The Evolution of China’s Biomedical Industry and its Global Impact

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The Evolution of China’s Biomedical Industry
Industry Evolution
(Pharma Industry)

- TCM
  - 1970’s
- Basic OTC Generic
  - 1980’s
- API CRO Generic
  - 1990’s
- Novel drug Biologics Cell therapy.
  - 2000’s

In line with the manufacturing and R&D capability development
Industry Evolution
(Pharma Industry)

Antibiotics
1970’s

GI
1980’s

Cardiovascular
1990’s

Cancer Diabetes
2000’s

In line with the economic and lifestyle change and market demand
Industry Evolution
(Medtech Industry)

In line with development of manufacturing supply chain on machinery, electronic and IT
Industry Evolution

Simple copy/Distribution → Design Improvement → Joint Development → Self Innovation

In line with the capability manufacturing & R&D, globalization and government policy
Industry Evolution

A formula which is fast, scale up, but not carefully planned and specialized.
From small to big

But need to be fit...
Industry Overview

(Pharma Industry)
China’s pharmaceutical

Snapshot 2015

Total healthcare expenditure: $640 billion (5.9% of GDP)

Gov. healthcare expenditure: $348 billion (54% of total)

Private healthcare expenditure: $291 billion (46% of total)

Total pharmaceutical sales: $108 billion (17% of total healthcare exp.)

Generic sales: $68 billion (64% of total sales)

Patented sales: $23 billion (22% of total sales)

OTC sales: $16 billion (16% of total sales)

China’s pharmaceutical

Market share (2015)

- TCM: 21%
- General antibiotics: 17%
- CV: 13%
- GI / Meta: 12%
- CNS: 8%
- Cancer / immune therapy: 8%
- Medical solution: 7%
- Hemotology: 5%
- Respiratory: 3%
- Bone / Muscle: 2%
- Urinary / hormone: 2%
- Other: 3%

Growth rate (2014-2015)

- Average: 6%
- TCM: 21%
- General antibiotics: 17%
- CV: 13%
- GI / Meta: 12%
- CNS: 8%
- Cancer / immune therapy: 8%
- Medical solution: 7%
- Hemotology: 5%
- Respiratory: 3%
- Bone / Muscle: 2%
- Urinary / hormone: 2%
- Other: 3%

Source: CPEA2015
Industry Overview (Pharma)

Manufacturer
5,646

Chemical
2,508

TCM
2,271

Biologics
867

Quantity vs quality

Source: CPEA 2014
Industry Overview
(Pharma)

Output Breakdown (%)

- Chemicals: 26.8%
- Biologics: 10.5%
- TCM: 21.7%
- API: 19.9%

source: ims 2014
Industry Overview
(Pharma)

cancer, immune disease, drug resistance infectious disease, diabetes, TB, hepatitis, AIDS etc.

immune therapy, gene therapy, sequencing and editing monoclonal antibody drug, therapeutic vaccine etc.

Product standard
Quality assurance system
Introduce advanced technology
Industry Overview

(Medtech Industry)
Industry Overview
(Medtech)

Medtech Total
16,169

Class I
3,966

Class II
9,355

Class III
2,848

Distributors: 189,833 (Class II and Class III)

Source: CFDA 2014
Industry Overview (Medtech)

Gross production: 70bn USD in 2016

Source: China Medical Statistics
First half in 2016 growth rate at 3.3% to 18.9bn USD, export 9.9bn USD, Import 8.9bn US, growth rate 9.87%

Source: CCCMHPIE
Market Trend
By product

• Heavy ion and proton accelerators
• Plasma treatment equipment
• X-ray linear accelerator therapy equipment
• The new generation of interventional products
• Minimally invasive treatment technology products
• POCT technology
• Hyperthermia equipment
• Dialysis equipment and consumables
• High end CT and MRI, PET-CT and PET-MR
• Digital X-ray
• High-end ultrasound machine
Industry Overview
(Medtech)

Import
- Manuf.
  - General Dis.
    - Logis.
      - Regional dis.
        - Sub R dis
          - Hospital
  - Regional dis.
    - Sub R dis
  - Sub R dis
    - Sub R dis
  - Sub R dis
    - Sub R dis
Two Invoice system

Distribution will be streamlined and transparent
Industry Overview

Healthcare
Healthcare

China’s 60+ Population 2010-2050

2010 estimated 2020 2050
167 M 248 M 437 M

Source: United Nations Population Division MIT AgeLab, 2010
Healthcare

CHINA TOBACCO FACTS

- 33% of the world’s cigarettes are smoked by Chinese men.
- 41% of the world’s cigarettes in 2010 were produced in China.
- 47% of Chinese youth, aged 13-15, are exposed to secondhand smoke at home.

