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# Overview of the life sciences sector In Hungary

Erno Duda
President, Hungarian Biotechnology Association
CEO, Solvo Biotechnology

# Hungary Was Right There at the Outset of the Biotechnology Era

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*„Biotechnology is all lines of work by which products are produced from raw materials with the aid of living things.”*

**The first known use of the word „biotechnology” (1917) by Károly Ereky, a Hungarian agricultural engineer**

# Life Sciences Have Traditionally Been a Focus Area for Hungary

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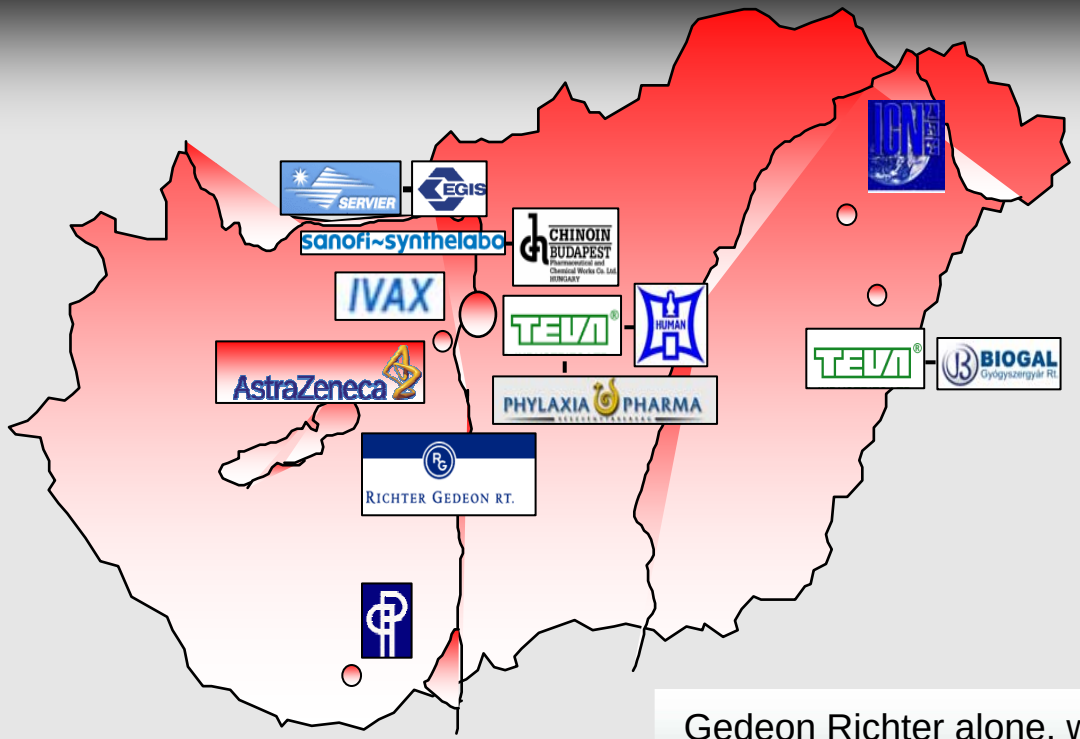
**Vast presence of large international pharmaceutical and biotechnology firms**

- Early and late stage R&D as well as manufacturing
- Not only sales and marketing




**National pharmaceutical industry with strong historical roots:**

| Founded in | Renamed after WWII | Now partially owned by |
|---|---|---|
| **1901 Gedeon Richter** | | |
| 1910 Alka | Chinoin | Sanofi-Aventis |
| 1912 Rex | Biogal | TEVA |
| 1912 Phylaxia | Human-Phylaxia | TEVA |
| 1913 Dr. Wander | Egis | Servier |
| 1927 Alkaloida | | ICN |

Gedeon Richter alone, with the addition of its planned $60 million R&D center, will employ over 1,000 R&D staff.

