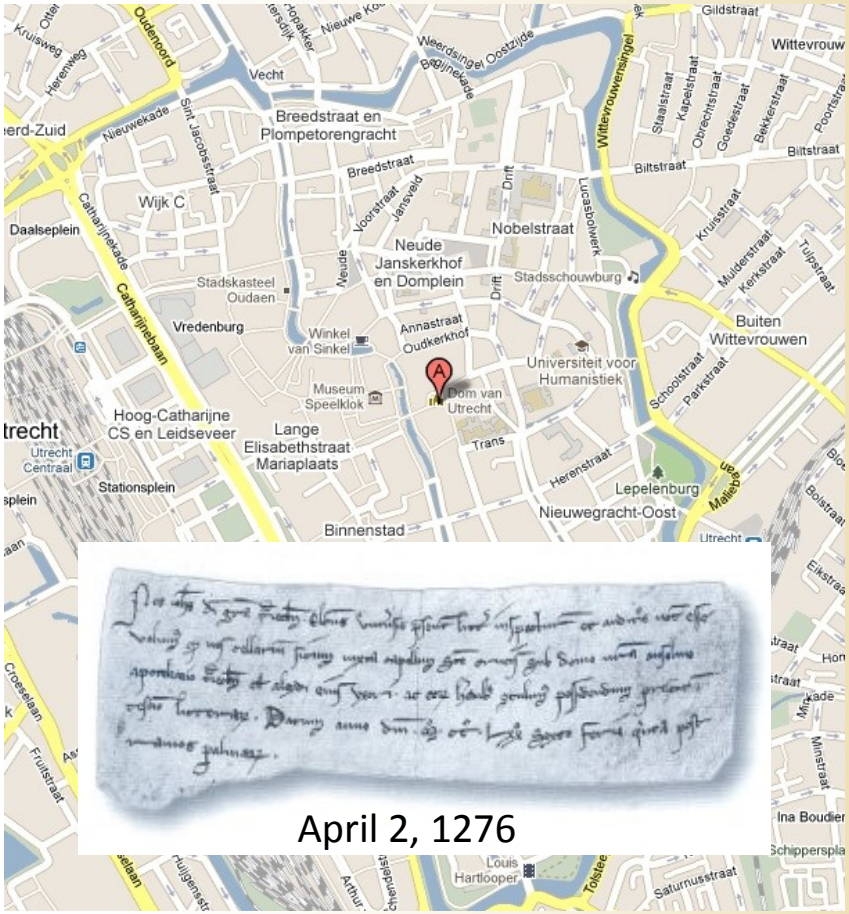
Domplein, Utrecht

Anselmus, the first known pharmacist in the Netherlands



Knowledge, skills and professional behaviour in one *curriculum*: making hard choices

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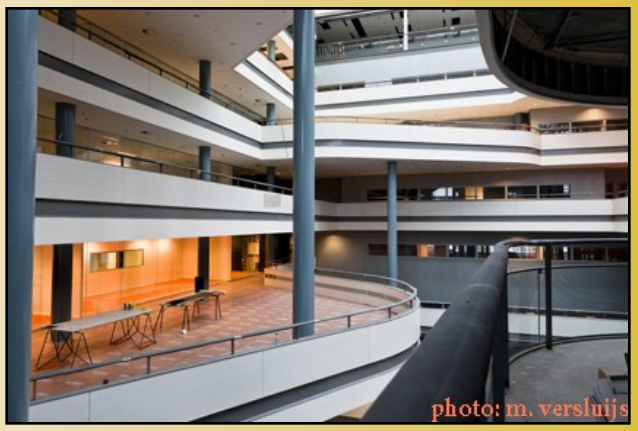


Annual conference European Association of Faculties of Pharmacy, 24-26 may 2012, Utrecht

Worldwide trends

- *Scientific*: Explosion of high MW medicines (proteins, peptides) requires knowledge in the areas of molecular biology, genetics, biotechnology and quality control of biotechnological products;
- *Technological:* Complex administration forms require more knowledge of physicochemical processes and understanding of release processes;
- *Professional:* Increasing complexity and individualization of pharmacotherapy (drug safety, pharmacogenetics) requires a role for responsible pharmacists. Legal regulations exist already in some countries.

