

SCHOOL OF PHARMACEUTICAL SCIENCES
GENEVA - LAUSANNE

ANNUAL REPORT 2013



UNIVERSITÉ
DE GENÈVE

Ecole de Pharmacie
EPGL
Genève – Lausanne

Unil
UNIL | Université de Lausanne

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Mrs Elena ONATE

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Mrs Florence VON OW (since 1.6.2013)

INFORMATIC STAFF

Mr. Loris FRANCO
Mr. Loïc MANET (auxiliary : 1st may to 31th december 2013)
Mr. Yann MANET

ABBREVIATIONS

<i>PO</i>	<i>Full Professor</i>
<i>PAS</i>	<i>Associate Professor</i>
<i>PAST</i>	<i>Assistant Professor</i>
<i>PT</i>	<i>Adjunct Professor</i>
<i>PI</i>	<i>Visiting Professor</i>
<i>PD</i>	<i>Privat-Docent</i>
<i>MER / CC</i>	<i>Senior Lecturer</i>
<i>CE</i>	<i>Lecturer</i>
<i>CS</i>	<i>Research Associate and Senior Research Associate</i>
<i>MA</i>	<i>Senior Research and Teaching Assistant</i>
<i>POSTDOC</i>	<i>Postdoctoral Scholar</i>
<i>ASS</i>	<i>Research and Teaching Assistant</i>

RESEARCH UNITS

BIOPHARMACEUTICS

Prof Gerrit BORCHARD, PO
Dr Olivier JORDAN, MER

LIFE SCIENCES MASS SPECTROMETRY

Prof Gérard HOPFGARTNER, PO
Dr Emmanuel VARELIO, MER

PHARMACEUTICAL ANALYTICAL CHEMISTRY

Prof Jean-Luc VEUTHEY, PO
Prof Serge RUDAZ, PAS
Dr Davy GUILLARME, CE

PHARMACEUTICAL BIOCHEMISTRY

Prof Leonardo SCAPOZZA, PO
Dr Yogeshvar KALIA, MER

PHARMACEUTICAL TECHNOLOGIES

Prof Eric ALLEMANN, PO
Dr Florence DELIE-SALMON, MER
Dr Norbert LANGE, MER
Dr Pascal FURRER, CE

PHARMACOGNOSY

Prof Muriel CUENDET, PAS
Dr Philippe CHRISTEN, MER

PHARMACOCHEMISTRY

Prof Pierre-Alain CARRUPT, PO

COMMUNITY PHARMACY

Prof Olivier BUGNON, PAS
Dr Jérôme BERGER, CE
Dr Marie-Paule SCHNEIDER, CS

PROTEOMIC CLINICAL

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CLINICAL PHARMACOLOGY

Prof Pierre DAYER, PO
Prof Jules DESMEULES, PAS

CLINICAL PHARMACY

Prof. Chantal CSAJKA, PAS

PHYTOCHEMISTRY & BIOACTIVE

NATURAL PRODUCTS

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Dr Elisabeth RIVARA-MINTEN, CE

HOSPITAL PHARMACY

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STAFF



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Sylvian CRETTON
Sergio DEL RIO SANCHO
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Carolina DOS SANTOS PASSOS
Sachin DUBEY (until 31.1.13)

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Anne-Laure GASSNER
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Van Nga NGUYEN
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Kiran SONAJE
Sébastien TARDY
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Karine VUIGNIER
Maria ZULUAGA ESTRADA

EXCELLENCE FELLOWSHIP

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Helena MANOCCHIO RUSSO

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Kyoko WATANABE
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Cecilia FORTUGNO
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Laurent STARRENBURGER
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(until 30.04.2013)
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Frederic NIKITIN
Lucie NOVAKOVA
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Eike REICH
Anna REIS
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Cecilia ROMANO
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Alexandra SEVIN
Maddalena SGUIZZATO
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Nguyet Thuy TRAN
Elena TRATTA
Eva TYTECA
Simone VIGNOLA
Shuqi WANG
Kyoko WATANABE
Maria Luiza ZERAIK
Jaozhen ZHANG

BUDGET

*STAFF SALARY ¹	11'838'652.--	(TABLEAU 1)
FONCTIONNEMENT BUDGET SECTION	1'203'002.--	(TABLEAU 2)
TOTAL BUDGET SALARY AND FUNCTIONMENT	13'041'654.--	¹
FACULTY INVESTMENT	205'348.--	
SECTION INVESTMENT	259'380.--	
TOTAL INVESTMENT FUND	464'728.--	(TABLEAU 3)
SWISS NATIONAL SCIENCES FOUNDATION	1'286'748.--	
OTHERS FUNDS	2'746'383.--	
TOTAL EXTERNAL FUNDS	4'033'131.--	(TABLEAU 2)
TOTAL BUDGET EPGL	17'539'513.--	²

*STAFF 2013

NUMBER OF PEOPLE WORKING AT EPGL DURING 2013 : 222

¹ With social security contributions

² including :

- contribution Etat VD CHF 5'071'005.--
- subsidies "universitaire intercantonale" AIU CHF 1'450'000.--

TABLEAU 1

TOTAL BUDGET STAFF (11.838 Mio)

