The Future Prospects of PMDA

Hideo Utsumi, PhD
Executive Director,
Pharmaceuticals and Medical Devices Agency (PMDA)
(Director, Innovation Center for Medical Redox Navigation of Kyushu University)

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Disclaimer

- The views and opinions expressed in the following PowerPoint slides include those of the individual presenter and should not be attributed to PMDA.
Today’s Presentation

1. As a Researcher of Kyushu University  
   “Innovation of Bio-Imaging and Medical Redox Navigation”  
   - Development of Novel Imaging for Pharmaceutical Researches  
   - Establish of Innovation Center for Medical Redox Navigation

2. As a regulator of PMDA  
   “PMDA’s Future Prospect”  
   - Eliminate the issue of “Drug Lag /Device Lag”  
   - Improve safety measures for ensuring public safety and reassurance  
   - Advance Regulatory Science
Science & Technology Basic Plan
- Aiming at a Nation that is Creative in Science & Technology -

Basic Plan 1st Stage
(FY1996 - 2000)
- 17 Trillion Yen
- Building New R&D System

Basic Plan 2nd Stage
(FY2001 - 2005)
- 24 Trillion Yen
- Policy Strategically focusing on Science Technology
- Science Technology System Innovation

Science & Technology Basic Act (Act No.130,1995)
R&D of Bio-imaging in Kyushu Univ.

Basic Plan 3rd Stage
(FY2006 - 2010)
- 25 Trillion Yen
- Making Promotion Strategy by the filed, Screening Strategic Science Technologies & National Key Technologies
- Human Resources
- Increasing Resources for Competent Researches

Basic Plan 4th Stage
(FY2011 - 2015)
- 25 Trillion Yen
- Promotion of the Two Major Innovations as a Pillar of Growth: Green Innovation & Life Innovation

Regulation in PMDA
Location

Innovation Center for medical redox navigation
Kyushu University

Here (Fukuoka city in Kyushu Island)
Correlation between Treatment Satisfaction and Drug Contribution (Survey in 2010)

Prospective Fields where Creation of Innovative New Drugs is Expected

Drug-Discovery is long & hard work

Drug-Discovery: 2～3 y
Optimization: 3～5 y
Pre-clinical: 5～10 year

Number of Compounds
>600,000 compounds
5～10 compounds
10,000 compounds
10,000～25,000 compounds

Death Valley

How do we overcome?
New Strategy is needed
New Innovation for Drug-Discovery

Pharma Innovation

Government
University
Industry

- Long (10-15 years) and large costs (20 M euro)
- Probability of success is extremely low
Innovation Center for Medical Redox Navigation (Redoxnavi Center)
1. Supported by the grant from the Ministry of Education, Culture, Sports, Science and Technology (MEXT) during 2008-2017 (6.5M$/year)
2. Collaboration of 4 Faculties (Pharmaceutical Sciences, Medicine, Engineering, and Agriculture) with 8 Industries (6.5M$/year)
3. New Center (2,000 m²) was built close to University Hospital.
Researchers from faculty of Medical, Pharmaceutical, Agriculture, Engineering etc. are studying at the same floor and have desks in the same room.→ It is good environment for collaborative Interdisciplinary research.

Innovation Center for Medical Redox Navigation (Redoxnawi Center)

Collaboration

staff room

Meeting room

Common

Experimental laboratory

Translational Research

Collaboration Staff room

LC-MS

MALDI-TOF-MS

OMRI

Animal housing facility

Probe Synthesis

Animal Experiments

Cell Culture

L-band EPR

Laboratory

Hypersense

0.015T OMRI

1.5T OMRI

1.5T OMRI

Hypersence Laboratory

L-band EPR

Animal housing facility

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“Innovation Center for Medical Redox Navigation”

Molecular Imaging

Non/low Invasive In vivo Analysis

Redox-drug Discovery

Redox Diagnosis & Therapy

Metabolic Profiling

In vitro Analysis

Home-page: www.redoxnavi.com
In vivo ESR Spectrometers and Imaging

1.2GHz *in vivo* ESR imaging (BBRC, 1989)

300 MHz *in vivo* ESR imaging (Diabetologia, 1998)

Commercialized System from JEOL

ESR imaging (mouse lung, BBRC1991)
Newly developed Overhauser-MRI

Picture of 1.5T OMRI

Magnet & Rotating system

1.5 T OMRI, MRI

0.02T ESR x 3

0.02T ESR-B

0.02T ESR-A2

0.02T ESR-A1

Philips 15mT OMRI

OMRI

OMRI

Developed 1.5T OMRI

OMRI

OMRI
Pharmacokinetics Imaging of Two Drugs

10mM $^{14}$N-oxo-TEMPO

300mM $^{15}$N-carbamoyl-PROXYL

$^{15}$N-carbamoyl-PROXYL

$^{14}$N-oxo-TEMPO

C)

Relative Intensity (a.u.)

0 2 4 6 8 10 12 14

0 0.3 0.6 0.9

Stomach

Heart

Bladder
OMRI images were obtained (FOV, 32 × 32 mm; matrix, 32 × 32; slice thickness, 30 mm; TR/TE/TESR, 1,200 ms/25 ms/700 ms).

