

Biotech & Technology Transfer Developments in Shanghai

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Biotechnology & Technology Transfer in Shanghai

- Biotech has emerged as one of the most active industrial sectors.
- From 1993 to 2001, the average annual growth rate in terms of revenue is 26%.
- From 1993 to 2000, the R&D expenditure in biotech increased 11.3 fold.
- The commercialization of biotechnology innovations in Shanghai is accelerating.

Source: Asia Pacific Biotech (2003) vol.7(5)



Shanghai's Biotech & Pharma Industry

- By the end of 2001, biotech and pharma industry employs over 70,000 staff.
- Among them, over 10,000 scientists and engineers.
- By the end of 2001, approximately 280 biotech and pharma enterprises are located in Shanghai.
- More than 10 are listed in domestic or overseas stock market.

Source: Asia Pacific Biotech (2003) vol.7(5)



Shanghai Biotech & Pharma Industry 2004

- Sales over RMB 30 billion (~\$4 billion USD),
i.e. 10% of the national B&P industry
- Location for over 450 B&P enterprises,
including 210 biopharmaceutical companies
which accounts for 35% of those in China

Shanghai's Drug Pipeline

During Jan. 2003 - Oct. 2004, Shanghai

- received 533 SFDA approvals for clinical trials and drug manufacture licenses, wherein 24 were for novel drugs;
- filed 297 new regulatory applications, including 34 novel drug INDs and 3 novel drug manufacture licenses.

Source: Shanghai Science & Technology Commission



Life Science Research in Shanghai - Universities

- Fudan University
- Shanghai Jiaotong University
- Shanghai Tongji University
- Shanghai University
- East China Normal University
- Shanghai Second Medical University
- Shanghai University of TCM
- East China University of Science and Technology
- Second Military Medical University



Life Science Research in Shanghai - Institutions

- Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences
- Shanghai Institute of Pharmaceutical Industry
- Shanghai Academy of Agricultural Sciences



Shanghai's Biotechnology Policy

- Promote innovation in science and technology
- Encourage commercialization of innovations in science and technology
- Enhance intellectual property rights protection

Shanghai Municipal Government Agencies

- Science and Technology Commission
- Coordinating Commission of Shanghai Biotechnological & Pharmaceutical Industry
- Biotechnology and Pharmaceutical Industry Office



Shanghai's Technology Intermediary Agencies

- Shanghai New High Technology Service Center
- Shanghai Intellectual Property Service Center
- Shanghai United Assets and Equity Exchange
- Shanghai Innovation Evaluating and Consulting Center for Science and Technology



Shanghai Zhangjiang Hi-Tech Park

- Established in July of 1992 as a national-level park designated for the development of new and high technology
- Leading industries:
 - Biotechnology and Pharmaceuticals
 - Information technology



Zhangjiang: National Shanghai Biotech & Pharmaceutical Industry Base (I)

- 41 multinational and domestic pharma groups:
 - GSK, Roche, Greenvalley, Celstar...
- 30 R&D centers:
 - National Center of Drug Screening, National Human Genome Center in Shanghai, National Engineering Research Center for TCM...
- Start-ups:
 - More than 120 small & middle sized enterprises



Zhangjiang: National Shanghai Biotech & Pharmaceutical Industry Base (II)

- One institute:
 - Shanghai Institute of Materia Medica, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences
- One university:
 - Shanghai University of Traditional Chinese Medicine
- Special services:
 - CRO
 - GMP pilot plan



Zhangjiang: National Shanghai Biotech & Pharmaceutical Industry Base (III)

In 2003,

- 547 patent applications were filed and 64 granted, wherein 408 and 32 are invention patents, respectively;
- 25 patent applications filed abroad, 2 were granted.



Trends in Chinese Patent Applications

- April 1, 1985, first application
- Jan. 2000, total applications reached one million; average annual increase rate 17.3%.
- March 2004, total patent applications reached 2 million; average annual increase rate 23.1%.
- In the last 4 years, the domestic invention patent applications increase at an average of 38.1% per year to a total number of 152,000, which is 3 fold of the sum of the first 15 years.



Shanghai Institutes for Biological Sciences (SIBS)

Founded in July 1999 by integrating 8 top CAS research institutions, now consist of:

- Institute of Biochemistry & Cell Biology
- Institute of Neuroscience
- Institute of Materia Medica
- Institute of Plant Physiology & Ecology
- Health Science Center
- Institute for Nutritional Sciences
- *Shanghai Institute Pasteur, CAS*
- *CAS-MPG Institute of Computational Biology*



The SIBS

A leading biomedical research institution in China.

- 28 academicians of CAS
- ~ 200 senior principle investigators
- ~ 800 scientists
- ~ 1450 graduate students

	2001	2002	2003	2004
SCI Publications:	364	375	437	>500
Filed Patents:	61	68	116	87
Granted Patents:	23	14	35	43



International Cooperation

- **Academic**

- Max Planck Society, Germany
- French National Center for Scientific Research (CNRS)
- Institut Pasteur, France
- Garvan Institute of Medical Research, Australia

- **Industry**

- GlaxoSmithKline
- Novartis
- Servier



SIBS OTT Functions

Set up in May 2002

- **Service functions**

- Invention evaluation
- Intellectual property protection
- Market assessment
- Licensing
- Collaboration agreements, MTAs



SIBS OTT Functions

- Enterprise functions
 - Start-up / spin-off
 - Manage incubator
 - Contract Research
 - Oversee venture capital-type funds



Juke Biotech Park

- Jointly set up by SIBS and Shanghai Xuhui District government
- Platform technologies:
genomics, proteomics, small molecule synthesis,
lab animal facility
- 46,000 m² incubating 49 start-ups



Contract Research

- Industry can utilize the strong scientific research expertise and state-of-the-art facilities of SIBS
- Add value to existing pipeline in a cost effective and timely manner
- Access to additional funds for SIBS scientists



Partnership of SIMM and Novartis

- In past three years, SIMM has isolated 1,828 natural compounds from Chinese herbs for treating a wide range of diseases including diabetes, cancers and central nervous system disorders.
- The research agreement is extended through 2007, by which time, another 1,500 new compounds are expected to be isolated.



Licensing - An Example

- ZT-1, a novel cholinesterase inhibitor from Chinese herb, shows efficacy in Alzheimer's disease.
- SIMM has licensed the compound to a Swiss pharmaceutical company that is conducting Phase II clinical trials.



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