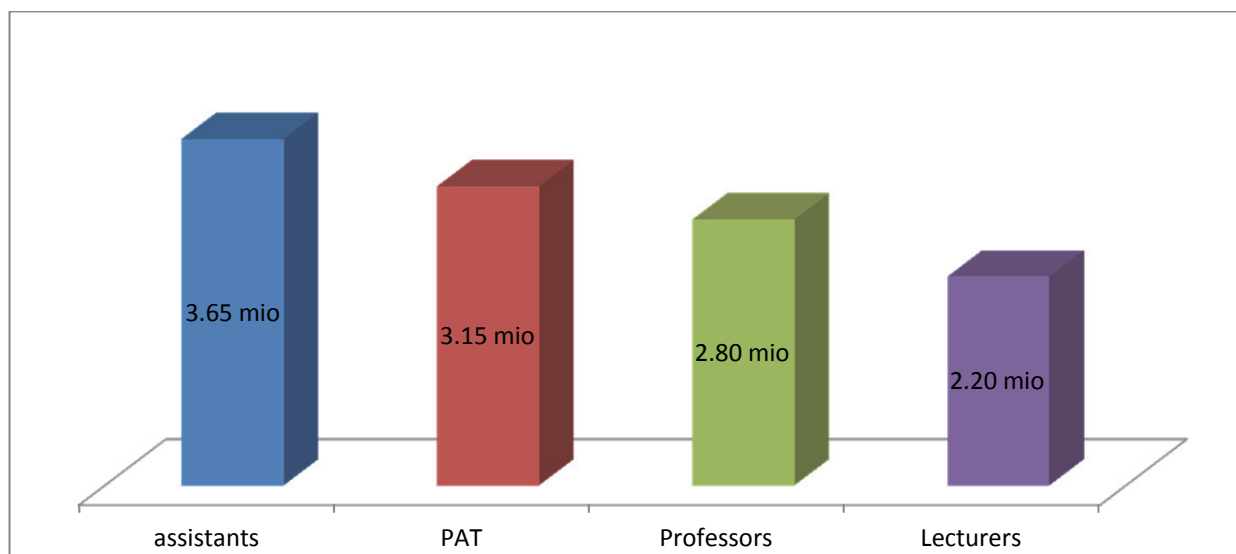


TABLEAU 2

TOTAL PUBLIC AND EXTERNAL FUNDS

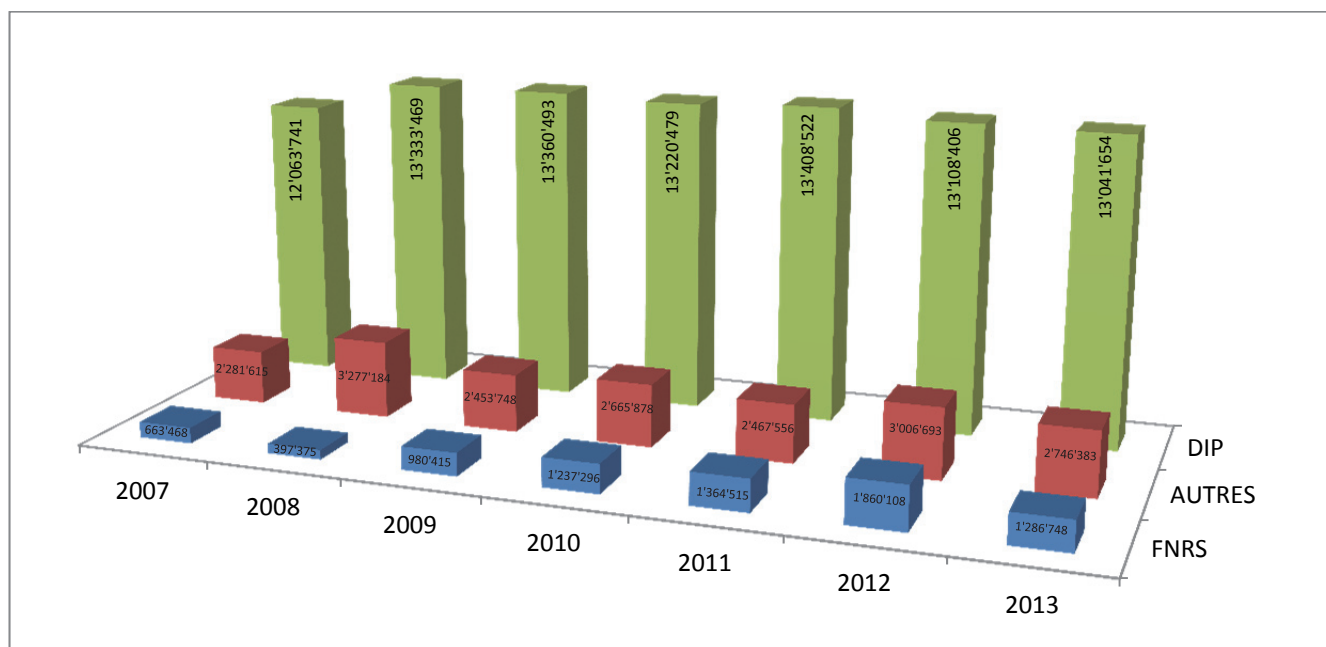
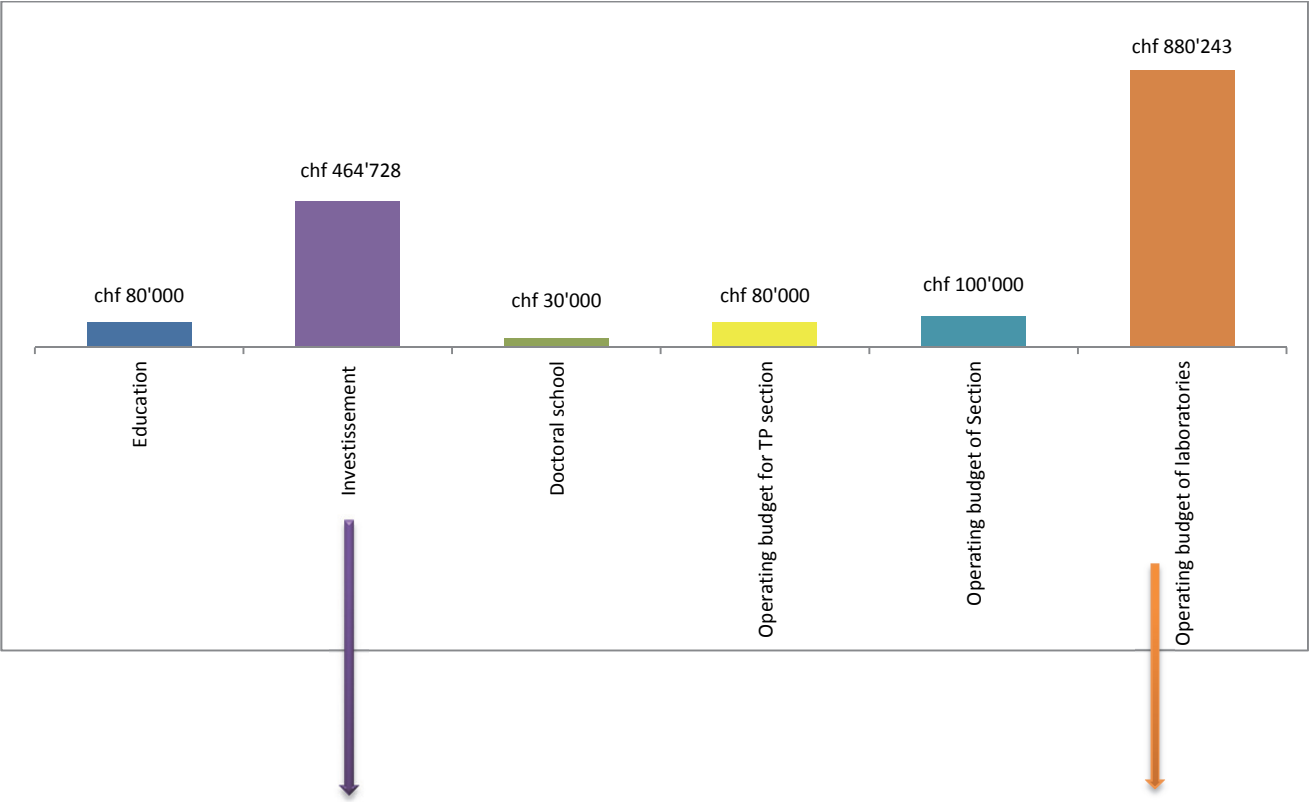
