

TOXICOLOGY TRAINING PROGRAM IN JAPAN

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1. Introduction

The study of modern toxicology in Japan originated in academic settings in the 1970s subsequent to severe health tragedies induced by chemicals in the 1960s. These included the congenital malformations induced by thalidomide, Minamata disease induced by methyl mercury, Itai-itai disease induced by cadmium, chionoform-induced SMON (subacute myelo-optico-neuropathy) disease, and Kanemi Oil Poisoning Case induced by Co-PCB (coplanar polychlorinated biphenyl) or PCDF (polychlorinated dibenzofuran). These events were driving forces in the formation of Japanese Society of toxicology.

2. Japanese Society of Toxicology

2.1 History

The Toxicology Research Group and the Toxic Action Research Group were formed in 1975 and 1976, respectively. In 1981, these two groups merged to form the Japanese Society of Toxicological Sciences (JSTS) as a non-profit scientific society to promote the acquisition and utilization of knowledge in toxicology. The JSTS also aimed to facilitate the exchange of information among toxicologists around the world. The JSTS was renamed the “Japanese Society of Toxicology (JST)” in 1997. The first membership list contained 943 names on June 1, 1981, and grew to nearly 2600 members as of June 1, 2010.

Among current JST members, 40 members are from across the world; Korea (19), USA (7), United Kingdom (4), Canada (1), China (3), Germany (2), Singapore(1), Taiwan(2) and Denmark (1). Member affiliations are industries including CRO (70%), Academia (22%), Government (6%) and others (2%). Currently, the JST has the second largest toxicology society membership in the world, and Japan is the second country with 126 SOT members next to Canada.

The JST has several missions, and the publication of the official journal of the society , and the accreditation and certification program are most important tasks of the JST.

2.1.1 Publication of the society journal

The official journal, “Journal of Toxicological Sciences (JTS)”, was launched in 1981. Recently, the Editorial Committee began to provide a highly efficient web-based manuscript submission and review system on June, 2008. The system facilitates all aspects of manuscript submission, including tracking and communication between authors, reviewers, and editor.

2.1.2 Accreditation and professional certification program

To foster and improve the quality of toxicologists in Japan, the Education Committee of the JST has three subcommittees, consisting of (1) Accreditation and Professional Certification and Recertification examinations, (2) Continuing Education Courses, and (3) Fundamental Education Courses every year.

Since 1995, the Board of Directors of the JST has seriously discussed the accreditation and certification of toxicologists in Japan. After extensive deliberations, the certification program of toxicologists was newly launched in 1997. The content and level of the examination questions of the JST are almost equivalent to the American Board of Toxicology.

At the first certification examination in 1997, 99 toxicologists were certified by the JST as Diplomat of the Japanese Society of Toxicology (DJST). The written examination has been offered every year, and as of June, 2010, 390 toxicologists have been formally approved as diplomat. Approximately 80 % of the diplomats are from industry, 12% from academia, and 8% from others. Diplomats can be recertified every 5 years based upon their active practice of toxicology and maintaining an expert knowledge in general toxicology.

An applicant must have had a principal involvement in the practice of toxicology, in addition to the appropriate background education. The examination covers all aspects of toxicology and toxicity testing. The certified toxicologists should have knowledge which encompasses all aspects of toxicology, and should be able to conduct proper toxicological planning, testing, evaluation and risk assessment. Certified individuals are initially recognized by being designated as DJST for a period of 5 years.

2.1.3 Certification Examination

In order to conduct the test for the examination of certification, the JST formed Certification Examination Committee in 1998. The main role of the committee includes development, administration, scoring and analysis of the examination. The examination is administered annually in the form of closed book examination.

The examination consists of 200 multiple-choice questions (one out of five in an alternative way), and the candidates are allowed three hours per 100 questions to complete the examination. The passing mark shall be 70 or more (percentage of correct answer).

2.1.4 Criteria for Certification Examination Eligibility

To be eligible for taking Certification Examination, applicants must fulfill the following requirements.