**All foreign owners have invested heavily in Hungarian subsidiaries' R&D and manufacturing**

# Hungary Has an Outstandingly High Quality Research Base and Human Capital

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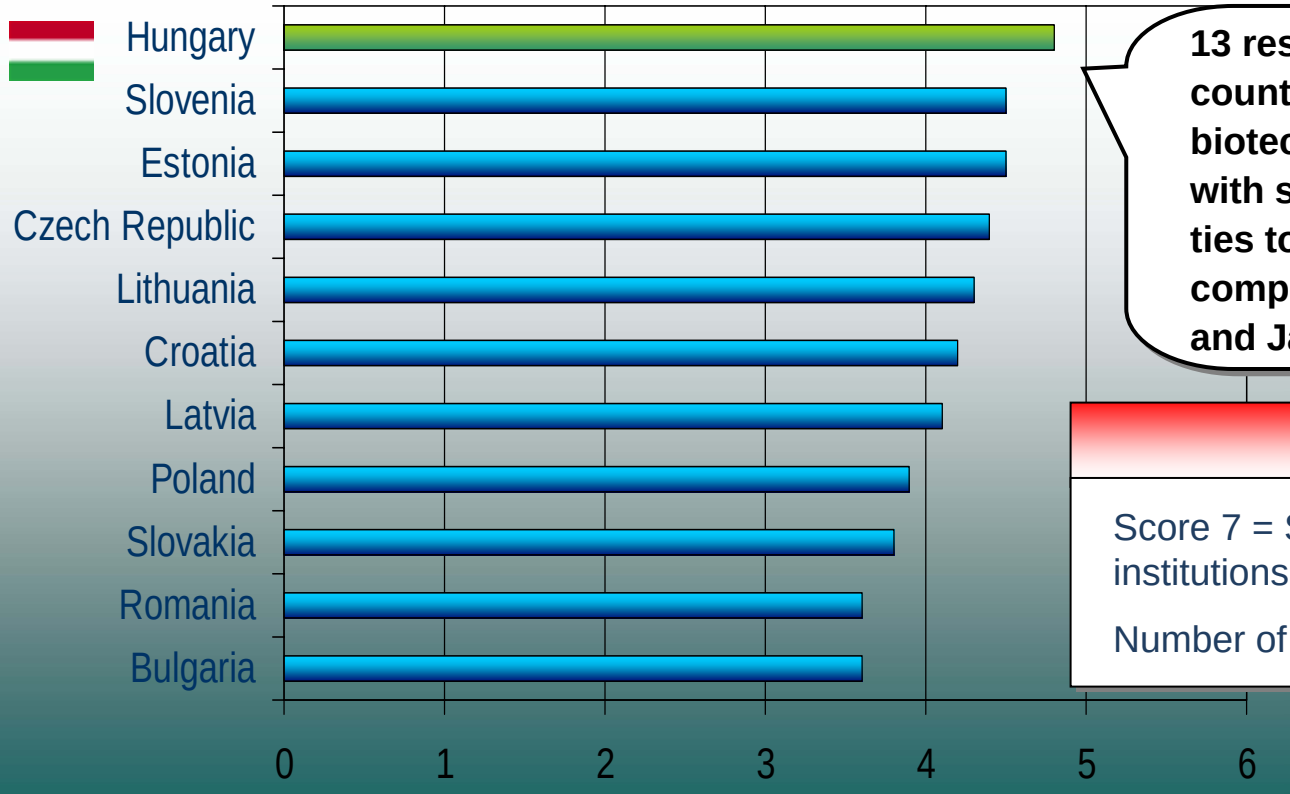
## Leading Position In Quality Of Scientific Research Institutions




**13 research institutions countrywide dedicated to biotechnology-related R&D with strong collaborative ties to universities and companies of the EU, US and Japan**