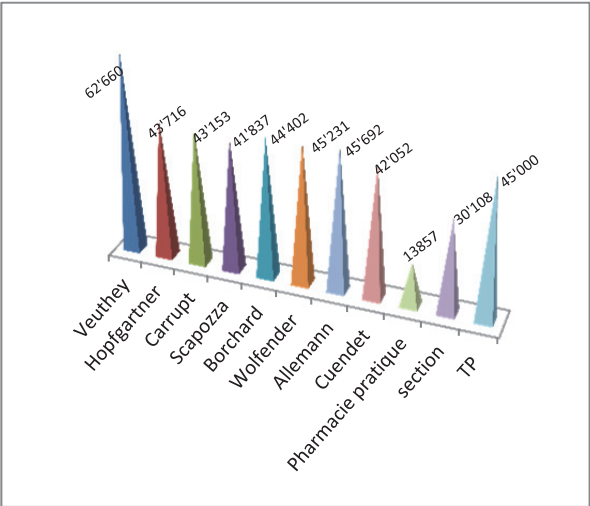


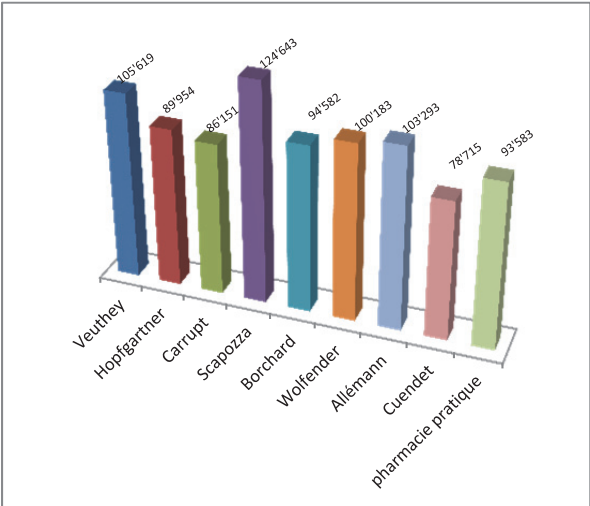
TABLEAU 3
OPERATIONAL BUDGET (1.24 Mio) AND INVESTISSEMENT (0.46 Mio)