- Increased attention required for training in (clinical) pharmacology, pharmaceutical technology and methodological aspects

Pharmacy in the Netherlands

	Developments
Pre WW II	Preparation of medicines in pharmacies. Emphasis of pharmacy curriculum on compounding and analysis
1945-1960	Development of industrial production of medicines. Deprofessionalization of pharmacists.
1960-1970	Increasing attention for the role in drug treatment for pharmacists. Introduction of pharmacology in the Pharmacy curricula. Start of reprofessionalization of pharmacists.
1970-1980	Development of clinical pharmacy, hospital pharmacy. Medication checks and automation in community pharmacy.
1980-1990	Further development of hospital pharmacy. Introduction of medication policies, pharmacotherapy assessment (FTO) with physicians institutionalized
1990-2000	Further development of pharmaceutical care, medication surveillance in community pharmacies (reporting adverse effects, drug interactions, pharmacogenetics)
2000-present	Development of pharmacotherapy: assessment and safety of medication
2007	Inclusion in WGBO-act: community pharmacist recognized as being co-responsible for the outcome of pharmacotherapy

Pharmacy in the Netherlands

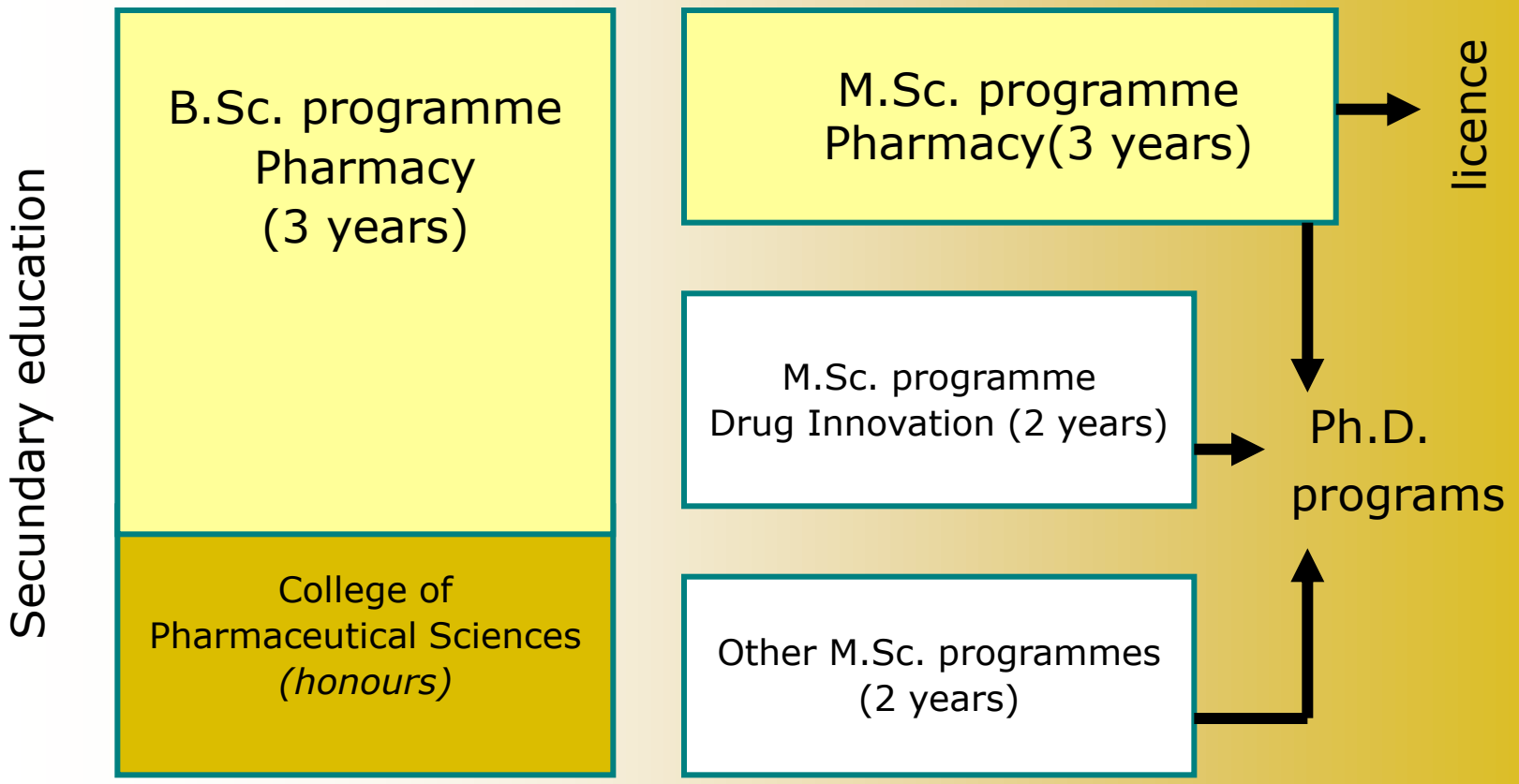
- Community pharmacists 3100
- Hospital pharmacists 400
- Industrial pharmacists 500
- Other occupations 1000

