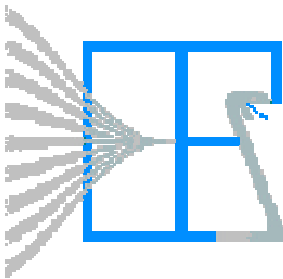


Leiden/Amsterdam  
Center for Drug Research

Universiteit Leiden/Vrije Universiteit Amsterdam

**Leiden University**  
**Leiden University Medical Center**  
**Vrije Universiteit Amsterdam**



**PhD Training Programme**

September 2005

## **Introduction**

The four-year graduate training programme aims at producing competent PhD's for academia and other research institutes as well as industry, in particular the pharmaceutical industry. The graduate programme is obligatory for all students who enroll in the PhD programme of the LACDR. Many will have completed the undergraduate programme (MSc degree) in Bio-Pharmaceutical Sciences (Leiden) or Pharmacochimistry (Amsterdam), but they may also be MSc graduates from other programmes and universities (The Netherlands or abroad) with equivalent qualifications.

The focus during the four years of the graduate study is on carrying out research in one of LACDR's ten divisions, each representing a major pharmaceutical discipline. As part of the training programme PhD students are obliged to follow an educational programme consisting of courses to enlarge their knowledge in the pharmaceutical sciences (defined in a very broad sense). It offers them the possibility to gain more extended knowledge, from drug design to clinical applications. Where appropriate also courses in other areas of science can be included on an individual base.

Furthermore, all PhD students have (limited) teaching duties in the BSc and/or MSc curriculum, thereby gaining experience in teaching and other forms of knowledge transfer.

The training programme takes into consideration that the students have different backgrounds, ranging from pharmaceutical sciences to biology, medical biology, chemistry or medicine. Therefore, a PhD course programme is drawn up for each individual PhD student taking into account what is required to eliminate deficiencies and to optimize know how required for the research project.

The PhD degree will be awarded when the course programme has been completed and a PhD thesis has been approved.

### **1.2. The organization to which the graduate student formally belongs**

#### **A. Leiden.**

The graduate students of the Center for Bio-Pharmaceutical Sciences (CBPS), the Leiden branch of the LACDR, formally participate in the graduate school of the Faculty of Mathematics and Natural Sciences ("W&N") of Leiden University. Most of them will get their PhD from the faculty of Mathematics and Natural Sciences; however, those who complete their studies in the division of Medical Pharmacology usually will get their PhD degree from the Medical Faculty/LUMC. Their research projects are part of the research program of one of the divisions of the CBPS; in certain cases it may be a shared responsibility with an "outside group", either within the Faculty, the LACDR, the LUMC or any other outside partner, including Industry.

For the students who work primarily within one of the Leiden divisions, the Research Director of the Leiden LACDR branch has the ultimate responsibility. For those students who work mainly outside the laboratories of the Leiden divisions, the ultimate responsibility will have to be decided; the CBPS professor involved as supervisor is obliged to take care of this before admission of the student, in agreement with the director of research

#### **B. Amsterdam.**

The graduate students of the Amsterdam branch of the LACDR, participate in the graduate school of the department of Chemistry & Pharmacochimistry of the Faculty of Sciences of the Vrije Universiteit. Their research projects are part of the research program of one of the Amsterdam divisions; in certain cases it may be a shared responsibility with an "outside group", either within the Faculty, the LACDR, or any other outside partner, including Industry.

For the students who work primarily within one of the Amsterdam divisions, the head of the dept of Chemistry & Pharmacochimistry has the ultimate responsibility. For those students who work mainly outside the laboratories of the divisions, the ultimate responsibility will have to be decided; the professor involved as supervisor is obliged to take care of this before admission of the student in agreement with the director of research.

## 2. The PhD Training Programme

The PhD graduates have achieved the following general competences:

- to do research independently and to set up original research projects.
- to publish their findings in high quality journals and to give presentations about their projects
- to fill knowledge-intensive positions in Society, requiring advanced analytical and integrative abilities, specialized knowledge and capacities to understand and direct complex, science-intensive activities

The main objectives of our four year training programme are, therefore, to enable the student to:

- design, direct and interpret experimental work, involving independent use of scientific methodology resulting in writing a PhD thesis to be defended in public;
- interpret the results of research projects in the broad perspective of pharmaceutical sciences;
- apply methods for literature research and evaluate the quality of scientific publications;
- present scientific results at international meetings through posters and oral communications;
- give guidance to laboratory personnel and undergraduate students

## 3. Structure of the Training Programme

The training programme is based upon three elements, which are designed for each individual student:

- A. Research training, including communication of knowledge (3.4)
- B. Courses (3.7, 4)
- C. Teaching of undergraduate students (5)

### 3.1. Responsibility

In **Leiden** the graduate training **program** is the ultimate responsibility of the Director of Research. He is responsible for all graduate students who work within the CBPS/LACDR, as well as for those students working outside these labs if this has been agreed upon **in writing** by both parties.