ALLOCATION INVESTMENT BUDGET
(CHF 464'728)



ALLOCATION OPERATIONAL BUDGET
(CHF 880'243)



Staff (headcount)	222
Students:	368
- Bachelor	242
- Master	121
- Master of advanced studies	5
Ph.D. students	120

Total budget CHF	15.7 Mio
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Patents	5
Publications with impact factor	179
Publications without impact factor	34
Presentations & posters	195
Books and chapters	18
Number of projects at FNRS and assimilated	42
Projects of collaboration with the industry	51
Ph.D. Thesis presented in 2013	15
Patents	6
Awards	15

BIOPHARMACEUTICS



FULL PROFESSOR

Gerrit BORCHARD

SENIOR LECTURER

Olivier JORDAN

SENIOR RESEARCH ASSOCIATE

Michael MÖLLER

POSTDOCTORAL SCHOLAR

Van Nga NGUYEN

Gaëlle VACHER

RESEARCH AND TEACHING ASSISTANT

Tiziana DI FRANCESCO (since
01.10.2013)

Stella EHRENBERGER (since
01.10.2013)

Katrin FUCHS

Floriane GROELL

Mohamed MOHAMED

Johanna POECHEIM

Sakthikumar RAGUPATHY

Christian REICHERT

Omar SAKR (since 16.07.2013 -
before extra muros)

INTERNSHIP STUDENTS

Sandra Cristina CAMPOS DE JESUS
(University of Coimbra, Portugal)

Viorica PATRULEA (Sciex)
(since 09.10.2013, University of
Timisoara, Romania)

ADMINISTRATIVE AND TECHNICAL STAFF

Nathalie BOULENS

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Tayeb JBILOU

Catherine SIEGFRIED-MICHEL (until
30.04.2013)

Emmanuelle SUBLET

Kevin ULDRY (technical apprentice)

GENERAL DESCRIPTION OF THE UNIT

The Biopharmaceutics group of EPGL in 2013 is a multidisciplinary and international group of mostly young scientists dedicated to the study of interaction of drugs and drug carrier systems with their biological environment, especially the immune system. Scientific projects include the physicochemical characterization of such drugs and carriers, the optimization of formulation methods, the establishment of cell based-assays, the utilization of suitable *ex-vivo* and *in-vivo* models, and translational research to allow for clinical testing.

The Biopharmaceutics group has gained expertise in the treatment and prevention of infectious diseases through its work on vaccines, and has accumulated considerable knowledge in interventional cancer therapy. The former line of research is dedicated to the development of particle-based vaccines against tuberculosis, which are equipped with novel adjuvants addressing the innate immune system (e.g., Toll-like and NOD-like receptors). Work in cancer therapy is focused on a superparamagnetic iron oxide nanoparticle (SPIONs) based combined approach of heat induction and chemotherapy, and on chemoembolization using (biodegradable) beads loaded with anti-angiogenic drugs.

In addition, more fundamental work is done in the area of drug interaction with the (innate) immune system. Here, we are attempting to elucidate the mechanisms underlying the inflammatory and immune response to aggregates of therapeutic proteins, especially observed after subcutaneous injection (injection site reactions, ISR). We have also recently unraveled the interplay of epithelial tight junction regulation and ligation of receptors of the innate immune system (e.g., Toll-like receptors).

The Biopharmaceutics group has access to all equipment necessary for the execution of the projects described above, either in-house or through cooperation within EPGL, the University of Geneva or with outside partners. The Biopharmaceutics group entertains a multitude of cooperative projects with academic institutions (basic research and clinical) as well as with industrial partners. Through the active participation in various learned societies and scientific committees, FABIO has the opportunity to shape the future of biopharmaceutical sciences and science policies.

SPECIFIC RESEARCH FIELDS

In the field of translational research, The Biopharmaceutics group is dedicated to developing novel methods in interventional oncology. One of these strategies is the chemoembolization of liver tumors. Our approach consists of delivering hydrogel beads to the tumor, which are loaded with anti-angiogenic agents (Fig. 1). Embolic beads are blocking the blood flow and thus the nutrient supply in the vascular network of the tumor. Neovascularization, i.e. the formation of new blood vessels, is initiated as a strategy for tumor survival and/or recurrence of disease. We have therefore loaded clinically used beads with different anti-angiogenic drugs, which are released from the beads blocked in the tumor vasculature. Our *in-vivo* results demonstrated a safe, localized delivery of the drug as well as preclinical efficacy.