17 Million inhabitants

- Community pharmacies 2000
  - 1 pharmacy *per* 8,500 inhab.
  - pharmacist/pharmacy 1.55
  - assistants/pharmacy 3 – 10
- Hospital pharmacies 100
  - 1 pharmacy *per* 170,000 inhab.
- Pharmacy programmes 2 (Groningen, Utrecht)

source: 2011 PHARMINE report (Atkinson and Rombaut)

The Utrecht pharmacy curriculum



Need for curriculum change

Directives, guidelines
(2005/36/EG, FIP/WHO)

Standards, norms
(KNMP, NVZA, NIA)

Expectations of postgraduate programmes

Pre-2001 Curriculum

Bologna Agreement:
B. Pharmacy (3 yr)
M. Pharmacy (3 yr)
M. Drug Innovation (2 yr)
+ 2010: Coll. Pharmaceutical Sciences

Dutch laws:
BIG
WGBO
MW
KWZ

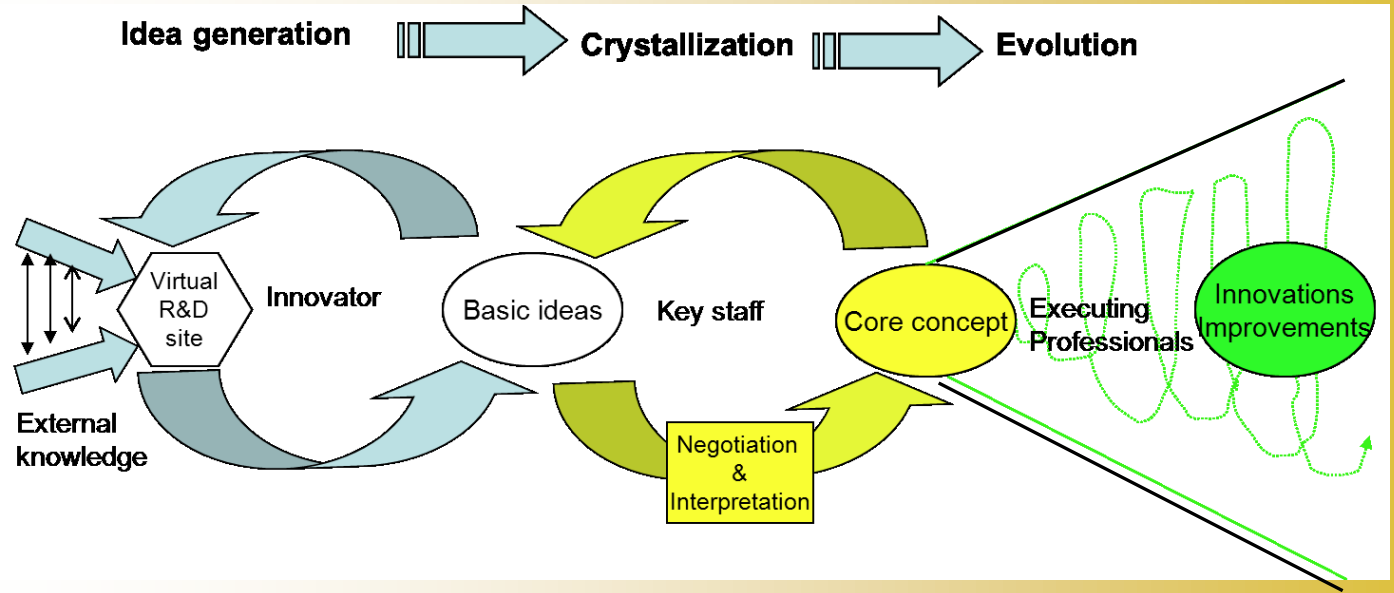
The "magic potion" model

- A mix of ….
  - intelligent, creative people with …
  - diverse, sometimes conflicting, inter
    and knowledge
  - who …
- Have, get or take the time to talk
  discuss and brainstorm ...
- And with an …
  - enormous commitment, involvement and patience, and …
  - mutual respect and trust (if things become difficult at the end of the day)

Hard choices

- Pharmacy practice *versus* pharmaceutical research
- Patient care *versus* compounding/analysis
- Integration of curriculum content
- Integration of skills and professional behaviour

- Curriculum development process (2000 – ongoing)



Choices: Practice *versus* research

- Do you want to distinguish between students, who are mainly practice oriented and student, who are research-minded?
- Separate curricula or differentiation within one curriculum (leading to self-selection)?
- If you choose to differentiate, at which stage and to what extent?

- Initially we choose to offer an undivided bachelor-curriculum with self-selection options: 2 different tracks
  - Pharmacy: largely fixed, preparing for M. Pharmacy curriculum
  - Drug Research: very open, preparing for M. Sc. curriculum in Drug Innovation or other programmes (*e.g.* Epidemiology, Immunology)
- After 8 years we decided to develop the undergraduate *College of Pharmaceutical Sciences* (honours, selective, English-taught) for talented students, starting in 2010

Choices: Patient *versus* medicine

