Regulatory Framework for Biotherapeutic Products including Similar Biotherapeutic Products

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Office of Cellular and Tissue-based Products
Pharmaceuticals and Medical Devices Agency (PMDA)

The views and opinions expressed in this presentation are those of the presenter and should not necessarily represent the views and opinions of the PMDA.
Outline

1. Introduction

2. Regulatory Framework for Biotherapeutic Products
   - Pharmaceuticals and Medical Devices Act
   - Standard for Biological Ingredients
   - Minimum Requirements for Biological Products

3. PMDA Experience and Perspectives on the Development and Approval of Biosimilars
<table>
<thead>
<tr>
<th>Office</th>
<th>Review Category</th>
<th>Products</th>
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<tbody>
<tr>
<td>Office of New Drug I</td>
<td>Team 1, Team 6-2</td>
<td>Gastrointestinal drugs, Dermatologic drugs, Hormone drugs, Drugs for metabolic disorders</td>
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<td>Team 2</td>
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<td>Antineoplastic drugs</td>
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<td>Bio-CMC, Cellular and tissue-based products, Gene therapy products</td>
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<td>Office of Vaccines and Blood Products</td>
<td>Vaccines, Blood products</td>
<td>Vaccines, Antitoxic serum, Globulin, Blood coagulation factor products</td>
</tr>
</tbody>
</table>
Outline

1. Introduction

2. Regulatory Framework for Biotherapeutic Products
   - Pharmaceuticals and Medical Devices Act
   - Standard for Biological Ingredients
   - Minimum Requirements for Biological Products

3. PMDA Experience and Perspectives on the Development and Approval of Biosimilars
Overview of the Regulatory Framework

-Focus on Quality-

1. **Law**
   - Pharmaceuticals and Medical Devices Act (PMD. Act)
   - Enforcement Ordinance of the PMD. Act
   - Enforcement Regulations of the PMD. Act
   - GMP, GQP
   - Japanese Pharmacopoeia
   - Standard for Biological Ingredients
   - Minimum Requirements for Biological Products
   - ICH guidelines
   - Guidance for monoclonal antibodies
   - Biosimilars Guideline
   - Etc.

2. **Government Ordinance**
   - MHLW Ministerial Ordinance
   - MHLW Notification
   - PFSB Notification
   - PFSB/ELD Notification
   - PFSB/ELD Administrative Notice

3. **MHLW Ministerial Ordinance**

4. **MHLW Notification**

5. **PFSB Notification**

6. **PFSB/ELD Notification**

7. **PFSB/ELD Administrative Notice**

-MHLW: Minister of Health Labour and Welfare
-PFSB: Pharmaceutical and Food Safety Bureau
-ELD: Evaluation and Licensing Division
Japanese Strategies for Ensuring the Quality of Biotherapeutic Products

- Development
- Review
- Post-marketing

Life-cycle management
Characterization, Process Development, Verification, Validation
Improvement

Non-clinical studies

Clinical studies
PMS

Phase I ➔ Phase II ➔ Phase III

JP, Standard for Biological Ingredients, Minimum Requirements for Biological Products

ICH Q

Biosimilars Guideline

Guidance for mAbs
Overview of the Regulatory Framework
-Focus on Quality-

- Law -
  • Pharmaceuticals and Medical Devices Act (PMD. Act)

- Government Ordinance -
  • Enforcement Ordinance of the PMD. Act

- MHLW Ministerial Ordinance -
  • Enforcement Regulations of the PMD. Act
  • GMP, GQP

- MHLW Notification -
  • Japanese Pharmacopoeia
  • Standard for Biological Ingredients
  • Minimum Requirements for Biological Products

- PFSB Notification -
  • ICH guidelines

- PFSB/ELD Notification -
  • Guidance for monoclonal antibodies
  • Biosimilars Guideline
  • Etc.

• MHLW: Minister of Health Labour and Welfare
• PFSB: Pharmaceutical and Food Safety Bureau
• ELD: Evaluation and Licensing Division
Past:
- HIV contaminated plasma derivatives
- Fibrinogen-transmitted Hepatitis C
- Iatrogenic CJD through transplantation of dura mater

Strengthening of Safety Measures for Biotherapeutic Products

Risk-based Safety Measures
How Do We Classify the Risk?

- MHLW classifies individual products including ingredients derived from human or biological source materials into three categories:
  - “Specified Biological Products”
  - “Biological Products”
  - Others

- Product classification is done, based on sound scientific assessment of potential risk of infection transmission, according to the recommendation from PAFS* council.