- 1) Applicants must have over 3 consecutive years of memberships in the JST at the time of application.
- 2) Applicants must have enough experience in the practice of toxicology for at least 5 years for any university graduate (six-year school course), 7 years for any university graduate (four-year school course), and corresponding years for any other graduates.

3) Applicants must reach a total points of 80 or more in the toxicology activities as noted below:

Toxicology Activity ➤ Item	Participation (per one time)	Presentation ¹⁾ (per one time)
Publication ➤ Toxicological articles published in academic journals ²⁾		10(5)
Academic Society ➤ JST annual meeting	10	10 (5)
➤ JST-authorized meeting ³⁾	5	10 (5)
➤ JST-authorized seminar/workshop ⁴⁾	5	10 (5)
JST-sponsored educational lecture ➤ Basic education course (after 1998) ⁵⁾	40	
➤ Continuing education course	5	

Note 1) Points in the parentheses shall be given for the co-author or co-presenter who is not the first author or first presenter.

2) Journals concerned shall be limited to the ones with efficient referee system

3) IUTOX, ASIATOX, SOT, EUROTOX, JST-cosponsored meetings, etc.

4) JST-cosponsored seminar/workshop, educational lecture, etc

5) 10 points per one time in case of participation before 1997

4) As an exception, the president of JST can provide eligibility for admission to the examination even if an applicant does not reach a standard among the above.

2.1.5 Recertification

Every 5 years after the certification or previous recertification, certified toxicologists shall have to make a recertification of their qualification.

1) Eligibility requirements for the recertification

Diplomats must reach a total point of 80 or more in the toxicology activities as noted below:

Toxicology Activity	Points (per one time)	Upper points (for 5 years)
Development of 5 questions for Certification Examination	20	80
Toxicological articles published in academic journals	5	25
Participation or presentation in JST annual meeting or JST-authorized meeting	5	25
Participation or presentation (lecturer) in	5	25

JST-sponsored educational lecture or JST-authorized seminar/workshop		
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2) Recertification examination

Diplomats must pass the recertification examination, in the form of open book manner, consisting of 100 multiple-choice questions. The passing mark shall be 80 or more.

2.2 Future Perspectives

Over the years, the JST has achieved exceptional success with two important tasks, including maintaining the high-quality certification program of toxicologists, and a highly efficient web-based manuscript submission and review system if the society journal. The number of the JST diplomats has increased every year, and certification program is now well recognized inside and outside Japan. The JST diplomats receive several benefits such as promotion at the workplace. Another goal of the program is to expand it to toxicologists in other countries.

3. Education and Training Program in Toxicology

In the 1970s, toxicology was adopted in the curriculum of education in the schools of Pharmacy, Medicine and Veterinary Medicine in the university in Japan. Toxicology is a multidisciplinary field encompassing Pharmacology, Pathology and Biochemistry and other related life sciences. Thus, teaching staff are composed of members from multiple department of School of Pharmacy, School of Medicine and School of Veterinary Medicine. As the MS Toxicology Program became popular, Ph.D. course in Toxicology was established in several universities in the 1980s.

3.1. Organizations for the Toxicology Education Program

3.1.1 Universities

Since Toxicology is younger science than pharmacology and pathology and other basic sciences in the university education, Department of Toxicology has been established in the limited number of universities in Japan. Education of Toxicology is normally conducted at the classes of Pharmacology, Clinical Pharmacology, Hygienic Chemistry, Hospital Pharmacy, Drug Information and Clinical Biochemistry in School of Pharmacy(Pharmaceutical Sciences), and Pharmacology, Clinical Pharmacology, Clinical Medicine, Pathology, Microbiology, Biochemistry in School of Medicine and School of Veterinary Medicine.