- Must all M.Pharm. graduates have the same training or is some differentiation desirable and allowed?
  - unitary license and legal position of pharmacists
  - differentiation based on future working environment (community, hospital, industry, regulatory) or on professional tasks?
- If you choose to differentiate, at which stage and how extensive?

- We choose to offer an undivided master-curriculum with self-selection options:
  - Patient profile: relatively high level in pharmacotherapy, patient care and medication policy
  - Medicine profile: relatively high level in compounding and quality control
  - four profile-specific courses and one elective (total 23 weeks) are free-of-choice for students; all student do a research project (20 weeks)

Choices: Integration of content

- Students need to be prepared for coping with ever-changing demands of the pharmacy profession, both scientifically and professionally
- Students need to develop a ‘lifelong learning attitude’
- Information (old and new) is and becomes available in electronic format at an increasing pace. Students generally are well-equipped to learn factual information from these resources.

- The curriculum concentrates on training students to connect, combine, analyze and integrate knowledge of different disciplines
  - mainly integrated courses: problem-based, project-based
  - explicit attention for methodological aspects
  - high level of abstraction and conceptualization required

Choices: Integration of skills

- Students need to be prepared to function in a complicated working environment:
  - using chemical, biological and medical knowledge
  - collaborating with other health care professionals
  - and communicating with patients
- Initial differences between students are very real, but in the end all skills must be at a required minimum for all individual students

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- The curriculum concentrates on training of skills, starting in isolation but increasingly integrated
  - bachelor: (partial) skills are assessed on an individual basis: portfolio
  - additional training and testing organized: skillslab
  - master: skills are fully integrated in courses