3 h reperfusion

24 h reperfusion
Multi-modality Imaging with OMRI & MS

In vivo OMRI

Decay Curve

Ln (Intensity)

Decay Rate

Image

control MCAO 24hr

1.07 min 3.87 min

6 x 10^5

MCAO 24hr

control

TTC Staining

Fructose-1,6-bisphosphate

Citric acid

N-Acetyl-asparagine


Development of Clinical Overhauser MRI
Commercialization of OMRI

Japan Redox Inc.: venture capital company from Kyushu University

High Field-type

Bench Top-type
“Japanese emperor bestows Medal with Purple Ribbon on ARS Editor Hideo Utsumi for contributions to redox biology”

From Dr. Chandan Sen (Chief Editor of ARS)

(November 3, 2011)
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Establishment of PMDA
Science & Technology Basic Plan  
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**Basic Plan 4th Stage**  
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  Green Innovation & Life Innovation

5-Year Strategy
“Five-Year Strategy for Creation of Innovative Pharmaceuticals and Medical Devices”

To Provide the People with access to the best pharmaceuticals/medical devices in the world

To boost the pharmaceutical/medical device industries into the driving force of Japan’s growth

The Measures Aiming at Japanese Origin R&Ds, and Japan’s Participation in International Collaborative R&Ds

1) Concentrated Research Financing
2) Nurturing Ventures, etc
3) Improvement of the Clinical Research/Trial Environment
4) Collaboration with Asian Countries
5) Faster and Better Reviews
6) Appropriate Assessment of Innovations
7) Public-Private Dialogues

April, 2007: MHLW, MEXT, METI, Cabinet Office; Feb, 2009 Revised
PMDA Staff Size

- Administrative part
- Safety Department
- Review Department
- Planned


Staff Size (planned): 256, 291, 319, 341, 426, 521, 605, 648, 751
Organization Chart of PMDA as of October 2011

Staff size: 256 (Apr. ‘04) → 648 (as of Apr. ‘11) with ca.1000 external experts
# Review time for New Drugs (Priority Review items)

## 2nd Mid-term Plan

### Targeted review times for New Drug

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Total review time [months]</th>
<th>Administrative review time [months]</th>
<th>Approved No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>12.3</td>
<td>4.9</td>
<td>20</td>
</tr>
<tr>
<td>2008</td>
<td>15.4</td>
<td>7.3</td>
<td>24</td>
</tr>
<tr>
<td>2009</td>
<td>11.9</td>
<td>3.6</td>
<td>15</td>
</tr>
<tr>
<td>2010</td>
<td>9.2</td>
<td>4.9</td>
<td>20</td>
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* The numbers are the medians of the review times of the applications submitted after 2008.
* The targeted review times are the medians of the targeted review times set for each FY.
### 2nd Mid-term Plan

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</tr>
<tr>
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<td>19.2</td>
<td>10.5</td>
<td>92</td>
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Pharmaceutical Affairs Consultation on R&D Strategy

Basic Research → Seeds Search → Seeds Improvement → Clinical Trial → Apply for product approval

( PMDA )

NEW

Pharmaceutical Affairs Consultation on R&D Strategy

Consultation on conducting clinical trials (in operation)

Necessary CTs / Drug formulation / Efficacy / Validity

academia

ventures

Promising seeds

Shorten duration of study

Improve success rate

Creation of innovative medical product

Innovative medical products
Objective: To reinforce / enhance the system for safety information collection and evaluation of medical products

- Ensure access to several kinds of electronic health information
- Develop pharmacoepidemiological methodology to use electronic health information for evaluation of risk for adverse drug reactions
- Develop methodology to use claim data
- Make safety information from post marketing studies electronically available to create a database
Development of Electronic Health Information Database of 10 Million Cases

Collaborating Hospitals
- Electronic Medical Records
- E-Prescription
- Lab Test Results

Anonymize

DB

National Support and Supervision

PMDA Researchers

Research

Quick Evaluation of Drugs’ Risk & Benefit

3rd Party Supervision
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Promotion of Regulatory Science
Promotion of Regulatory Science

Regulatory Science is seen as “Science that adjusts science technology outcome to it’s most favorable shape in harmonization between human and society” that is an essential concept to prove risk/benefit and to ensure safety of pharmaceuticals and medical devices.

Policy recommendations released in 2011 Committee on Pharmaceutical of Science, Science Council of Japan (August 19, 2011)

Drug discovery by Academia

For Developments Eying their Exits (Practical Use), for Rapid Processes Leading to Practical Use, and for Ensuring the Efficacy and Safety, Promotion of Regulatory Science Research is Essential.
Regulatory Science Research in PMDA

- Development/Review of Drug/Medical Device
- Safety Measurement
- Relief Service for ADR & Other Infectious Disease

Improve Quality of PMDA’s Operations with More Transparent and Objective Decision based on Clear Evidences
Program of Collaborative Graduate Schools

Agreement with 7 Universities
(as of October, 2011)

Yamagata University
Professor: 1

University of Tsukuba
Visiting Professors: 2
Visiting Associated Professor: 1

Musashino University
(a professorship is scheduled)

Kobe University
Guest Lecturers: 2

Gifu Pharmaceutical University
Guest Professor: 1

Chiba University
Guest Professors: 2

Yokohama City University
Guest Professor: 1
Thank you for your attention!

http://www.pmda.go.jp/