*: Pharmaceutical Affairs and Food Sanitation Council
What are “Biological Products”?

“Biological Products”
Products including ingredients derived from human or biological source materials (excluding plants), which are designated by the Minister ...... as requiring special precautions in terms of public health and hygiene

(Article 2.10 of PMD. Act)

“Specified Biological Products”
“Biological products” as requiring measures to prevent the onset or spread of risk to public health and hygiene

(Article 2.11 of PMD. Act)
Classification of “Biological Products”

“Specified Biological Products”
- Blood products/Plasma derivatives
- Human extracts (except urine)

“Biological Products”
- Vaccines, Antigens
- Human urine extracts
- Animal extracts
- Recombinant proteins

Others
- Oral, dermal administration
- Vigorous temperature, chemical treatment
- Use of non-pathogenic bacteria
- Less possibility of human-animal infection

Some of those containing human plasma derivative

If the risk is estimated to be equivalent to blood products/plasma derivatives in terms of usage, dose, quantities and duration, the product is designated as “Specified Biological Products”.
Post-Marketing Safety Measures for “Biological Products”

- Labeling
- Package insert

<table>
<thead>
<tr>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.B. Ingredients, Risk of infection, Risk-benefit etc.</td>
</tr>
<tr>
<td>B.P. Ingredients etc.</td>
</tr>
</tbody>
</table>

- Periodic surveillance report
- Retention of record

<table>
<thead>
<tr>
<th></th>
<th>Manufacturers</th>
<th>Health professionals</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.B.</td>
<td>30 yrs. (donor records, manufacturing records)</td>
<td>20 yrs. (patient records)</td>
</tr>
<tr>
<td>B.P.</td>
<td>10 yrs. (donor records, manufacturing records)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>If B.P. contains human plasma derivatives, 30 yrs.</td>
<td></td>
</tr>
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</table>

S.B.: “Specified Biological Products”  B.P.: “Biological Products”
Overview of the Regulatory Framework

- Focus on Quality -

Law

Government Ordinance

MHLW Ministerial Ordinance

MHLW Notification

PFSB Notification

PFSB/ELD Notification

PFSB/ELD Administrative Notice

- Pharmaceuticals and Medical Devices Act (PMD. Act)
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- Standard for Biological Ingredients
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- ICH guidelines
- Guidance for monoclonal antibodies
- Biosimilars Guideline
- ...Etc.

- MHLW: Minister of Health Labour and Welfare
- PFSB: Pharmaceutical and Food Safety Bureau
- ELD: Evaluation and Licensing Division
Chapter VIII Standards and Tests for Pharmaceuticals etc.

Article 41
For the purpose of regulating the properties and quality of pharmaceuticals, the Minister shall establish and publish the Japanese Pharmacopoeia, ... .

Article 42
The Minister may lay down the necessary standards, .... , related to the manufacturing process, properties, quality, storage method, etc. of those pharmaceuticals and regenerative medicines that require special attention concerning public health and hygiene.
1. General Rules

2. General Rules for Blood Products
   i) General Rules for Blood Products for Transfusions
   ii) General Rules for Blood Plasma Derivatives

3. General Rules for Human Derived Ingredients
   i) Standard for Raw materials of Human Cellular/Tissue-based Products
   ii) Standard for Human Urine-derived derived Raw Material

4. General Rules for Animal-derived Ingredients
   i) Standard for Ruminant Animal-derived Raw Materials
   ii) Standard for Raw Materials of Animal Cellular/Tissue-based Products
   iii) Standard for Animal-derived Raw Materials
the purpose of this standard is to ensure the quality, efficacy and safety of products by establishing standards regarding raw materials used in the manufacturing process, which are derived from human or biological source materials (plants are excluded). \textit{(General rules 1.1)}
Main points of the Standard

• **Eligibility of donors**
  e.g.) blood donors must be confirmed as eligible donors by means of medical examinations, interviews, etc. and... *(General Rules for Blood Products for Transfusions)*

• **Testing for raw materials**
  e.g.) the blood collected from each donor must be serologically tested for, at minimum, treponema pallidum, HBV, HCV, HIV-1, HIV-2 and HTLV-1.

  blood that is to be used as a source material for blood products for transfusions must be subjected to NAT for, at minimum, HBV DNA, HCV RNA, and HIV RNA. *(General Rules for Blood Products for Transfusions)*

• **Basic requirements for risk mitigation in manufacturing process**
  e.g.) for cells or tissue used as source materials (in case cell banks are used as a starting material for production culture, including cell line and cells after production culture), all necessary testing to detect viruses (virus tests) must be performed. Furthermore, at the unprocessed or unpurified bulk stages, appropriate virus tests must be implemented. *(Standard for Animal Derived Ingredients)*

• **Record retention**
Minimum Requirements for Biological Products
MHLW Notification No.439 (2014)

General Rules

Monograph

• Influenza Vaccine
• Influenza HA Vaccine
• Freeze-dried Inactivated Tissue Culture Hepatitis A Vaccine
• ...Etc.