Choices: curriculum reform

- Centralized development: curriculum committee
- Backward engineering, starting from curriculum goals and explicit end-terms, ordered in task domains (not working environment):
  - academic competenciesgeneric
  - patient care — differentiated for patient-profile
  - medication policy — differentiated for patient-profile
  - compounding — differentiated for medicine-profile
  - professional practice
  - research
  - communication and education
- Curriculum constructed top-down: course goals set by curriculum committee, and monitored during development
- Establishment of interdisciplinary course development teams
- Avoid twin sins of instructional design:
  - coverage-focused teaching and activity-focused teaching

Design principles: guidelines

1. The curriculum is designed as a coherent program.
2. The program stimulates active study behaviour, is challenging and varied.
3. Acquisition, application and integration of knowledge and skills take place in a context relevant for the future profession.
4. Within the program systematic and explicit attention is paid to the development of academic and personal skills and values.
5. Regulation of the learning process is gradually shifted from teacher to student.
6. The program enables students to follow individual interests by offering electives and a patient- or product-oriented profile.
7. A well-balanced system of mentoring and assessment is used, which takes into account the steering effects of testing.

Content and skills consultants

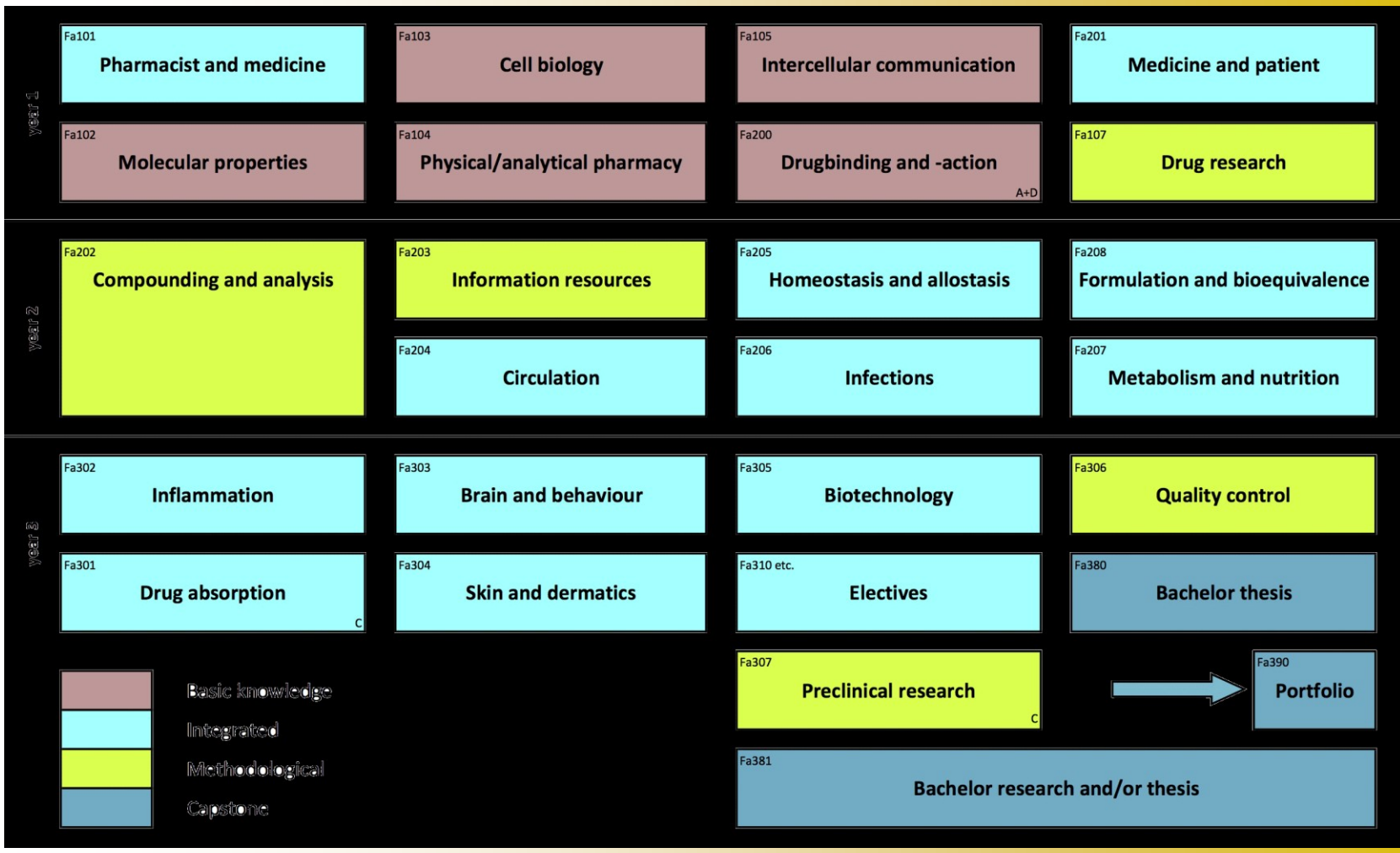
- Internal coherence of the curriculum is constructed and monitored