Another project in the realm of interventional oncology reached the preclinical stage this year. Here, the generation of heat by superparamagnetic iron oxide nanoparticles (SPIONs) injected into a tumor and exposed to a magnetic field is combined with the release of cytotoxic drugs loaded onto these SPIONs. We have obtained favorable results *in-vitro* (cytotoxic activity upon release), as well as on injection of these loaded particles into human spine serving as a model for prostate cancer metastases. In a project within a Nano-Tera consortium, we have commenced to prepare loaded SPIONs decorated with targeting moieties to be able to specifically target solid tumor metastases in, e.g., lymph nodes.



Figure 1: Animation of a liver tumor being embolized by beads eluting an anti-angiogenic drug through intra-arterial administration. Courtesy of Adam Wilson.

OUTSTANDING PUBLICATIONS

S. HEUKING, B. ROTHEN-RUTISHAUSER, D.O. RAEMY, P. GEHR, G. BORCHARD "Fate of TLR-2 agonist functionalized pDNA nanocarriers upon deposition at the bronchial epithelium *in vitro*." *J. Nanobiotech.* 11 (2013) 29.

L.R. ASMUS, J.-C. TILLE, B. KAUFMANN, L. MELANDER, T. WEISS, K. VESSMAN, W. KOEHLING, G. SCHWACH, R. GURNY, M. MOELLER "In vivo biocompatibility, sustained-release and stability of triptorelin formulations based on a liquid, degradable polymer" *Journal of Controlled Release* 165 (2013) 199–206

CONGRESSES

Prof. G. BORCHARD was co-organizer of the 6th Swiss Pharma Science Day in Bern, Switzerland, in August 2013.

The Biopharmaceutics group organized the 2013 meeting of the Swiss pharmacy schools of Zürich, Basel and Geneva, in Geneva, July 1st, 2013.

1. PUBLICATIONS (DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 7)

1.1	Scientific publications (with impact factor)	19
1.2	books or books chapters	1

2. POSTERS PRESENTATIONS (DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 8)

2.1	Posters presentations	17
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3. ORAL PRESENTATIONS (DETAILS IN SCIENTIFIC PRODUCTIONS 2013– PAGE 10)

3.1	Congresses & Symposia	12
3.2	Continuing education & open to the public lectures	1

PUBLIC RESEARCH FUNDS (FNSR, NIH, CTI)



SWISS NATIONAL SCIENCE FOUNDATION

Logoregional treatment of prostate cancer metastases to bone using implant-mediated hyperthermia, SNF No. 31003A-127513/1

Main applicant: O. JORDAN

Co-applicants: G. BORCHARD, G. THALMANN, H. HOFMANN, E. DOELKER

Allocation 2013: CHF 78'200

Duration: 3 years

Starting date: 2010



NANO-TERA

MagnetoTheranostics: From Superparamagnetic Nano-particles until Tools for Detection and Treatment of cancer

Main applicant: H. HOFMANN

Co-applicants: O. JORDAN, M. STUBER, N. KUSTER, T. HARRIET, B. VON RECHENBERG

Allocation 2013: CHF 97'800

Duration: 4 years

Starting date: 09/2013

RESEARCH FUNDS (INDUSTRY AND ASSIMILATED)

Code	Service Development Research	Amount (CHF)
	Novel capsule-based methods for the protection of maize plants using entomopathogenic nematodes	18'360.30

PATENTS

F. SAUCY, J.A. HAEFLIGER, F. DELIE, L. LUCA, O. JORDAN. Pharmaceutical formulation for use in the treatment and/or prevention of restenosis. US provisional patent application US 618 057 16 (2013)

AWARDS & DISTINCTIONS

Omar SAKR, Second prize in the Poster Award competition by the Foundation of the Swiss Society of Industrial Pharmacists on the Swiss Pharma Science Day 2013. Poster title: Double Chambered LbL Nanoparticles as a Novel Intracellular Delivery System.

Gaëlle VACHER, Prix René Bernier for the best dissertation, "virus-like particle-based vaccines for mucosal application". Académie nationale de pharmacie (France).

Gerrit BORCHARD was elected Vice-President of the European Federation of Pharmaceutical Sciences (EUFEPS)

LIFE SCIENCES MASS SPECTROMETRY



FULL PROFESSOR

G rard HOPFGARTNER

SENIOR LECTURER

Emmanuel VARESIO

EXCELLENCE FELLOWSHIP

Kyoko WATANABE

POSTDOCTORAL SCHOLAR

Sandra JAHN

David SIEGEL

RESEARCH AND TEACHING ASSISTANT

Bandar ALGHANEM

Tobias BRUDERER

Tatjana SAJIC

V ra BILAN (University of Zurich)

Sandrine CUDRE

Jonathan SIDIBE

Aivett BILBAO PENA

Tiffany PORTA

Ying ZHANG

Dario BOTTINELLI

ADMINISTRATIVE AND TECHNICAL STAFF

Chantal GRIVET

Eliane KUEHN

Dominique STORZ

GENERAL DESCRIPTION OF THE UNIT

The Life Sciences Mass Spectrometry (LSMS) group focuses on the development of mass spectrometry (MS) in combination with separation techniques (chip-based nanoHPLC, nanoUHPLC, UHPLC) for the quantitative and qualitative analysis of low molecular weight compounds and large molecules in biological matrices. It is well equipped with various ionisation techniques including MALDI, ESI, APCI, APPI, DESI and various types of mass spectrometers such as ion mobility, quadrupole-time-of-flight, triple quadrupole linear ion traps and Fourier transform ion cyclotron resonance mass spectrometry. In collaboration with external industrial partners the group develops new MS strategies based on high-resolution mass spectrometry, ultra-fast MS/(MS) acquisition workflows, MALDI-imaging, and differential ion mobility spectrometry for life sciences. The group is also developing software approaches for analyzing large set of MS/MS data to support structure elucidation in drug metabolism and metabolomics. Various studies are on-going in the field of toxicology to understand the binding of reactive metabolites to proteins, to image the distribution of drugs and their metabolites in tissues, and to characterize the effects of pharmaceuticals on the metabolome, lipidome and proteome of mammals or cell systems.

