies
7. Engineering in theapeutics and support of life





Research Univ. Project in Numbers

54 principal investigators, more than 100 PhD students are involved from 6 faculties, 20 departments

- Faculty of Civil Engineering
- Faculty of Mechanical Engineering
- Faculty of Chemical Technology and Biotechnology
- Faculty of Electrical Engineering and Informatics
- Faculty of Natural Sciences
- Faculty of Economic and Social Sciences

Major results of the last year

- Number of publications: 400
- Cumulative impact factor of publication: ~1000



Aims of Research Univ. Proj.

- Horizontal cooperations
- Building research network
- Fitting basic and applied researches
- Continuous communication with industrial partners

An example: Pharmatech project

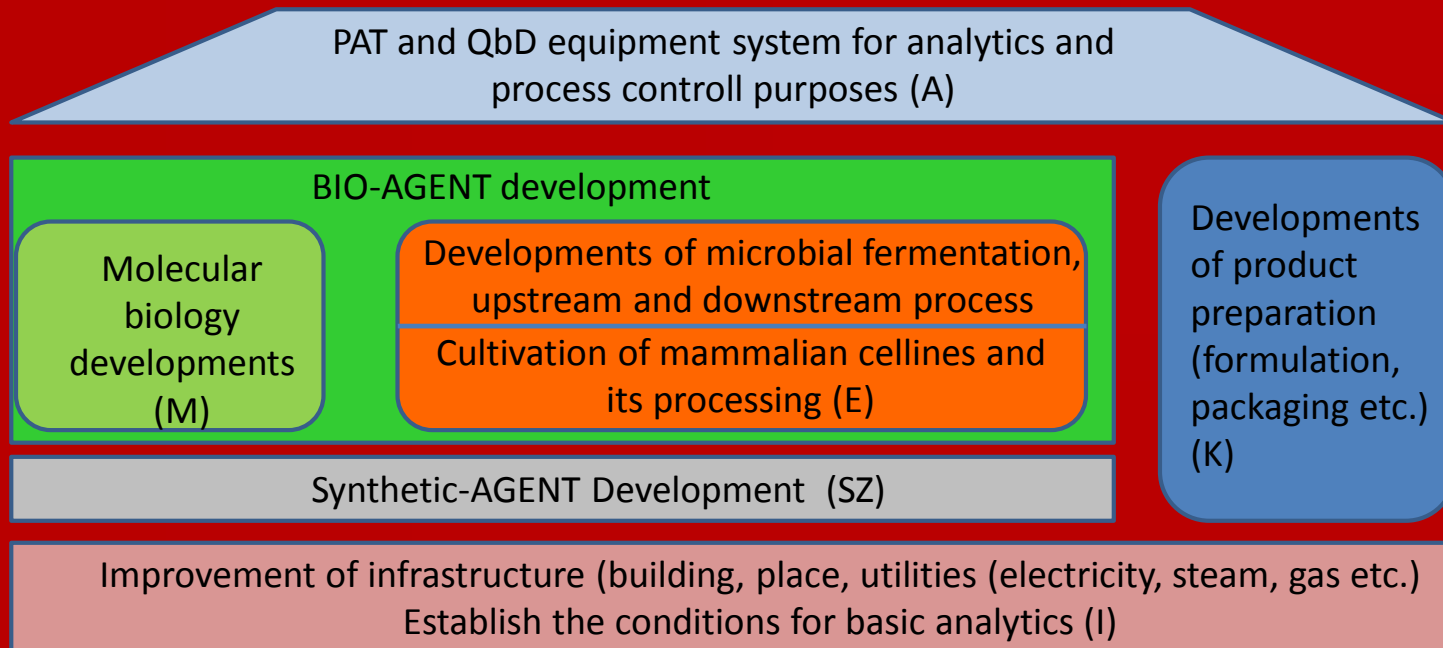


PHARMATECH project at Faculty of Chem. Techn. and Biotechn.

- **Aim: to establish a model laboratory for whole technology from rawmaterial to final packaged product**
- **There are some common steps in synthetic and biotechnological production**
- **This model laboratory can serve every pharmaceutical company with research capacities for common (not very specialized) problems**
- **Establish an integrated research and educational site**
- **The mammalian technology line will be unique**

PHARMATECH project

Structure of Pharmatech Model Labor (PML)



**First main partner:
Richter Gedeon Plc
Invests: ~400M HUF**

This can be operated in network as an „open-lab”, of which units can be placed separately.

1. Overview of the present status
2. Design and planning step pro units (M, F, E, K, A, I)
3. Set up a priority list

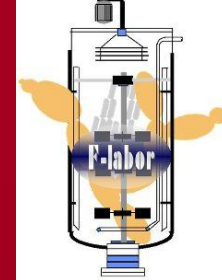


Biotech fundamentals: Dep. Of Applied Biotechnology and FoodScience – Research groups

Formerly:

1. Dep. Of Biochemistry and **Food Science**
 - Amino acid lab (Sarkadi)
 - Molecular Biology Lab (Szarka)
 - Food technology Lab (Merész)
 - Grain analytics lab (Tömösközi)
 - NIR lab (Salgó)
2. Dep. Of Agricultural Chemical Techn. – **Applied Biotechnology**
 - Enviromental risk assesment (Gruiz–Molnár)
 - Bioenergetics (Réczey–Barta)
 - Waste Water (Jobbágy)
 - Yeast cellcycle (Sveiczser – Novák(Oxford))
 - Fermentation (Sevella–Németh)

Largest Biotech Labor: F-labor



<http://f-labor.mkt.bme.hu>

- „Where basic research and applied research really meet”
- Microbial fermentation/cultivation from 0.001 – 300L scale
- Basic researches on: metabolism of sugars; antibiotic production, primer product (acids and alcohols) production, development of vaccines, biopesticide production,
- Building and examining new reaction systems (algae photobioreactors)
- Applied researches: scale up, feasibility study large scale production of fertilizers, probiotics, biocontrol agents (plant protection)
- Research University project: lactic acid fermentation and 1,3–propanediol bioconversion

To summarize

- BME is one of the largest Univ. in Hungary
- Thus it has staff, capacity, infrastructure and experiences for almost every field of biotechnology
- We involve students frequently into researches, thus our Biotechnological research and education is one of the bests in East Europe
- The real bio–engineering is almost exclusively related to our University (in Hungary)
- Thus results of basic researches can be easily transferred into applied researches or into market
- The separated researchgroups were joint around important topics in Research university project
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THANK YOU FOR YOUR KIND ATTENTION!