$6.2 billion private and public direct medical costs of treating tobacco-related illnesses in China in 2010.

The World Health Organization’s grouping. Western Pacific is East Asia plus Mongolia, Vietnam, Laos, Cambodia, Malaysia, Philippines, Australia, New Zealand and the Solomon Islands, Bhutan, Timor-Leste, India, Indonesia, Maldives, Myanmar, Nepal, North Korea, Sri Lanka, and Thailand.

†Figures don't include disease.
Healthcare

Fact Sheets

- 260m people with major disease.
- 80m disabled
- 202m over 60 yr

China’s healthcare system is challenged by increasing demand and expensive medical treatment and imbalanced medical resources.
Major Disease in China: Cancer

Cancer Prevalence China

Morbidity and mortality

Source: NHFBC
Major Disease in China: Cancer


Source: PDB database.
More Target Therapy Cancer Drugs in China
Top 20 anti cancer drug 2005-2015

<table>
<thead>
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<th></th>
<th>2005</th>
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<th>2010</th>
<th></th>
<th>2015</th>
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<tbody>
<tr>
<td>1</td>
<td>Paclitaxel</td>
<td>13.1%</td>
<td>Docetaxel</td>
<td>10.5%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Oxaliplatin</td>
<td>9.7%</td>
<td>Paclitaxel</td>
<td>9.3%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Docetaxel</td>
<td>8.7%</td>
<td>Oxaliplatin</td>
<td>6.8%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Gemcitabine</td>
<td>6.2%</td>
<td>Capecitabine</td>
<td>5.1%</td>
<td></td>
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<tr>
<td>5</td>
<td>Epirubicin</td>
<td>5.4%</td>
<td>Gemcitabine</td>
<td>4.3%</td>
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<tr>
<td>6</td>
<td>Kanglaiye</td>
<td>4.6%</td>
<td>Rituximab</td>
<td>3.9%</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Pirarubicin</td>
<td>3.9%</td>
<td>Pemetrexed</td>
<td>3.2%</td>
<td></td>
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<tr>
<td>8</td>
<td>Vinorelbine</td>
<td>3.5%</td>
<td>Epirubicin</td>
<td>2.8%</td>
<td></td>
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<tr>
<td>9</td>
<td>Aidi</td>
<td>3.4%</td>
<td>Trastuzumab</td>
<td>2.7%</td>
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<tr>
<td>10</td>
<td>Capecitabine</td>
<td>3.3%</td>
<td>Geftinib</td>
<td>2.7%</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Leucovorin</td>
<td>3.3%</td>
<td>Aidi</td>
<td>2.5%</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Rituximab</td>
<td>2.6%</td>
<td>Imatinib</td>
<td>2.0%</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Carboplatin</td>
<td>1.3%</td>
<td>Irinotecan</td>
<td>2.0%</td>
<td></td>
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<tr>
<td>14</td>
<td>HCPT</td>
<td>1.3%</td>
<td>Cetuximab</td>
<td>1.9%</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Irinotecan</td>
<td>1.3%</td>
<td>Letrozole</td>
<td>1.8%</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Gefitinib</td>
<td>1.2%</td>
<td>Erlotinib</td>
<td>1.8%</td>
<td></td>
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<tr>
<td>17</td>
<td>Ifosfamide</td>
<td>1.2%</td>
<td>Anastrozole</td>
<td>1.8%</td>
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<tr>
<td>18</td>
<td>Cisplatin</td>
<td>1.1%</td>
<td>Sorafenib</td>
<td>1.7%</td>
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<tr>
<td>19</td>
<td>Daclizumab</td>
<td>1.1%</td>
<td>Compound Matrine</td>
<td>1.7%</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Ubenimex</td>
<td>1.0%</td>
<td>Pirarubicin</td>
<td>1.6%</td>
<td></td>
</tr>
</tbody>
</table>

* Light blue highlights point to plant alkaloids drugs. Grey highlights point to target therapy drugs.