General Tests

A. Test procedure
B. Standards, Reference Preparations, Test Toxins and Units
C. Reagents, Test Solutions, etc.
D. Buffered Solutions and Culture Media
Purpose of the Standard

This standard specifies manufacturing methods, properties, quality, storage, and other matters for biological products listed in the monographs. (General rules 1)
Overview of the Regulatory Framework

-Focus on Quality-

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  - ICH guidelines
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  - Biosimilars Guideline
  - ...Etc.
Regulations for Biosimilars in Japan

• Guideline for the Quality, Safety and Efficacy Assurance of Follow-on Biologics (FOBs)*
  (PFSB/ELD Notification No. 0304007 / March 4, 2009)
  http://www.pmda.go.jp/english/service/pdf/notifications/PFSB-ELD-0304007.pdf (GL in English)

  *: “Follow-on Biologics” in this guideline is a synonym for “Biosimilars”.

• Marketing Approval Application for FOBs
  (PFSB Notification 0304004 / March 4, 2009)

• Nonproprietary Name and Drug Name of FOBs
  (PFSB/ELD Notification No. 0214-1, Administrative Notice / February 14, 2013)

• Questions & Answers regarding Guideline
Outline

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2. Regulatory Framework for Biotherapeutic Products
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   - Standard for Biological Ingredients
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3. PMDA Experience and Perspectives on the Development and Approval of Biosimilars
Regulatory History and Status of Biosimilars

- Application Category for biosimilars
- Guideline
- Nomenclature rules

Q&A 2009
Q&A 2010
Q&A 2011
Q&A 2012
Q&A 2013
Q&A 2014
Q&A 2015

Somatropin BS [Sandoz]
Epoetin alfa BS [JCR]
Filgrastim BS [F], [MOCHIDA]
Filgrastim BS [NK], [TEVA]
Filgrastim BS [Sandoz]
Infliximab BS [NK], [CTH]
Insulin glargine BS [Lilly]
## List of Approved Biosimilars in Japan

<table>
<thead>
<tr>
<th>Drug name</th>
<th>Japanese Accepted Name (JAN)</th>
<th>Manufacturer</th>
<th>Reference product</th>
<th>Approved year</th>
</tr>
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<tbody>
<tr>
<td>Somatropin BS S.C. Injection 5mg [SANDOZ] etc.*</td>
<td>Somatropin (genetical recombination)</td>
<td>SANDOZ</td>
<td>Genotropin (Somatropin) (Pfizer)</td>
<td>2009.5</td>
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<tr>
<td>Epoetin alfa BS Injection 750 syringe [JCR] etc.*</td>
<td>Epoetin Kappa (genetical recombination) [Epoetin Alfa Biosimilar 1]</td>
<td>JCR Pharmaceuticals</td>
<td>Espo (Epoetin alfa) (Kyowa Hakko Kirin)</td>
<td>2010.1</td>
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<td>Filgrastim BS Injection 75µg syringe [F] / [MOCHIDA] etc.*</td>
<td>Filgrastim (genetical recombination) [Filgrastim Biosimilar 1]</td>
<td>Fuji Pharma / Mochida Pharmaceutical</td>
<td>Gran (Filgrastim) (Kyowa Hakko Kirin)</td>
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<td>Filgrastim BS Injection 75µg syringe [NK] / [TEVA] etc.*</td>
<td>Filgrastim (genetical recombination) [Filgrastim Biosimilar 2]</td>
<td>NIPPON KAYAKU / Teva Pharma Japan</td>
<td>Gran (Filgrastim) (Kyowa Hakko Kirin)</td>
<td>2013.2</td>
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<td>Filgrastim BS Injection 75µg syringe [SANDOZ] etc.*</td>
<td>Filgrastim (genetical recombination) [Filgrastim Biosimilar 3]</td>
<td>SANDOZ</td>
<td>Gran (Filgrastim) (Kyowa Hakko Kirin)</td>
<td>2014.3</td>
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<td>Infliximab BS I.V. infusion 100mg [NK] / [CTH]</td>
<td>Infliximab (genetical recombination) [Infliximab Biosimilar 1]</td>
<td>NIPPON KAYAKU / Celltrion</td>
<td>Remicade (Infliximab) (Mitsubishi Tanabe Pharma)</td>
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<tr>
<td>Insulin glargine BS Injection [Lilly] etc.*</td>
<td>Insulin glargine (genetical recombination) [Insulin glargine Biosimilar 1]</td>
<td>Eli Lilly Japan</td>
<td>Lantus (Insulin glargine) (Sanofi)</td>
<td>2014.12</td>
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*: etc. means different presentations.
Review Team for Biosimilar application