SPECIFIC RESEARCH FIELDS

- Metabolomic, Lipidomic and Proteomic Analyses
- Toxicology
- Development of QUAL/QUAN MS/(MS) analytical strategies for pharmaceuticals and biopharmaceuticals in complex matrices
- High-Resolution Mass Spectrometry
- Mass Spectrometry Imaging
- Dried Blood Spots Analysis and related techniques
- Structure elucidation by LC-MSn and High Resolution MS, SWATH/MS
- MS Libraries
- Miniaturized separation and infusion techniques
- Multidimensional separation platforms
- Ultrafast and High-throughput Analysis
- Quality control and validation of analytical methods

PARTICULAR PROJECTS INITIATED

PhD Trip 2013, Wageningen University, Laboratory of Organic Chemistry, April 26, 2013

COLLABORATIONS INITIATED WITH INDUSTRY

CTC Analytics - Automated sample preparation collaboration

1. PUBLICATIONS (DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 11)

1.1	Scientific publications (with impact factor)	2
1.2	Scientific publications (without impact factor)	1

2. POSTERS PRESENTATIONS (DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 11)

2.1	Posters presentations	19
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3. ORAL PRESENTATIONS (DETAILS IN SCIENTIFIC PRODUCTIONS 2013– PAGE 13)

3.1	Congresses & Symposia	8
3.2	Continuing education & open to the public lectures	1

THESIS PRESENTED

INTRA-MUROS THESIS

Tiffany PORTA,
“Multimodal molecular mass spectrometry imaging – Development and applications in plant biology and forensic toxicology”,
Directors : G. HOPFGARTNER, E. VARESIO
Faculty of Sciences, University of Geneva, Thesis 4634 - 30 August 2013

Tatjana SAJIC,
 "Analytical proteomics by liquid chromatography tandem mass spectrometry in obesity and diabetes research",
 Directors : G. HOPFGARTNER, D. CARPENTIER (Faculty of medicine, Unige) E. VARESIO
 Faculty of sciences, University of Geneva, thesis N° 4549 - 25 February 2013

PUBLIC RESEARCH FUNDS (FNSR, NIH, CTI)

SWISS NATIONAL SCIENCE FOUNDATION

FNSR "Investigations of protein expression during anti-viral response mechanisms based on innovative mass spectrometric and bioinformatic workflows" (CRSII3_136282)

FNSR "Unraveling age-related changes in energy metabolism by using a QUAL/QUAN data independent LC-MS workflow based on SWATH acquisition" (IZKOZ3_150518 /1)

RESEARCH FUNDS (INDUSTRY AND ASSIMILATED)

Code	Service Development Research	Amount end 2013 (CHF)
Div. Spectro	Service	190'417
Fonds B. Alghanem	Recherche	28'878
CRSII3_136282	Recherche	219'920
IZKOZ3_150518/1	Recherche	6'510

DEVICES IN LEND

- 1x ESI-Single Quadrupole
- 2x ESI-Triple Quadrupole Linear Ion Traps (QqQLIT) + peripherals
- 1x MALDI-Triple Quadrupole Linear Ion Trap (QqQLIT) + peripherals
- 2x Quadrupole-Time of Flight (QqTOF) + peripherals
- 1x Quadrupole-Time of Flight (TripleTOF) + peripherals
- 1xShimadzu LCMS 8040
- 1xShimadzu LCMS8080
- 1x Automated chip-based nanospray system
- 1x Automated dried blood spots (DBS) system
- 1x Automated SPE device
- 1x Microfraction collector
- 1x Dual UHPLC system with column-switching valves
- 1x Micro-UHPLC pump
- 1x Micro-LC system with column-switching valves
- 1x Narrowbore LC system with column-switching valve
- 1x Dual nano-UHPLC system
- 1x Chip-based nano-LC system
- 1x Splitless nano-LC pump
- 1x Nano-LC system with column-switching unit
- 1x 2D nano-LC system with column-switching unit
- 1x RTC sample preparation system

PHARMACEUTICAL ANALYTICAL CHEMISTRY



FULL PROFESSOR /

Jean-Luc VEUTHEY (vice-chancellor since January 2011)

ASSOCIATE PROFESSOR

Serge RUDAZ

LECTURERS

Davy GUILLARME (50%)

