Toward Acceleration of Open Innovation
—The Role of Industrial-Academic-Government-Collaboration—

Masafumi Nogimori
Representative Director and Chairman
Astellas Pharm Inc.

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1. Changes in Drug Discovery Environment
2. Importance of Partnership in Drug Discovery
3. Introduction of Innovative Collaborations
4. Proposal to Construct New Collaboration
Development of new drugs is becoming more difficult due to greater challenges in the drug discovery environment.
Increased R&D costs

New drug approval rates stagnant and R&D costs are increasing, making it difficult to sustain the conventional business model.
Open Innovation (OI)

**Definition**
A paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology.

**Effects**
- Knowledge integration
- Synergy
- Efficiency
- Cost reduction
- R&D risk management
- Shared infrastructure
- Creative ideas
- Different cultures
- Expanded network
- Research concept
- Cutting-edge technology
- Expertise

Integration of knowledge in each company is essential.
Construction of efficient collaboration is needed.
Renovation of the mind is important for further enhancement of OI.

3. Introduction of Innovative Collaborations

Japan Compound Library Consortium (J-CLIC)

“Compound library” is; A collection of stored chemical compounds used in high-throughput screening (HTS)

- Launched in April 2015
- 16 companies participate

- First successful collaboration between pharmaceutical companies for constructing a compound library
- Integration of industrial know-how to construct an innovative and high quality library
Drug Discovery with Big Data

“Big Data” is;
Massive volumes of data that is too big and complicated to handle using traditional database and software

- Preventive Medicine
- Biomarker Discovery
- Target Discovery

Definition and re-categorization of diseases

Gathering Big Data
- Electrical Health Records
- Personal Health Records
- Genome
- Omics Data

Medical services
Health examination

Utilization
- Support for health maintenance
- Healthy Persons, Patients

Data Management and Analysis

Method establishment to handle Big Data

- Precision Medicine

Big Data utilization is essential for novel drug target discovery and early diagnosis
- Due to differences corporate strategies, there is little consensus regarding Big Data utilization

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### Comparison between J-CLIC and Big Data Consortium

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<th>J-CLIC</th>
<th>Big Data</th>
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<td><strong>Purpose</strong></td>
<td>Hit discovery using HTS</td>
<td>Preventive Medicine, Biomarker discovery</td>
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<td><strong>Basic Technology</strong></td>
<td>Equipped in each company</td>
<td>Dispersed in various institutions</td>
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<td><strong>Collaboration Structure</strong></td>
<td>Pharma companies only</td>
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<td><strong>Expenditure</strong></td>
<td>Within running costs</td>
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<td>Promoting innovation with shared know-how</td>
<td>Promoting innovation in new fields with cutting-edge technology</td>
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4. Proposal to Construct New Collaboration

Proposals to the industry

Strategy
Developing an overall strategy to expand collaboration in pre-competitive and leading edge areas

OI mind-set
Audacious open-mind to open innovation and pre-competitive collaboration

Funding
Sharing costs among industries with government support

Human resources
Training experts in the area of open innovation
Expectations of Government and Academia

➢ Control Function
  Strong Leadership for the Industry-Academia-Government collaboration in the field of medical research.
  ■ AMED…Bio bank, Regenerative medicine and Oncology etc.
  ■ PMDA…Regulatory science and Partnership with Asian countries
  ■ NIBIO…Center for Drug Design Research
  ■ AIST…LEAD
  ■ Riken…Supercomputer and Spring-8 etc.

➢ Cultivation of Human Resources
  Alliance management expertise

➢ Cultivation of Ventures
  Continual and long-term support