**Keys**

Score 7 = Scientific research institutions are best in their fields

Number of countries assessed: 102

**Strong ICT sector relatively to Hungary's size – a good basis for biotech development**

Source: Global Competitiveness Report, 2003-2004

# … producing much from scarce resources …

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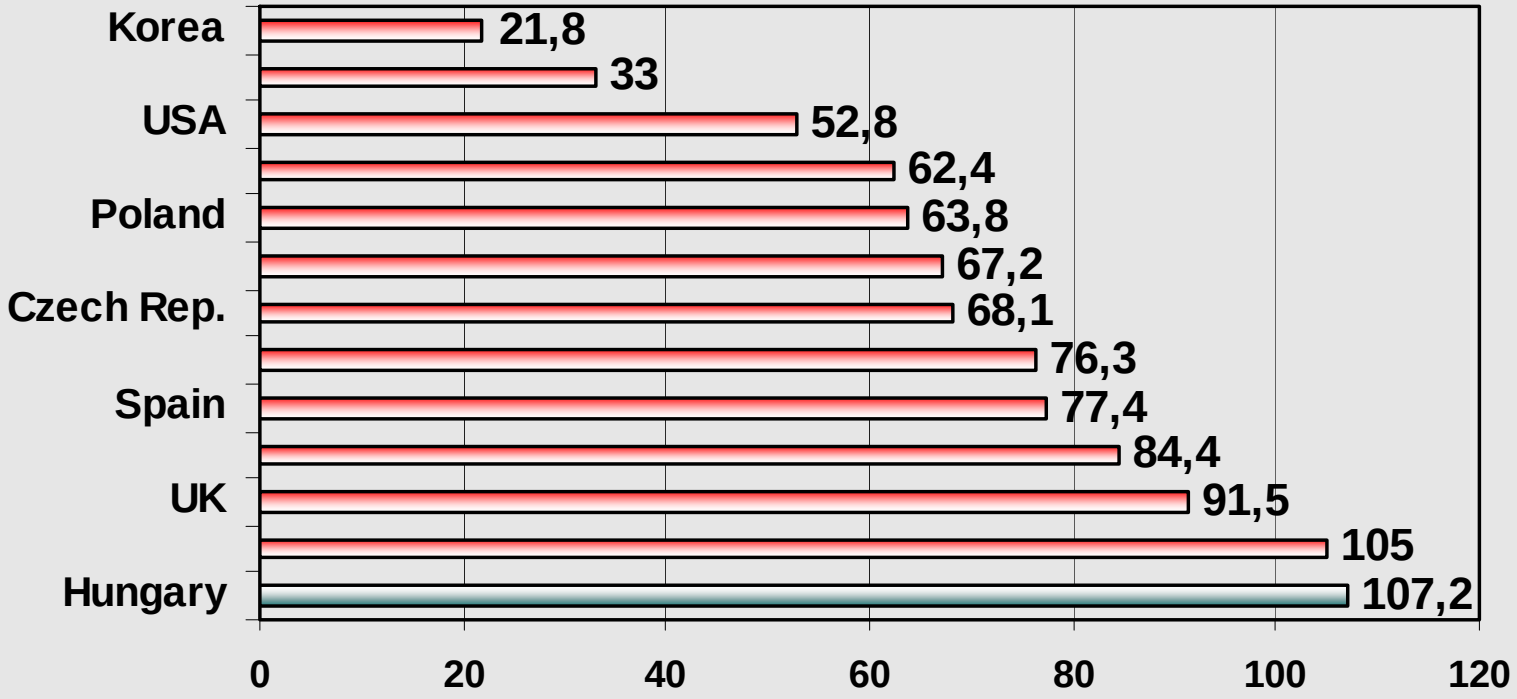
**Number of publications per 1 M USD R&D expenditure in universities and research institutes**

(source: NSIOD, Institute for Scientific Information)



| East-West divide: science and technology benchmarks across Europe | | | | |
|---|---|---|---|---|
| | R&D Spending (% of GDP) | Annual Scientific Publications per million population | Publications/ R&D spending (per million pop./ % of GDP) | High-tech exports (% of total exports, 2000) |
| **European Union** | 1,93* | 755 | 391 | 19,7 |
| **Poland** | 0,75 | 221 | 295 | 2,1+ |
| **Czech Republic** | 1,24 | 352 | 284 | 7,8 |
| **Hungary** | 0,88 | 370 | 536 | 22,9 |
| **Romania** | 0,40 | 70 | 175 | 4,5 |
| **Slovak Republic** | 0,66 | 293 | 444 | 4,1** |
| **Slovenia** | 1,51 | 577 | 382 | 3,7** |