Julie SCHAPPLER

SENIOR RESEARCH ASSOCIATE

Laurent GEISER

Fabienne JEANNERET

SENIOR RESEARCH AND TEACHING ASSISTANT

Julien BOCCARD

POSTDOCTORAL SCHOLAR

Szabolcs FEKETE

Florence MEHL

Karine VUIGNIER

Anne-Laure GASSNER

RESEARCH AND TEACHING ASSISTANT

Marco ANASTASI

Ameena JESAIMANI

Marta RODRIGUEZ ALLER

Leire AZURMENDI

Isabelle KOHLER

Stéphanie ROMAND

Grégoire BONVIN

Linnéa LAGERSTEDT

Dany SPAGGIARI

Nicolas DROUIN

Niloufar MARSOUSI

Alexandre GRAND-GUILLAUME-
PERRENOUD

Aurélié PERIAT

CO-SUPERVISION (CO-TUTELLE)

Cristina CASETTA (Turin, Italy)

Samia OUERTANI (Nantes, France)

Assane Diop (Sénégal)

ADMINISTRATIVE AND TECHNICAL STAFF

Nicole DECREY

Jessica ORTELLI

Cédric SCHELLING

Christophe FRANCEY

Emilie REGINATO

Laurent STARRENBARGER

Charlène MEYLAN (technical
apprentice)

GENERAL DESCRIPTION OF THE UNIT

The group focuses its activities on separation techniques mainly liquid chromatography (LC), capillary electrophoresis (CE) and supercritical fluid chromatography (SFC) coupled with various detectors, including mass spectrometry (MS) for the analysis of pharmaceutical and biopharmaceutical compounds. New chromatographic supports are evaluated and original strategies to gain selectivity and/or sensitivity of the analytical process are developed. Reduction of the analysis time is also studied. Special focus is given to environmentally friendly analytical and sample preparation techniques (green chemistry).

The research of this group also focuses on the development and the use of methods for mathematical and statistical analysis of data produced from chemical instrumentation. The use of chemometric tools for developing analytical methods, determining optimised or robust conditions, as well as for treating data with pattern recognition techniques are applied in many projects within the School of Pharmaceutical Sciences and numerous external academic and/or industrial collaborations. Three main fields are currently developed, namely Design of experiments (DOE), method validation, and data mining (exploratory data analysis). For the latter, numerous important collaborations are under progress, particularly in the field of metabolism, metabolomics, and toxicology.

RESEARCH AREAS CONSIST IN:

- pharmaceutical and drugs of abuse analysis
- doping substances analysis
- chiral separation of pharmaceutical products
- study of the impact of sample preparation procedures in the analytical process
- characterization of chromatographic supports for pharmaceuticals analysis
- drug metabolism
- affinity chromatography
- UHPLC and SFC
- separation techniques
- screening method for metabolomic purpose
- data mining

SPECIFIC RESEARCH FIELDS

- Liquid chromatography (LC)
- Capillary electrophoresis (CE)
- Supercritical fluid chromatography (SFC)
- Hyphenation to mass spectrometry (MS)
- Sample preparation
- Validation
- Chemometrics
- Metabolomics
- Toxicology

OUTSTANDING PUBLICATIONS

A. PERIAT, I. KOHLER, J.-L. VEUTHEY, D. GUILLARME. Advances in Hydrophilic Interaction Liquid Chromatography for Pharmaceutical Analysis, SCGC Europe, May 2013, 17-23 (2013) - classé N° 10 du TOP13 de l'année des articles publiés dans LC/GC en 2013

1. PUBLICATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 15)

1.1	Scientific publications (with impact factor)	37
1.2	Scientific publications (without impact factor)	4
1.3	Books or books chapters	3

2. POSTERS PRESENTATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 18)

2.1	Posters presentations	28
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3. ORAL PRESENTATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 19)

3.1	Congresses & Symposia	28
3.2	Continuing education & open to the public lectures	19

THESIS PRESENTED

INTRA-MUROS THESIS

Isabelle KOHLER

Sensitivity Improvements in Capillary Electrophoresis - Mass Spectrometry for Clinical and Forensic Toxicology.

Directors: S. RUDAZ, J.-L. VEUTHEY

Faculty of sciences, University of Geneva – Thesis N° 4611,

EXTRA-MUROS THESIS

Cristina CASETTA

Study of the composition of biologically active fractions from plant extracts by advanced techniques of HPLC and UHPLC/MS.

Directors: J.-L. VEUTHEY (UniGe), C. BICCHI, (Uni Turin)

University of Turin and University of Geneva, - Thesis N°4536

PUBLIC RESEARCH FUNDS (FNSR, NIH, CTI)



SWISS NATIONAL SCIENCE FOUNDATION

2011-2013 Swiss National Science Foundation: J.-L. WOLFENDER, T. FARMER, S. RUDAZ.

“Targeted and metabolomic study of the early chemical events of the wound response in *A. thaliana*: dynamics of signalling and search for long distance biomarkers.”

N° 205320/135 190 – 1: 130'620 CHF



RESEARCH FUNDS (INDUSTRY AND ASSIMILATED)

2012 - 2013 Marie Curie Actions Intra European Fellowships (IEF), « ConFirMS ». S. RUDAZ (PI).

