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NORWEGIAN REGISTER OF TOXICOLOGISTS

Introduction

The safe use of chemicals is fundamental when it concerns both the good health of humans and animals, in addition to our ecological system. Toxicology is a widely encompassing and broad subject field and contains professionals that represent varying areas and levels of competency; however, all have a common toxicological foundation. In 1994 EUROTOX decided not to initiate a registration system for toxicologists, but to allocate resources to harmonisation of existing and newly formed National registers. The background for this is to contribute to the high competence and quality assurance of the work practising toxicologists perform for the public and business sectors. By assisting in the safe use of chemicals, toxicological activity represents very important work within the community. A rapid process of international change and a steadily increasing European co-operation concerning the rules and challenges affecting chemicals and chemical pollution make it necessary to insure a sufficiently high quality of the toxicological work that is performed in individual countries. This concerns our country to a large extent.

The Norwegian Society for Pharmacology and Toxicology (NSFT) has taken the initiative in establishing a system for the registration of toxicologists in Norway. Several organisations in other countries have established equivalent systems. The EUROTOX list of Registered Toxicologists (=European Register) is the collated list of registrations on national registration requirements under the direction of each national organisation that have been approved by the EUROTOX Executive Committee, on the recommendation of its Registration and Accreditation Task Force. In this context, EUROTOX has formulated a number of basic requirements (EUROTOX Newsletter, Vol. 19, No. 1, Feb. 1996). Individuals who fulfil these requirements can bear the title »EUROTOX Registered Toxicologist». Registering as a toxicologist can be achieved in several ways. In each case, fundamental theoretical knowledge and practical experience in toxicology are prerequisites.

Below follow the regulations established in Norway. These regulations were approved by NSFT at the general Assembly, January 30, 1999 and approved by EUROTOX (February 12.).

A. Theoretical knowledge in toxicology

In addition to a fundamental knowledge in toxicology, this part encompasses knowledge corresponding to 10 credits in a major or doctorate degree level (at least 26 weeks, 30 hours per week). The subjects should cover toxicological effect mechanisms, ethics of toxicology, cellular toxicology, methods in animal experimentation, toxicological testing, methods in epidemiology, exposure assessment, biological monitoring, toxicological

pathology, genetic toxicology, reproductive toxicology, carcinogenesis, immunotoxicology, industrial toxicology, clinical toxicology (the study of poisons), radiation toxicology and ecological toxicology. Education in the principles of risk assessment is especially emphasised. In addition, knowledge in regulatory toxicology and toxicological documentation are prerequisites.

1. Individuals with a major in toxicology from a university or college

These individuals already have a basic knowledge and the required 10 credits in toxicology at the major level. The curriculum must cover the subjects described above. The registrations committee will assess these.

2. Individuals with a major in another biological subject or honours degree in medicine or veterinary medicine

These individuals must document a theoretical knowledge in toxicology corresponding to 10 credits in the subjects listed above. In some studies, other subjects, such as pharmacology, the study of disease, and pathology could cover some of the toxicology requirements.

a. For individuals with a doctorate degree in toxicology it is assumed that parts of the theoretical curriculum in connection with the course work will cover the theoretical requirement in toxicology; where necessary, the subjects not covered must be documented as described below.

b. For individuals without a doctorate degree in toxicology the knowledge of toxicology must be documented in the form of a course diploma/certificate, publications or similar.

B. Job experience in toxicology

1. Job experience in a toxicological environment for a minimum of 5 years after the major degree: the work should contain a certain breadth (see Appendix*). Published articles, reports, etc. should be included with the application. The practical work should be assessed and recommended by a registered toxicologist.

Or

2. A completed doctorates work in toxicology and additional relevant experience constituting totally at least 5 years.

Or

3. A doctorate in a closely related subject, for example cell biology, pharmacology, physiology, pathology would extend the job experience in toxicology as mentioned under point 1, but this would be deducted by the registrations committee upon an assessment of its relevance. The total experiences have to be at least for 5 years.

To become registered as a toxicologist it requires that both A (theoretical curriculum) and B (job experience) are completed in one of the above mentioned ways.

Another way to become registered as a toxicologist

Individuals with toxicological competency, but without formal documentation as described above can be approved for registration. This applies to full professors in toxicological subjects and other individuals that teach toxicological subjects at a major degree level. Individuals with a longstanding broad toxicological experience and competency can also be evaluated. In all these cases it is presumed that required skills are at least equivalent to those described above. The evaluation should be based upon practical experience, publications, reports, article, etc.

Description of the registrations committee

The registrations committee should have 6 members appointed by the board of NSFT in accordance with a proposal from the Section for Toxicology. The committee members should represent the board of the Toxicology Section, universities, government institutions dealing with regulatory toxicology and industry. The chairperson of the committee is appointed by NSFT and the committee members serve a 3-year term.

The registration committee has the task to receive the applications for registration, to decide whether an applicant for registration meets the requirements and to maintain the Register of Toxicologists. This committee also formulates, when necessary, guidelines for a more detailed description of the required skills described in this registration document.

Appeals Committee

In cases where applicants for registration are rejected and come for appeal the board of the Toxicology Section appoint 3 members for an Appeal Committee.

Re-registration

On a 5-yearly basis, a registered toxicologist will be expected to re-affirm their registration credentials and illustrate their currency. To achieve re-registration an updated CV should be submitted to the Registration Committee. The candidate must be able to confirm that they have been actively involved in toxicology and that they have partaken of continuing education opportunities.

Appendix:

***B. Practical curriculum**

Practical experience and training must be appropriate. In some cases toxicologists will undertake research and be based in a single department: candidates for registration are advised to ensure at the outset that their intended course of study is seen as applicable.

Working areas

For example to obtain eventual registration, it is likely that work will be based in one of the following areas:

B1. Clinical toxicology
B2. Research into toxic mechanisms
B3. Toxicology testing under Good Laboratory Practice
B4. Regulatory toxicology

Practical awareness

Although toxicologists work under very diverse circumstances, during a period of not less than 5 years a candidate for registration will be expected to have obtained Practical awareness in the topics listed below. In addition an in-depth knowledge and experience will be expected in at least two (ideally 3-5) of these:

B5. Postmortem methods and gross pathology
Microscopic identification of the major organs
Microscopic recognition of the major pathological processes
Foetal and neonatal examination for malformations
B6. Making observations and recording signs in animals
Humane dosing, sampling and euthanasia of animals
In vivo monitoring, biomonitoring
B7. Basic principles of cell culture
Microbiological methods, Ames test
Recognition of basic chromosome aberrations, blood film analysis
Sub-cellular fractionation techniques
B8. Standard analytical methods: e.g. spectrophotometry, gas chromatography, mass spectrometry, high performance liquid chromatography
Analytical techniques: protein determination, enzyme activity, Western blotting, radiochemistry
B9. Data retrieval, data derivation
Computer assisted technologies, data-bases, data-banks, data acquisition
Determination of simple pharmacokinetic parameters