Content development
Physiology & pathophysiology
Biotechnology
Biomolecular chemistry
Pharmacodynamics
Pharmacokinetics
Pharmaceutical Technology
Pharmacotherapeutics & epidemiology
Pharmaceutical Analysis
Toxicology

Skills development
Pharmaceutical calculations
Information management
Oral communication
Written communication
Laboratory skills
Compounding
Methodology (incl. Statistics)
Management
Ethics and law
Metacognition

- Consultants have access to all course materials and advise programme directors and course coordinators on a regular basis

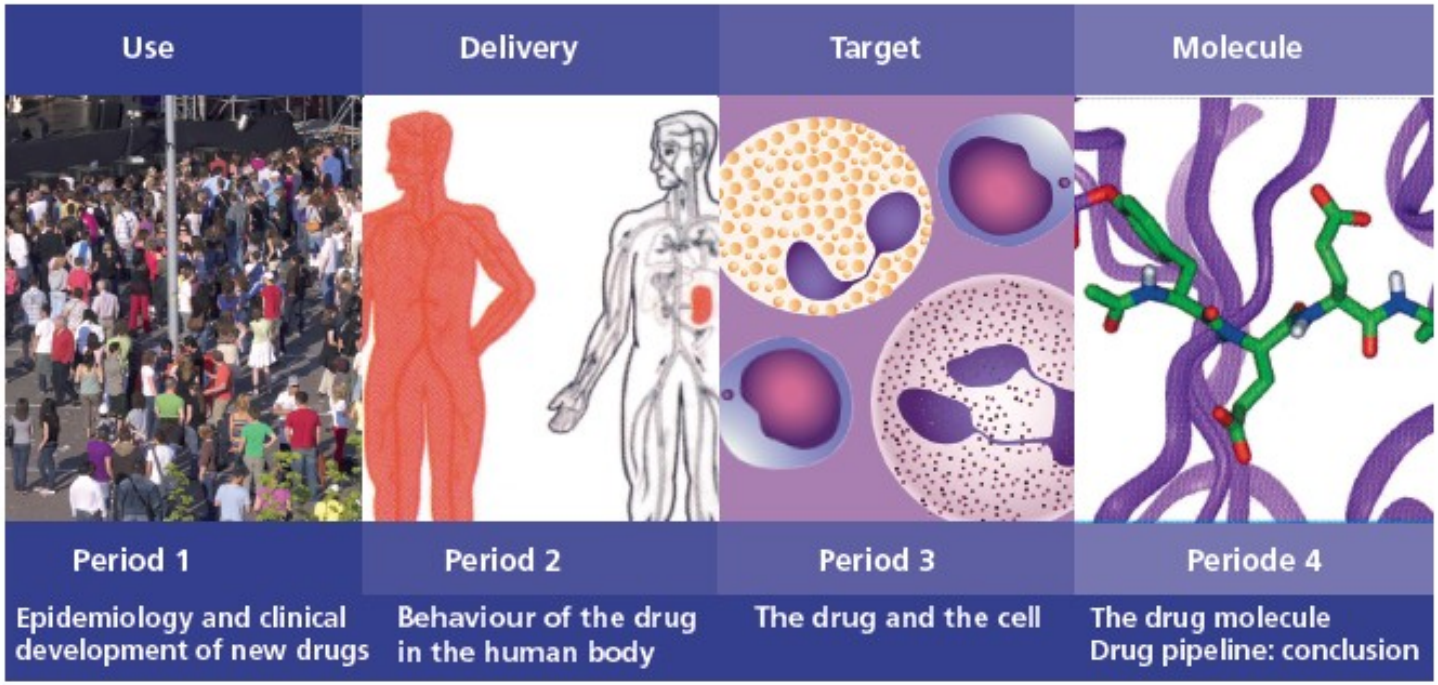
Curriculum B. Pharmacy

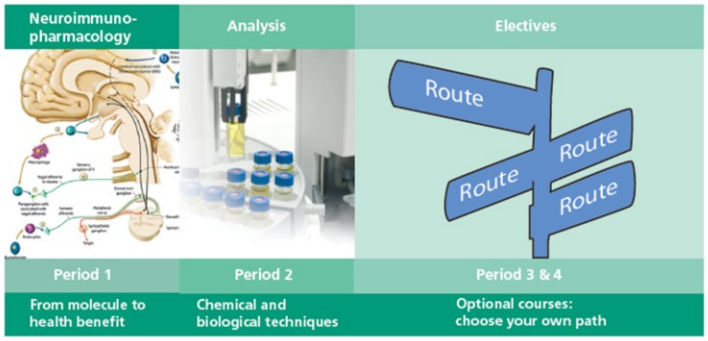


Curriculum M. Pharmacy (3 years)

FA-401 Diseases	**FA-402 Extemporaneous preparations**
FA-403 Patient care	**FA-404 Medication policy**
FA-405 Quality control	**FA-406 Pharmacotherapy (with M.D. students)**
Elective (5 weeks): Immunopharmacology, Pharmacoepidemiology, Pharmaceutical Law, Pharmacy policy, Hospital pharmacy, Nanomedicines, etc.	
Introductory traineeship: community and hospital pharmacy	4 weeks
Individual research project	23 weeks