Office of Cellular & Tissue-based Products

- Director
- Deputy Director

Bio-CMC team

- Review Director
- Team Leader
- Deputy Team Leader

- CMC
- Toxicology
- Pharmacology
- PK/PD
- Biostatics
- Clinical
- PMS
Review Process of MAA* for NMEs# in Japan

*: marketing authorization application
#: new molecular entities

1. **Application** from Applicant to PMDA
2. **F2F meeting** between Applicant and PMDA
3. **Inquiry/Response** from Applicant to PMDA
4. **GMP audit** by PMDA
5. **Review report** from PMDA to Applicant
6. **Consultation** from PMDA to Minister of Health Labour and Welfare
7. **Opinion** (Positive or Negative opinion) from Minister of Health Labour and Welfare to PMDA
8. **Pharmaceutical Affairs and Food Sanitation Council**
9. **External experts**
10. **Expert discussion**
11. **Approval** from PMDA to Applicant
Review Process of MAA for Biosimilars in Japan

Applicant

- Application
- F2F meeting
- Inquiry/Response

Manufacturing site

PMDA

- GMP audit
- Review report

External experts

- Expert discussion

Pharmaceutical Affairs and Food Sanitation Council

Review report

Minister of Health, Labour and Welfare

Approval

Report
Number of Consultation for Biosimilars

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<th>Fiscal year</th>
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<td>2013</td>
<td>23</td>
</tr>
<tr>
<td>2014</td>
<td>24</td>
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Based on date of application (from April 1 to March 31)
Frequently asked Questions

• Can a sponsor use non-Japan sourced reference product in comparability exercise?

• What should a sponsor consider when utilizing foreign clinical trials or designing global clinical trials?
Can a sponsor use non-Japan sourced reference product in comparability exercise?

Guideline: The reference product (RP) should be already approved in Japan.

- PMDA thinks the sponsor should confirm the comparability to the RP which is approved (and used by healthcare providers and patients) in Japan.
Can a sponsor use non-Japan sourced reference product in comparability exercise?

- However, if a sponsor needs to use non Japan-sourced RP in comparability exercise, it is required to explain that the non-Japan sourced RP is the representative of the Japan sourced RP by analytical assays and publicly available information.
What should a sponsor consider when utilizing foreign clinical trials or designing global clinical trial?

Guidance

• Ethnic factors in the acceptability of foreign clinical data (*ICH E5 (R1))*

• Basic principles on Global Clinical Trials (GCTs)
  *(PFSB/ELD Notification No. 0928010 / September 28, 2007)*

• Basic principles on Global Clinical Trials (Reference Cases)
  *(PFSB/ELD Administrative Notice September 5, 2012)*

• Ethic factors should be considered when a GCT is designed.
  • A GCT should be designed so that consistency can be obtained between results from the entire population and the Japanese population, and by ensuring consistency of each region, it could be possible to appropriately extrapolate the result of full population to each region.
PMDA Consultation *(charged)*

- Application procedure consultation
- Quality consultation
- Safety consultation
- Consultation on bioequivalence testing, etc. for drugs
- Consultation Pre-phase I study for drugs
- Consultation Pre-phase IIa study for drugs
- Consultation Pre-phase IIb study for drugs
- Consultation after End of phase II study for drugs
- Pre-application consultation
- Additional consultation
- Etc...

For more information:
PMDA Consultation Flowchart

**PMDA’s action**
- Accept Tentative application
- Fix the meeting date
- Accept application
- Review the Questions and Documents
- Inquiries
- PMDA’s preliminary opinion

**Sponsor’s action**
- Tentative application
- Application
- Submit the Questions and Documents
- Responses to Inquiries
- Sponsor’s opinion

**F2F meeting**
- Draft minutes
- Fixed minutes
- Amendments

Timeline:
- -8W
- -5W
- -5day
- 0
- +30day
Sharing of Information, Experience and Knowledge is Valuable!!

...Others
Thank you for your attention!

TERIMA KASIH ATAS PERHATIAN ANDA

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Pharmaceuticals and Medical Devices Agency
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