In **Amsterdam**, the graduate training **program** is the ultimate responsibility of the head of the department of Chemistry & Pharmacochimistry of the Faculty of Science. This responsibility has been delegated to the committee CWP, consisting of full and associated professors of the department of Chemistry & Pharmacochimistry.

The **PhD research project** is the direct responsibility of the promotor, one of the professors of the divisions.

The **daily activities** will be the responsibility of the direct supervisor, who is one of the staff members of the division. This can be the promotor or one of the associate/assistant professors.

### 3.2. The PhD research project

The project is approved by the prospective promotor. It may be a position funded by the university ("eerste geldstroom"), NWO/STW, Specific research foundations (KWF, Heart foundation etc), European union, Industry etc: all students are being treated equally. Project approval is based on the following criteria:

- It enables the student to show his/her own creativity.
- It allows the student in due course to add his/her own innovative input
- The high-risk aspects should be limited, so that the risk of failure because of that aspect is absent.
- The required expertise and equipment is sufficiently available or can easily be acquired
- Adequate supervision can be guaranteed
- It can be finished (including writing of most of the PhD thesis) within 4 years

### 3.3. Selection of a graduate student

The student will be selected by the prospective supervisor and promotor. The candidate will have an MSc diploma in a relevant area. Selection will be based on past performance of the candidate (MSc research project, references) as well as aspects like creativity, ambition, independence, abilities of

written and oral presentations. The position will be full time for 4 years. It may include a research period at an other laboratory in the Netherlands or abroad.

### 3.4. Research training and PhD thesis

During the first four months of the LACDR Graduate Training programme, the student is required to present his/her *preliminary* research plan in a research group meeting of the Division where the research project will be conducted.

This plan comprises:

- a description of the research, including objective, hypothesis and theoretical background of the research project;
- the planning and contents of the experimental work including a prediction of the potential outcome of the first experiments.

During the course of the research project, the PhD student is provided with support and guidance by his/her individual supervisors. Special attention is paid to obtaining experience in research methodology, preparation of scientific articles and communication skills. The supervisor will actively coach students to master a range of writing and presentation skills so that the student will become more effective communicator. Research results are discussed regularly at research group meetings. Each PhD student will thereby gain experience and actively contribute to the training of colleague PhD students by giving feedback to one another on the basis of reasoned argumentation, clear presentation etc.

In **Leiden** the supervisor and promotor together with the student should judge within one year whether the project is feasible; usually, the student will continue the project.

If the promotor and/or supervisor feel that the project should be discontinued because of lack of quality of the student's work, in Leiden the director of research should be informed. He will discuss the situation with the PhD student and the supervisor(s) before a decision is reached. Once every year the student fills in a form to indicate which courses have been followed. Also, once a year the director of research will have discussions with all PhD students in groups of 6-10 on various aspects of the PhD programme. For each graduate student a file is kept on courses followed.

In **Amsterdam** a formal procedure, installed and supervised by the CWP committee, demands students and supervisors/promotor to give a yearly overview of the project and the progress made by the student with respect to his/her training and research program. Ten months after the start of the project the supervisor and promotor together with the student are asked by the CWP to judge the feasibility of the project and the quality of the student. Most of the time the projects will continue as foreseen, but in case of e.g. lack of quality of the student, a PhD contract can be discontinued. The student may appeal against that decision with the chairman of the CWP committee.

One year after enrolment in the Graduate Training Programme the student will present his/her *definitive research project* in a research group meeting of the Division. The programme comprises the results of the first year's investigations and a presentation of plans for the remaining three years.

During the course of the research project PhD students attend national and international symposia and seminars. These meetings provide an opportunity to improve skills such as:

- presenting a paper
- preparing an abstract
- collecting and selecting data
- arranging the presentation, using (audio)visual aids
- handling questions during the discussion
- preparing a conference poster

The research project will be concluded by a PhD thesis which has to be written in English by the student and is predominantly based on papers published (or to be published) in the international scientific literature (peer reviewed journals).