Source: European Commission; *2000, **1999

# In Central and Eastern Europe, Hungary has:

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- the highest rate of participation in adult training and education of employees
- highest percentage of GDP spent on higher education
- highest rate of labor force working in the R&D sector
- most patent applications submitted and most patents granted per capita
- most high-technology patents per capita
- highest number of biotechnology companies
- first association for biotechnology founded in 2002

# Most Significant Biotech Sector Amongst the 10 EU Accession States

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**~50 Biotech Firms And Three Biotech-related University Knowledge Centers Clustered In Four Academic Towns**


## Major Areas Of Strength

- Medicinal chemistry
- Plant genomics
- Bioinformatics and infobionics
- Clinical trials
- Diagnostics

- **IP policies, Technology Transfer Offices and spin-off companies formed at most major universities**
- **IP and legal framework conforms to international standards**

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# What we have...

- **Highly skilled scientist at reasonable cost**
- **Strong academic/university background**
- **Strong traditions in pharmaceutical sector**
- **Considerable results in basic research**
- **Large number of well-trained graduates**
- **Scientists working in the U.S. and Europe who would like to return**
- **Subsidies on patenting**

# ...and what we don't

- **Lacking management experience in running biotech companies**
- **Limited scientific management skills**
- **Scientists not used to working in a for-profit environment**
- **Most research results are not protected**
- **Have to earn trust of pharma partners**

# National biotechnology strategy for 2005–2010 has set a list of achievables:

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- Formation of 100 to 200 new biotech companies, of which approx. 80 viable and established ones remain in business by 2010;
- 2 to 5 new large FDI into R&D by multinational pharmaceutical or biotechnology companies;
- Several thousands of high value added jobs with highly skilled and well payed employees;
- Multiple positive effect on the Hungarian economy through the widely defined life sciences and other high-tech industries;
- Global recognition of Hungary as an ”up and coming” biotech country.

# What We Already Achieved and Initiatives in Progress

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- ✓ Six **regional knowledge centers** at major universities

  With significant state funding of ~$50 mn over four years – three of them with clear focus on biotechnology and biomedical research

- ✓ **Cooperative Research Center** (KKK) program

  Allows companies to build up joint infrastructure at major universities, and to join in to pre-competitive research at a very early stage

- ✓ New **SME financing** program with state support to provide pre-seed and seed financing

- ✓ Partially state-financed **biotechnology incubator** program

- ✓ Initiatives for **repatriation of scientists** of Hungarian origin

- ✓ New Bayh-Dole-like **„Innovation Act”** passed in December 2004

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”It is worth investing in Hungary since, in the very recent years, Hungarian researchers have discovered two original molecules which are in development phase now.”

*Jean-François Dehecq – world-wide CEO*
*Sanofi-Aventis*

Sanofi-Aventis SA plans to set up a EUR 15 million R&D center at its Hungarian subsidiary Chinoin, in order to further boost capacity at its Hungarian unit over the next several years.

The Hungarianresearch unit is currently involved in 45 Sanofi-Aventis development projects, including initial research and clinical testing.

The company employs 2,300 people in Hungary and **has invested more than EUR 400 million** in its Hungarian subsidiary
since 1991.

# N-Gene Research Laboratories, Inc

- Headquartered in the US, operates though a wholly owned subsidiary in Hungary
- Develops small molecules
  - To treat insulin resistance syndrome
  - Improve cancer chemotherapy
  - Prevent skin cancer and skin aging
  - GI motility disorders
- Lead molecule compleated phase II. clinical trial attracted significant amount of venture capital

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# BIOPOLISZ

## *Innovation Services Ltd.*

Our services:

*IP and technology law consultancy*
*Subsidy consultancy*
*Prior art research*
*Transfer of technology*
*Matching of partners*
*IP Training*

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# PharmaHungary

## *preclinical and clinical R&D, consulting*

Outsource your preclinical and clinical development to us:

- Complex platform of new cardiovascular disease models
- Proof-of-concept studies & target validation with innovative approach
- Highly trained (in the US, Canada, & UK) management and staff
- Scientific excellence, internationally recognized team
- high quality, cost effective, and fast