Medicine profile Stability Childrens' formulations Drug development Pharmaceutical proteins	**Patient profile** Cardiovascular pharmacotherapy Evidence-based medicine Pharmacotherapy CNS Clinical pharmacotherapy
Integrated Pharmacy, including Pharmacy game GIMMICS	10 weeks
Traineeship: community pharmacy	6 weeks
Traineeship: hospital pharmacy	8 weeks
Traineeship of choice (community, hospital, industry, regulation)	6 weeks

College of Pharmaceutical Sciences





M.Sc. In Drug Innovation (2 years)

DI-407 Introduction **DI-408 Drug discovery** **DI-409 Drug developmen**	**12 weeks**
Electives Understanding drugs Pharmacology Immunopharmacology Pharmacoepidemiology Pharma policy Nanomedicine Bioanalysis Biomolecular mass spectrometry Principles of medicinal chemistry Laboratory animal Sciences Radiation hygiene 5B Safe microbial handling Biostatistics Scientific writing	**5-7 weeks**
Minor research project	24 weeks
Major research project	36 weeks
Master thesis	5 weeks

Teacher quality: QA

- University requirement: all teaching staff must hold a relevant teaching qualification (basic or senior)
- Qualifications are granted by the Head of Department (HoD) on the basis of a portfolio assessment
- 63 out of 89 (full, associate and assistant) professors hold this qualification