**The student should be "manager" of his/her own project: he has his own responsibility for his project and should not become too dependent on his supervisor. After all; (s)he is to become an independent researcher!**

### **3.5. Supervision**

One of the professors of the LACDR will be the promotor. In some cases 2 promotors will be involved, either both from the LACDR or one from the LACDR and one from an other institute of LU, LUMC, VU, VUMC etc.; in that case it should be made clear to the student who is responsible for which part of the project. There may be a co-promotor: one of the staff members who in many cases wrote the project proposal and takes care of the supervision of the student. In certain cases there may be two co-promotors; again it should be made clear to the student who is responsible for which part of the student's activities. A maximum of 3 (co-)promotors is allowed by university regulations.

Often daily supervision will be done by one of the permanent staff members of a division. Promotor and supervisor should guarantee that the student is provided with a concise description of the project, that he is thoroughly introduced in the subject (practice and theory) and that the required equipment is available for the student's project.

In the course of the project emphasis of supervision should shift from direct steering of the project to supervision at some distance, reflecting maturation of the graduate student. The student should regularly present his data in research discussions within the division and at workshops/conferences. Publications should be written by the student him/herself, but edited carefully and rapidly by supervisor and promotor.

In case of problems with supervisor or promotor the student should contact in Leiden the Director of Research (or the P&O officer), whereas in Amsterdam the chairmen of the CWP committee or the Director of Research are available for help.

### **3.6. Monitoring of progress**

Between 10 and 12 months after start of the project a go/no go decision will be taken; usually the project will be continued. Once every year the supervisor and promotor will discuss in a formal session progress of the project, the quality of supervision and the training program. In Amsterdam, the results of this session are noted on special evaluation forms for the PhD-program, signed by all parties and sent to the CWP committee. Also once a year the director of research will invite the students in groups of 6-8 to follow progress. On that occasion (at the end of every calendar year) the student will have to submit a form to the Office (Leiden) or CWP committee (Amsterdam) in which he/she sums up which courses/conferences, etc have been attended that (calendar) year. At the annual Spring symposium each graduate student will present a poster on his/her project and submit an abstract for that purpose.

In Leiden the Research Director keeps a file of the courses attended by each student, whereas in Amsterdam the CWP committee is responsible for this task.

### **3.7. Course programme requirements**

In consultation with the supervisor the student selects a preliminary course training program which suits his/her specific needs and wishes.

The following options exist:

- Advanced Courses organized by LACDR or other Organizations which are of primary interest to the agreed research program;
- Other programs, e.g. courses to eliminate any deficiencies in skills necessary for conducting the experimental work and/or to better understand the theoretical framework of his or her research project;
- Any other course which is of individual interest of the student to broaden his or her scope in pharmaceutical sciences or another relevant field.
- Teaching /didactical courses

The study programme can be adapted to individual needs and interests during the course of the research project.

### credit points

A student is required to achieve a course training program which consists of **60 credit points throughout his/her training**. The course program should be completed during the first three years of the PhD training program.

The student and his/her supervisor are responsible for the registration of the participation in this course program. During evaluation sessions with the supervisor, the course program and PhD research program are discussed. If lecture courses (e.g. capita selecta in the undergraduate program) are part of the course program of the PhD student, he/she has to pass the corresponding examinations. There will be no formal examinations after attendance of certain Advanced Courses.

On the following pages a list of existing courses and the credit points allocated to the courses is provided. These credit points are based on the duration of the courses, as well as the student's workload required to prepare for complete the course. Usually the student gets one credit point per course day.

## 4. Courses available

The following are **obligatory** for each student:

- The Introductory Course on Drug Research ("aio cursus", 5 credit points)
- the ULLA Summerschool (10 credit points).
- If the PhD student needs to work with laboratory animals also the following course has to be completed: "Experimental techniques and methodology in *in vivo* studies with laboratory animals" ("Proefdierkunde" , 15 credit points).

Other courses mentioned in this list are **optional**. For specific courses organized by other Research Schools or other organizations, credit points are allocated after consultation with the supervisor. Each student chooses an individual training program. Therefore, the short list below is just an indication of what can be chosen. Specific courses or activities have to be identified by supervisor, promotor and student. Usually the promotor and supervisor are aware of courses or other training opportunities in the division's scientific area which are available to the student (e.g. organized by the KWF on cancer related issues, on Heart and Vascular diseases, etc).