**“More than a CRO: your creative R&D team”**

CardioVasC .Com

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**www.pharmahungary.com**

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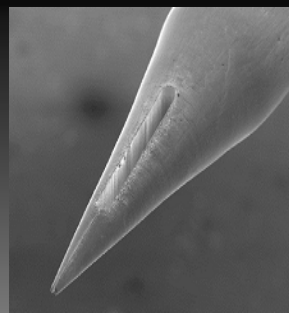
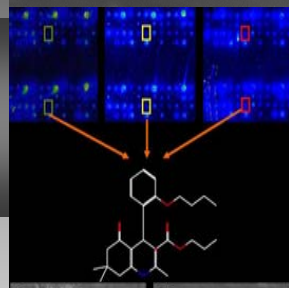
# AVICOR
## the chemical microarray company

*Bridge between Chemistry & Genomics*



*Unique technology, instrumentation*
*chemical libraries and know-how*
*New market possibilities for research laboratories & for pharmaceutical companies*



## *Buisness activities*

**Avicor Ltd offers services & products in the are of:**

***Drug discovery***

**fast and parallel hit & target identification**

***Proteomics***

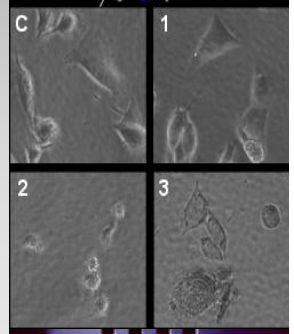
**druggable marker identification and selection**
**comparative druggable fingerprint analysis**

***Chemical microarrays***

**patented surface chemistry**

**ligand-protein and ligand library – proteome interactions**

**-printing from our libraries**
**-printing from custom libraries**
**-selection for druggability**

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# Semmelweis University - Technology Transfer Office

Established: Sept. 2005 Director: dr. Csaba Szabo

Mission: management and commercialization of IP, start of spinoffs

## Spin-off companies in the works:

- A novel, ultra-rapid device to test the antibiotics resistance of bacteria on the bedside.
- A novel artificial arm system (biocybernetics).
- A novel NO-releasing dermal cream formulation to prevent diabetic leg ulcers.
- A novel anti-inflammatory anti-gingivitis mouthwash formulation.

## CellScreen Applied Research Center ($10M)

- Combination of cell-based HT-methods and HT-chemistry and lead multiplication approaches.
- Development of high throughput MS methods and devices including DESI.
- Development of an immunogenetics screening kit for Type I diabetes.

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# Rational Drug Design Laboratories Cooperation Research Center

*Molecular Targeted Signal Transduction Therapies*

**Synthetic Chemisty - Nested Chemical Library ™**

**Semi-HTRS Biochemical and Biological Screening**

**Complex Preclinical Pharmacology**

**Biobank**

**Molecular Diagnostics for Personalized Medicine**

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## Umbilical blood bank (storage)

1. Individual initiation and financing
2. Initiation by professionals, financed by a foundation
3. Special ethnical populations

## Bone marrow transplantation

1. Isolation
2. Gene thera

GMP →

## Islet cells transplantation

1. Isolation
2. Differentiation from stem cell

GMP →

## Cartilage replacement

1. Isolation and cell culture
2. Differentiation from stem cell

GMP →

## Cardiovascular regeneration

1. Mesenchymal stem cell
2. Angiogenic stem cell
3. Differentiation from stem cell

GMP →

SPIN OFFS

BIC

## RESEARCH

Ujhelly Sarkadi B, Nemet K. Application of a human multidrug transporter (ABCG2) variant as selectable marker in gene transfer to progenitor cells. Human Gene Therapy. 2003 Mar 1;14(4):403-12.