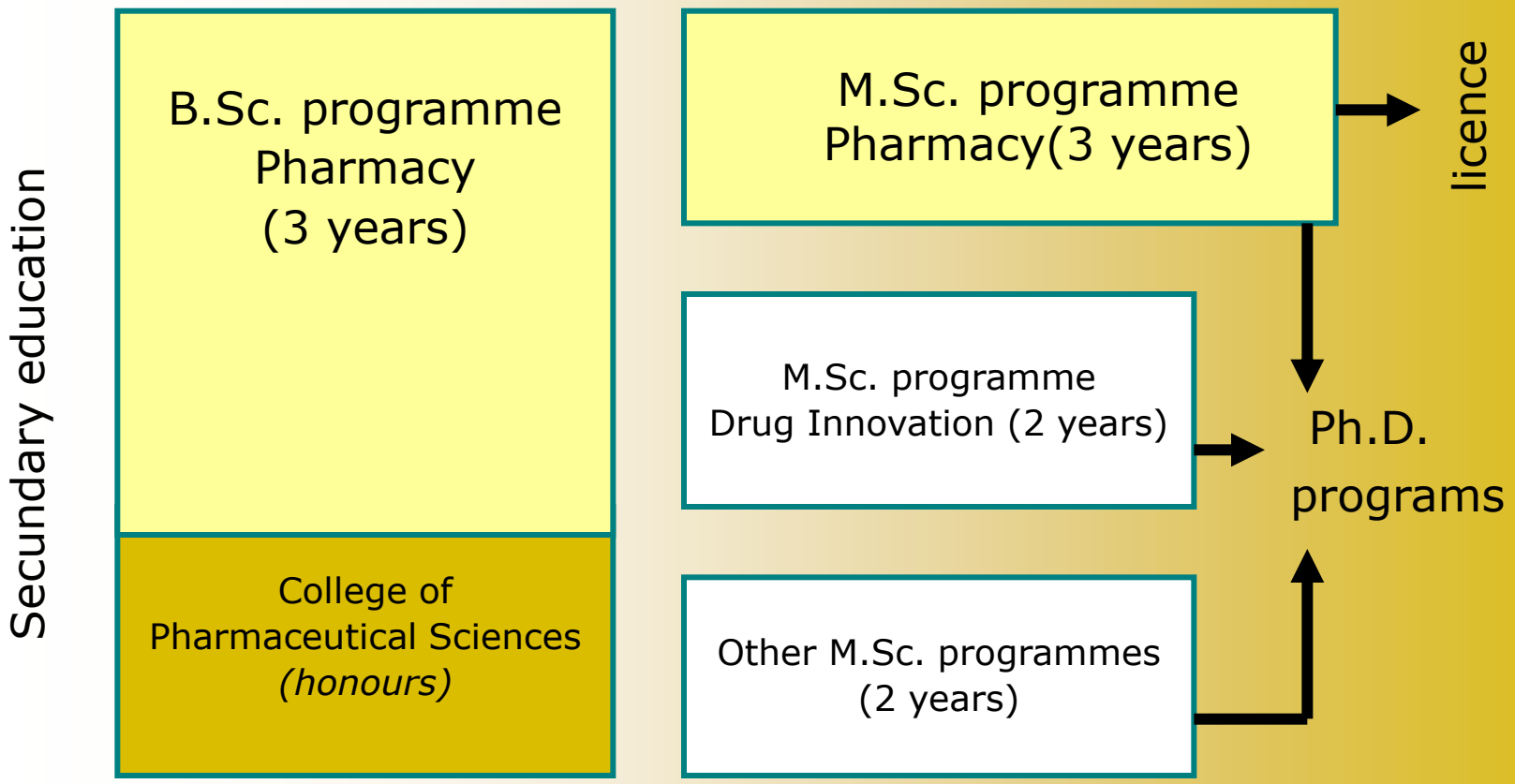
- Utrecht University offers a program for educational leadership (Centre of Excellence for University Teaching, CEUT)
- All program directors and coordinators hold this qualification

Teacher quality: CPD

- Development is stimulated by monthly informal ‘Teacher-for-teacher’-meetings and a Journal Club
- Training for problem- and project-based teaching is organized on a regular basis.
- Educational (action) research projects are carried out, partly in collaboration with the Centre for Teaching and Learning of the University

The process of project-based learning
Effectivity and efficiency of “jigsaw”-tutorials
Organization and structure of the skills-lab
Improvement of “classical” written individual exams
Perception of learning environment
Relation between secondary school grades and study-success
Effectiveness of enquiry-based learning

The Utrecht pharmacy curriculum



Introduction of a new curriculum requires an enormous effort of all people involved, in particular when new educational forms are introduced.

Thank you for your attention ….

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