### Courses will be announced separately in the electronic newsletter and on the LACDR Web site

<b>Courses</b>	<b>Organisation</b>	<b>Credits</b>
1. Introductory Course on Drug Research	LACDR	5
2. Experimental techniques and methodology in <i>in vivo</i> studies with laboratory animals	LACDR	15

<b>Advanced Courses</b>	<b>Organisation</b>	<b>Credits</b>	<b>Contact</b>
1. Pharmacokinetic-pharmacodynamic mod.	LACDR	6	M. Danhof
2. School on Medicinal Chemistry	LACDR	8	A. IJzerman
3. Pharmacokinetics	LACDR	6	M. Danhof
4. Cognitive Neuroscience	LACDR	5	M.Oitzl
5. Signal Transduction	LACDR	5	B. vd Water
6. Pharmacogenomics	LACDR	5	E. Vreugdenhil
7. Atherosclerosis	LACDR	5	T. v Berkel
8. Systems Biology (planned)	LACDR		T. Hankemeier
9. Bioinformatics	LACDR/KUN (various options)		G. Vriend. Contact LACDR: IJzerman
10. Skin delivery of drugs (planned)	LACDR		J. Bouwstra
11. Blood-Brain-Barrier (planned)	LACDR		B. de Boer
12. Modern Drug Discovery	LACDR/LIC	8	IJzerman/van Boeckel/Overkleef
13. Computational Drug Discovery	CMBI (Nijmegen)		De Vlieg/Schaftenaar Contact LACDR: IJzerman
14. Molecular Toxicology	LACDR	5	J.N.M. Commandeur
15. Cell Toxicology	LACDR	5	J.F. Nagelkerke

**Other Courses: Will be announced by electronic Newsletter**

*ULLA Summerschool Courses*  
(1 or 2 days courses)

ULLA 10

*Other sources of credit points:*

1. Journal Club of the division depends
2. Congresses depends
3. Courses organized by the Vrije and Leiden Universities for aio's for teaching purposes etc. See the respective programmes depends

**Several courses are free of charge. However, if a course requires a course fee, the promotor will have to judge if the division's funds for graduate training allow participation in the course. It should be stressed, however, that funds are very limited.**

## **5. Teaching of undergraduate students**

As part of their training, all PhD students are involved in teaching of undergraduate students (for the curricula of the Bio-Pharmaceutical Sciences and BioMedical Sciences in Leiden and Pharmacochimie in Amsterdam) which should not exceed 10% of the time on average over the 4 year period.

Based on experience and interest the students are appointed to assist at a specific part of the undergraduate programme (mainly practical courses) for a period of three years. The main task of PhD students in the education of undergraduates is transferring knowledge and expertise, monitoring practical sessions and evaluation of undergraduate students' performance.

Furthermore, usually each PhD student supervises one or two undergraduate students during a research traineeship of 3 - 10 months. PhD students are coached by their supervisor during the course of their teaching task.

On a regular basis, an evaluation of the PhD training programme takes place in meetings with PhD students. In these meetings relevant general aspects of the training programme are discussed:

- research training
- the course programme
- teaching of undergraduate students
- requirements for new courses, activities etc.



## **DUTIES AND RESPONSIBILITIES**

### **The LACDR directors of Research**

- Organization of the Introductory course on Drug Research ("aio cursus")
- Hearing of the graduate students once every year after 2 and 3 years on issues like progress of the project, quality of supervision, research environment.
- Keeping a file on the progress of each student
- Organizing the Spring Symposium with poster session
- Actively helping solve problems of graduate students with their supervisor/promotor

### **The promotor**

- Is responsible for the PhD project
- Stimulates/challenges creativity of graduate students
- Promptly reviews concept articles and thesis chapters.
- Has ultimate responsibility for supervision
- Stresses the importance of on time preparation of the PhD thesis
- Organizes the PhD defence session
- Has ultimate responsibility for the training program of each student
- Discusses career perspectives with student

### **The supervisor**

- Is responsible for the daily supervision of the student
- Is responsible for instruction of oral and written presentation skills.
- Is responsible for on time preparation of PhD thesis.
- Prepares and discusses training program with student
- Regularly discusses progress with student
- Oversees teaching duties of the student
- Teaches student how to write scientific articles and reviews them promptly
- Teaches students presentation skills (oral, written).
- (together with promotor) Makes sure that required equipment and other facilities are available

### **The aio/graduate student**

- Prepares a PhD thesis on time (within 4 years)
- Regularly discusses progress with supervisor and promotor
- Actively participates in research discussions of division or LACDR
- Presents a poster once a year for the LACDR Spring symposium
- Participates in scientific conferences, usually presenting a poster
- Writes scientific articles and chapters for thesis (including first drafts!)
- Participates in the teaching program of the LACDR (see 5)
- Orients him/herself on next step in career