RECENT SITUATION AND FUTURE PERSPECTIVES OF THE CERTIFICATION OF TOXICOLOGISTS

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Thank you for giving me this opportunity to share with you the 'Current Situation and Future Perspectives on the Certification of Toxicologists in Taiwan'. Taiwan has been enjoying rapid economic growth for the last two decades. The main force behind this growth has been the small manufacturing industry. Large quantities of chemicals have been used and also produced. Before the Taiwanese realized what was happening, a large quantity of chemicals, including many well-recognized as well as not-so-well-recognized, were unfortunately released into the environment. This has not only affected our quality of life and created a lot of public health problems, but has also upset the delicate ecological balance. Our prosperous economy further demands a lifestyle of high technology, convenience, and better medicine. All these perpetuate the use of more and more chemicals, including specialized chemicals. Over the past 10 years or so, the public and the government have loudly called attention to the need to: (1) understand the scope and degree of all toxic impact of all pollutants on our lives and the environment; and (2) devise and apply methodologies to regulate and control the proper use of chemicals.

As shown in the following schematic chemical flow chart, toxicologists' efforts should encompass from chemical absorption all the way to the right.

The Taiwanese Toxic Substances Control Act (TSCA) was promulgated by the President on November 26, 1986. The Taiwanese Environment Protection Bureau (EPB) was established in the following year, on August 22, 1987, and the Regulations of the TSCA became effective on August 2, 1989. Since then, various projects have been put forth to identify the existing environmental pollutants and to evaluate their effects on human health, ecological balance, and on the economic growth. Projects targeting comparative risk analyses and controlling chemical release into the environment were also launched. Each of these projects is a team effort, and especially

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<th>decomposition</th>
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<td>chemicals</td>
<td>gases, solid waste, wastewater</td>
<td>deposition, water, soil</td>
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<td>import &amp; manufacturing permits</td>
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needs the participation of the trained toxicologist. However, only a handful of trained toxicologists are available in Taiwan.

It is widely recognized that professionally competent toxicologists are needed to evaluate the proper use of existing chemicals, such as pesticides and formulations for agricultural and environmental purposes, and specialty chemicals for industry. Skilled toxicologists are also needed to provide competent toxicological data for the approval of new drugs, pesticides, formulations, and chemicals, and to recommend proper environmental standards based on the results of relative risk analyses.

As described in the Newsletter (#25, Jan 1997) of the American Board of Toxicology, ABT diplomates would participate in the (1) design and interpretation of safety studies for product development, (2) review and interpretation of such studies for regulatory compliance, (3) basic and applied research into toxic effects, mechanisms of toxic action, toxicokinetics and toxicodynamics, (4) education of undergraduates, professional, graduate students, and public in the science of toxicology through courses, legal cases and media interactions.

Recognizing the need for professionally competent toxicologists for this country, I, myself went to the United States, in 1991, to obtain certification (DABT) by the American Board of Toxicology and have been recertified in 1996. Since then, I've been heavily involved in the following areas: (1) the evaluation of the merits of various proposals and projects related to toxic substance control, (2) the evaluation of in vivo and in vitro toxicological testing protocols; (3) the evaluation of the scope and approaches involved in comparative risk analyses, (4) the teaching of general toxicology to the Occupational Physicians and Nurses, Industrial Hygienists, Toxic Substances Control Personnel, and medical students, (5) research in biological monitoring of exposure to toxic chemicals, and (6) evaluation of QA/QC program for three different Lab accreditation programs.

With an active international trade, and in keeping with the agenda of the 21st century, the international harmonization of regulations controlling toxic substances, and of standards for approval of new chemicals and drugs is inevitable. Certainly, certification of the qualified toxicologists by a well recognized institute would be an important part of an effective means to meet all of these demands.

A final word on the certification of toxicologists. Personally, I would like to see emphasis not only on general toxicology, which usually involves more descriptive and mechanistic toxicology, but also on regulatory toxicology, especially in the area of comparative risk analyses. In other words, stress on the total picture covering from chemicals existing in the environment to the final health outcome, as shown in the flow chart. Thank you all for your attention.