EUROTOX
Federation of European Toxicologists & European Societies of Toxicology

Expectations of a "EUROPEAN registered toxicologist"

A. Theoretical curriculum

Purpose
Theoretical training in toxicology, with associated practical working to re-enforce concepts, is essential. Such training can be provided on a modular basis and should embrace at least the topics that are defined below.

Topics
A candidate for registration will have undertaken theoretical training in the following topics areas:

A0. Foundation Introduction to Analytical, Mechanistic and Organ-specific Toxicology. Experiment Design, Biometry and Statistics should also be considered.
A1. Animal Science
A2. Cell toxicity, Carcinogenesis
A3. Ecotoxicology and Biomonitoring
A4. Epidemiology and Clinical Toxicology
A5. Genetic and Reproductive Toxicology
A6. Metabolism and Kinetics of Xenobiotics
A7. Molecular and Mechanistic Toxicology
A8. Occupational Toxicology, Sensitisation, Immuno and Radiation Toxicology
A9. Clinical, Gross and Histo-Pathology
A10. Risk Assessment, Regulatory Toxicology and Information Technology

Time needed
Each module will probably involve on average two weeks of contact time: less time may suffice for some of the above (e.g. A4) whereas others will need more (e.g. A6, A9).
If studied from the beginning, with no credit given for content of previous degrees, then about 26 weeks of 30 hr per week contact time should be allocated to undertake the theoretical basis needed for eventual registration.
It is possible that some parts of this syllabus can be certificated if they have been covered in a basic degree (BS) or a postgraduate degree (MS).

Standards and issue of credits
The "Introductory Module" (A0) is to be set at an appropriate standard. For an example, see the "Textbook of Toxicology" (the joint effort of the Netherlands Open University and EUROTOX, published by CRC Press in 1996.

Candidates for registration will be expected to present credits in all topics.

Although national differences will be encountered, it is desirable that strenuous efforts are made to ensure that the quality and performance of participating institutes and teachers, and the standards and conduct of examination are harmonised as fully possible.

Costs and collaboration
In principle, credits may be obtained from modules based in more than one country. In collaborative training schemes, more than one institute and country may contribute modules.
In order to stimulate a wide range of teachers, these should be encouraged, if necessary, from outside the training establishments.
In principle commercially-based students should be paid for by industry.

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 appropriate and applicable to the eventual target of Registration.

Working areas
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 Assessment

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 all of 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. Post-mortem 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 Records of signs in animals
Humane Dosing, Sampling and Euthanasia of animals
In vivo Monitoring, Biomonitoring, Biomarkers
B7. Basic Principles of Cell Culture
Microbiological methods, including applied methodology such as the Ames Test
Recognition of basic Chromosomal Aberration
Blood Film Analysis
Subcellular 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, and data acquisition
Determination of simple pharmacokinetic parameters

Authorship
It is regarded as essential that a candidate for Registration will have demonstrated a high standard of critical ability and communication skills. This may be demonstrated through authorship of written papers and/or reports.
Examples, whose titles should be included with any application for Registration, may include peer-reviewed scientific papers, confidential reports, a dissertation or thesis, or even essay-type answers in examinations.

Confirmation
For all the above mentioned the candidate for registration will be expected to provide written confirmation from relevant supervisors who are also prepared to act as sponsors.

C. Implementation of registration

C1. Academic requirements before commencing training
Before starting toxicological training leading to registration an individual will have been educated in a relevant science subject.
They will usually have attended a full-time taught course at a university (for at least three years) or a part-time taught course at a university for an equivalent period.
The candidate for registration will possess Certificates of Attendance and evidence of success in examinations.
C2. Minimum accomplishments during training
To be considered a candidate for Registration, in addition to basic academic training in science, an individual will have undertaken further theoretical and practical training, and will have achieved the minimum standards set out in A and B above.
C3. Relationship of a registering body with EUROTOX
A participating registering body will have lodged (and had accepted) its criteria for registering toxicologists with an appropriate national society. The national society in turn, will have lodged (and had accepted) these criteria with EUROTOX.
C4. Attributes of a participating registering body
A participating registering body will have agreed its criteria for registering toxicologists with its national body (e.g. society of toxicology). The criteria will address the following:
Legislative Aspects
- An outline of what is expected from candidates, expressed in local terms. Ongoing responsibility for quality control of the assessment process.
Executive Aspects
- A constitution and modus operandi for the assessment panel, whose task is to validate the individual's candidature and application for registration.
Judicial Aspects
- An outline of what steps will be taken in the event that there is an objection to the panel's decision.
C5. Maintenance of Registration
On a 5-yearly basis, a Registered Toxicologist will be expected to re-affirm their registration credentials and illustrate their currency.
As a minimum, to remain registered, a candidate must be working as a toxicologist, and must submit to their registering body an updated CV confirming that fact. An updated CV when submitted to the register panel will contain relevant information such as details of post(s) held, papers published, reports supplied, etc., during the period of registration.

D. Tasks to be undertaken by EUROTOX

D1. The EUROTOX Registration Liaison Officer, on request, will provide an outline of the criteria and resources that will be required, if a member nation seeks to set up its own national scheme within the EUROTOX guidelines.
D2. The EUROTOX Registration Liaison Officer is able to provide information regarding registration schemes that are already in existence, thereby possibly avoiding the need to set up and resource new schemes.
D3. The EUROTOX Registration Liaison Officer is able to provide information regarding registration schemes that are envisaged, in order possibly to facilitate participation between National Societies, for example in establishing conjoint schemes.
D4. EUROTOX provides observers who can assist in setting up and running of national schemes. Appointment of these observers is co-ordinated by the Registration Liaison Officer.
D5. Training - generally, through monitoring schemes designed to facilitate the registration of toxicologists, EUROTOX seeks to identify training needs and encourage the provision of such training.
D6. Individual members - EUROTOX will provide an advisory role for its individual members; for those not adhering to a National Society, the Registration Liaison Officer may be able to guide applicants an appropriate registry and may be able to play a judicial role in some cases. Such tasks are co-ordinated by the EUROTOX Registration Liaison Officer with help from the EUROTOX Executive Committee as necessary.