Source: PDB database.
Opportunities vs. Challenges

**Opportunities**
- ✓ Increasing aging population
- ✓ Primary care demand
- ✓ Increasing healthcare expenditure
- ✓ Strong financial resources

**Challenges**
- ✓ Pricing and cost reduction pressure
- ✓ Regulatory process
- ✓ Low global presence
- ✓ IP protection improved but not perfect
Global Impact

An increasing important role,

but not a leading role yet

Rong Hui Gao
G-Med Consulting
Global Impact

Chinese global investment since 2005

- N. America: $136.7B
- Europe: $140B
- West Asia: $163B
- East Asia: $142.3B
- S. America: $115.9B
- Sub-Saharan Africa: $197.2B
- Central America & Caribbean: $11.9B
- Middle East & North Africa: $116.3B
- Australia: $77.8B

Major investment goes to commodity and infrastructure

NOTE: Numbers do not include countries with investments of less than $100 million, and also do not include loans or trade.

Source: American Enterprise Institute's China Global Investment Tracker
Global Impact

**Contribution to Global Growth, Constant US$**

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-2011</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>19%</td>
</tr>
<tr>
<td>2012-2016</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>13%</td>
</tr>
<tr>
<td></td>
<td>18%</td>
</tr>
</tbody>
</table>

**2016 Market Share, US$**

- United States: 35%
- Canada: 8%
- EU5: 5%
- Rest of Europe: 11%
- Japan: 7%
- S. Korea: 2%
- Phamerging Tier 1 (China): 1%
- Phamerging Tier 2: 1%
- Phamerging Tier 3: 1%
- Rest of World: 1%

*Rest of Europe excludes Russia, Turkey, Poland, Romania, Ukraine, which are included in Phamerging.
Phamerging 1: China; Phamerging 2: Brazil, India, Russia; Phamerging 3: Argentina, Egypt, Indonesia, Mexico, Pakistan, Poland, Romania, South Africa, Thailand, Turkey, Ukraine, Venezuela, Vietnam*

Source: IMS
China-Europe biomedical trade

China-Europe healthcare import and export trade rose from 8.417b USD in 2005 to 38.132b USD in 2014, an increase of five times, and CAGR of 16.5%

Source: CCCMPHC
China-Europe biomedical trade

In 2014, China-Europe healthcare trade volume increased by 11.37%, about 40% of the total. China’s export volume was 14.488 billion USD, up by 6.36%. China’s import volume was 23.644 billion USD, up by 14.67%.

Source: CCCMPHC
## Global Impact

### International Transactions in 2016

<table>
<thead>
<tr>
<th>Company</th>
<th>Target</th>
<th>Deal process</th>
<th>Deal size (mUSD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fosun</td>
<td>Gland Pharma Ltd.</td>
<td>In Process</td>
<td>1,300</td>
</tr>
<tr>
<td>San Power</td>
<td>Valeant Pharma</td>
<td>Completed</td>
<td>820</td>
</tr>
<tr>
<td>Humanwell Healthcare</td>
<td>Pharma&amp;RE</td>
<td>Completed</td>
<td>600</td>
</tr>
<tr>
<td>Dongcheng Pharma</td>
<td>GMS (BVI)</td>
<td>Completed</td>
<td>70</td>
</tr>
<tr>
<td>Innovation Medical</td>
<td>PSTI</td>
<td>In process</td>
<td>30m</td>
</tr>
<tr>
<td>Xilong Scientific</td>
<td>Fulgent</td>
<td>In process</td>
<td>25m</td>
</tr>
<tr>
<td>Hasico Pharm</td>
<td>Regentis</td>
<td>In process</td>
<td>8m</td>
</tr>
</tbody>
</table>

Source: CPEA2016
Global Impact

Fact sheets

- 90 companies involved in transactions 2016
- 110 deals (completed and process) 2016
- About 300 listed biomedical companies
- 780 gov.backed VCs with 231bn USD fund
- 1600 incubators nationwide

More and bigger deals to come…
Global Impact

Chinese investors’ major interests

- Products with great market potential in China
- Match the company portfolio
- Already approved or clinical stage in US/Europe
- Market right in China

Licensing and acquisition
Sino – Euro BioMedical Centre

Located in the heart of healthcare and life science hub

- Fudan University
  + Zhongshan Hospital
  + Cancer Hospital
  + Pediatric Hospital
  + ENT Hospital

- Shanghai Jiao Tong University
  + Chest Hospital
  + IPMC Hospital
  + General Hospital of Psychiatry
  + Sixth People's Hospital

- Shanghai University of Traditional Chinese Medicine
  + Longhua Hospital
Sino – Euro BioMedical Centre

Transaction and soft landing platform for European SMEs
Partnership with no border!

Thank you!

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