The following are names of the universities and governmental Institutes which are involved in teaching Toxicology. (Details, see the book, Phillips Wexler ed. "Information Resources in Toxicology 4TH Edition", Academic Press, 2009)

Azabu University(School of Veterinary Medicine)

Chiba University(Graduate School of Pharmaceutical Sciences)

Health Sciences University of Hokkaido(Graduate School of Pharmaceutical Sciences)

Hiroshima University(Faculty of Pharmacy)
Hokkaido University(Graduate School of Veterinary Medicine)
Hokuriku University(Faculty of Pharmaceutical Sciences)
Hoshi University(Faculty of Pharmaceutical Sciences)
Iwate University(Faculty of Agriculture and Graduate School of Agriculture)
Kanazawa University(Faculty of Pharmaceutical Sciences)
Kitasato University(School of Pharmaceutical Sciences)
Kobe Gakuin University(Faculty of Pharmaceutical Sciences)
Kumamoto University(School of Medicine, School of Pharmacy)
Kyorin University(School of Medicine)
Kyushu University(Faculty of Pharmaceutical Sciences)
Meijo University(Faculty of Pharmacy)
Nagasaki University(School of Pharmaceutical Sciences)
Nagoya City University(Graduate School of Medical sciences)
Nagoya University(Faculty of Medicine)
Nippon Veterinary and Life Science University(Department of Veterinary)
Osaka Prefecture University(School of Life and Environmental Sciences)
Showa University(School of Pharmaceutical Sciences)
The University of Tokyo(School of Medicine, Faculty of Agriculture)
Tohoku University(Faculty of Pharmaceutical Sciences)
Tokyo University of Pharmacy and Life Sciences(School of Pharmacy)
University of the Ryukyu(Faculty of Medicine)

3.1.2 Government Institutes

National Institute of Industrial Health (NIIH)
National Institute of Industrial Safety (NIIS)
National Cancer Center (NCC)
National Institute for Environmental Studies (NIES)
National Institute of Health Sciences (NIHS)
National Institute of Public Health (NIPH)
National Institute of Radiological Sciences (NIRS)

3.2 Post-educational courses

Students and young toxicologists are encouraged to receive the cutting age knowledge of toxicology at the national and international congresses and meetings of toxicology.

3.2.1 JST-sponsored Education Courses

To foster the young toxicologists, the JST has sponsored two kinds of education lectures, Basic Education Course (BEC), and Continuing Education Course (CEC) since 1998. BEC is planned to

study the general knowledge of toxicology for students and young scientists. CEC is focused on the specific topics to provide the basic and advanced knowledge of toxicology. These courses are beneficial for the university students as well as professional toxicologists to study the state-of-the-art toxicology.

3.2.2 National Level

The scientific program of the JST annual meeting contains the invited lectures of prestigious speakers from throughout the world, symposia, workshops, oral/poster presentations, luncheon seminars, and panel discussions. In addition to the JST, Japanese Society of Clinical Toxicology, the Japanese Society of Toxicologic Pathology and other societies relevant to toxicology also have provided the scientific meetings every year. The students and young toxicologists who graduated from the MS and/or Ph.D. courses in the university are further trained at the scientific meetings.

3.2.3 International Level

International congresses of Toxicology (ICTs) sponsored by the International Union of Toxicology (IUTOX) and the International congresses of Toxicology sponsored by the Asian Society of Toxicology (ASIATOX) are good opportunity to study the updated knowledge of toxicology for young toxicologists in Japan. The ASIATOX congress has been hosted by the ASIATOX member societies every 3 years.

4. Japan Poison Information Center (JPIC)

4.1 History and activities

Japan poison information center (JPIC) was established in 1986. The main aim is to receive the emergency call from general public, and provide the useful information to them. The current activities of JPIC include (1) Information Service (limited to acute toxic exposure and emergency telephone services), (2) Information Collection and Preparation, (3) Use of computers in JPIC (Poison information database and Records of all inquiries), (4) Educational Activities (Post-graduate education for pharmacists and Education for other emergency service personnel).

4.2 Education and Training of Pharmacy students at JPIC

The MS students of school of pharmacy at universities are credited with the definite units at the JPIC education course. Students are trained emergency medicine, basic knowledge of poison and human data collection of poison information.



The opening ceremony began with Japanese court music and dance performance by the music department of the Imperial Household Agency (ICT-IV, 1986, Yokohama, Japan)



Snapshot at the award ceremony of the 37th annual meeting of Japanese Society of Toxicology in Okinawa in 2010