## SERVCICE

**Distribution**

- **Production – R&D**
- **Regional**
  - **Production**
  - **Distribution**

OBIK

- BIOTECHNOLOGY


- HEALTHCARE

www.kps.hu

# GenomNanotech

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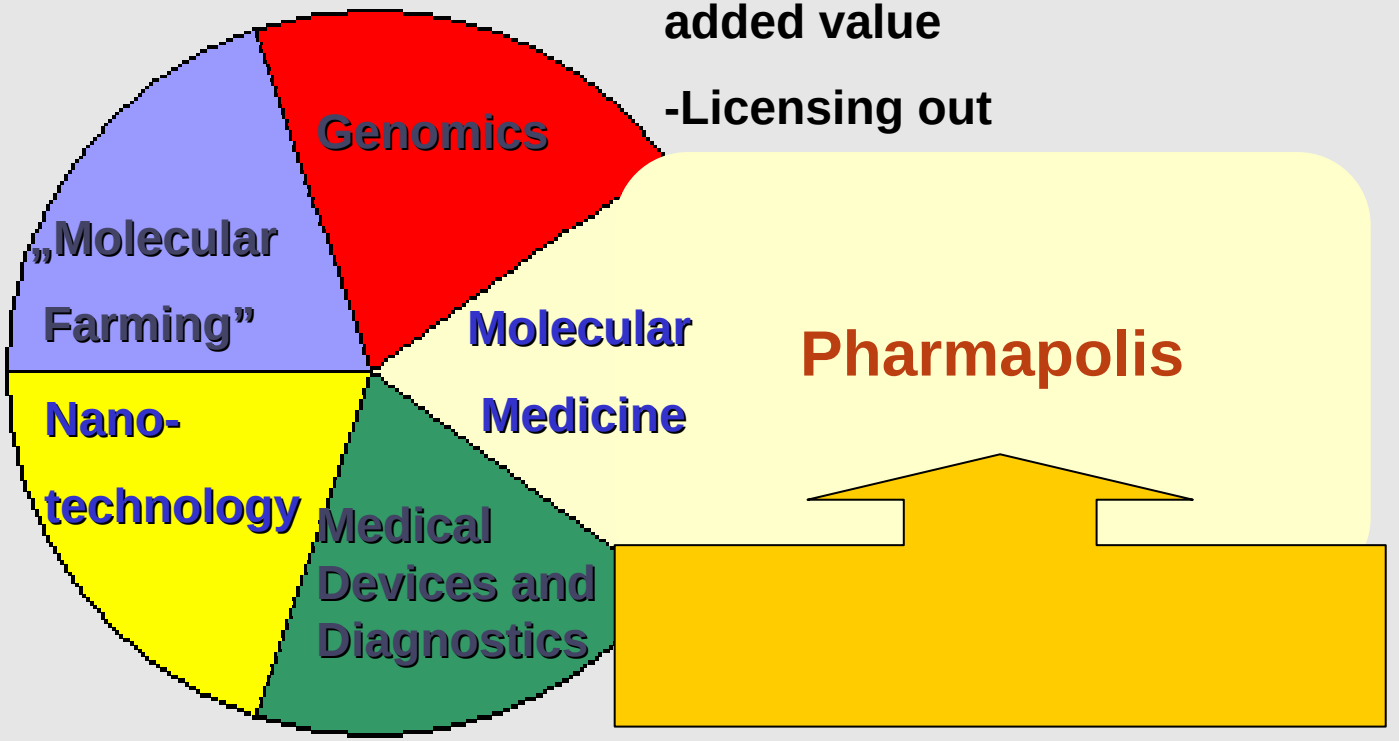
## University of Debrecen Knowledge Center & Technology Transfer office

-Developing drug candidates up to phase II. with the possibly highest added value

-Licensing out

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http://gnd.unideb.hu

Alkaloida/ Sunpharma

TEVA

Keri Pharma/ Actavis

# ComGenex

- Largest drug discovery service provider in Central-Europe
- Together with Albany Molecular the largest drug discovery service provider in the world
- Fully integrated with tox, biological and chemistry capabilities
- Collaborative partnerships with largest Pharma in the world
- Excellent equipment/facilities and technical staff
- Customer specific effective solutions based on confined project experience

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# PCA CAPITAL ADVISORS

- Professional, **independent advisory firm with a biotech sector-specific** business strategy
- **Local advisory partner** for US companies in **Hungary, Germany and Austria**
- Venture capital, private equity placement agent
- M&A advisory
- Supports companies with the identification and selection of suitable financing partners
- Sector-specific approach also allows to provide critical **business development support**
- Drafting of sector reports in cooperation with other companies and industry associations

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