“Contaminant analysis in Food by Liquid Chromatography Mass Spectrometry towards a generic extraction and screening for pesticides and veterinary drugs” Project N° 299455 / Call (part) identifier FP7-PEOPLE-2011-IEF - 184'000

2012-2014 CTI funding application “Neurospectrum”: “in vitro assay for neurotoxicity assessment”. L. STOPPINI (PI), K.K. KRAUSE (CI), S. RUDAZ (CI).

Collaboration with Neurix (Minibrain) N° 13759.1 / Risky innovations 579'000 CHF allocated ca. 150'000 CHF

Financial support for spectromètre de masse de type triple quadripôle – Agilent

RESEARCH FUNDS (INDUSTRY AND ASSIMILATED)

Code	Service Development Research	Amount 2013 (CHF)	end
Teoxane SA. Genève, Suisse	Service – analytical investigations and dosages	39'453.48	
Industrial funds	Confidential – Collaboration with Prof. Wolfender	50'000.00	
Sanofi, France	Service – analytical investigations and dosages	52'093.61	
Stragen	Service	12'315.00	
Fonds Mark Birkigt		33'000.00	
Fondation Ernest Boninchi		40'000.00	
Fondation Schmidheiny		50'000.00	
Subvention fédérale		33'500.00	
Société académique		33'000.00	

DEVICES IN LEND

Appareil	Entreprise/Laboratoire	Période de prêt	Localisation	Contrat d'assurance
CE Agilent (CHF 75'000)	LCT – Pharmacochimie	Dès le 03.07.2006	I 18	Non
CE Agilent (CHF 75'000)	IUML – LAD - Lausanne	Dès le 17.04.2008	I 18	Non
UPLC (DAD) (CHF 120'000)	AGEMEL	Dès le: 24.03.2010	I3A	Non
G7100 Series Capillary Electrophoresis with CE-MS interface Kit and Agilent technologies G1310A 1200 series isocratic pump (CHF 75'000)	Agilent	Dès le 15.05.2010	I18	Oui
HPLC Waters Série 1500 (CHF40'000)	AGEMEL	Dès le: 18.05.2011	I20A	Non
Wyatt miniDawn TREOS (CHF 84'335)	DebioPharm	Dès le 13.06.2013	I3A	Non
Wyatt Optilab re (CHF 84'335)x	DebioPharm	Dès le 13.06.2013	I3A	Non
Wyatt ViscoStarII (CHF 84'335)	DebioPharm	Dès le 13.06.2013	I3A	Non
UPLC H-Class + MS (CHF 200'000)	Waters	Dès novembre 2013	I20A	Oui

AWARDS & DISTINCTIONS

I. KOHLER, Capillary Electrophoresis Mass spectrometry in Clinical and Forensic Toxicology, Prix ccCTA 2013, 17^{èmes} Journées Scientifiques du ccCTA, 12-13 september 2013, Les Diablerets

J.-L: VEUTHEY, Elected among the 100 most influential people in the analytical sciences – ranking reported in the analytical scientist, 2013, 9, 23-37

D. GUILLARME, Elected among the 100 most influential people in the analytical sciences – ranking reported in the analytical scientist, 2013, 9, 23-37

B. BOBALY, D. GUILLARME, S. FEKETE, Effect of temperature and pressure on protein aggregates in ultra-high pressure size exclusion chromatography. Best poster award, 1st price, 9th Balathon symposium – Siofok, Hungary, September 2013

A. GRAND-GUILLAUME-PERRENOUD, J.L. VEUTHEY, D. GUILLARME, S. FEKETE, Optimal column geometry for high kinetic performance supercritical fluid chromatography using state-of-the-art instruments. Best poster award, 2nd price , SFC 2013 – Boston, USA, July 2013

D. GUILLARME, LC-GC Emerging leader in chromatography award, 2013

J. BOCCARD, Analyse métabolomique pour la recherche de biomarqueurs urinaires d'exposition à la dioxime chez l'Homme. Prix CAMO. Chimiométrie 2013. Brest, France, 25-26 september 2013

PHARMACEUTICAL BIOCHEMISTRY



FULL PROFESSOR /

Leonardo SCAPOZZA

SENIOR LECTURER

Yogeshvar KALIA

SENIOR RESEARCH ASSOCIATE

Ingo ALBERTI

Béatrice KAUFMANN

Remo PEROZZO

SENIOR RESEARCH AND TEACHING ASSISTANT

Oscar VADAS

Magali ZEISSER

EXCELLENCE FELLOWSHIP

Amparo GARCIA LOPEZ

POSTDOCTORAL SCHOLAR

Yvonne ARNOLD

Sergio DEL RIO SANCHO

César SERNA JIMENEZ

Gianpaolo CHIRIANO

Sachin DUBEY

Kiran SONAJE

Sébastien TARDY

RESEARCH AND TEACHING ASSISTANT

Chiara AMBUEHL

Patricia GRAVEN

Ivana NOVAKOVIC

Vilma ARMOSKAITE (until 31.1.13)

Hisham HAMED (until 25.10.2013)

Surekha PIMPLE

Michela BOI (extra-muros)

Sema KADERLI

Giuseppina PISIGNANO (extra-muros)

Lara BRAMBILLA (extra-muros)

Maria LAPTEVA

Verena SANTER

Yong CHEN

Leonardo LAUCIELLO (until 11.2.2013)

Monica TESTONI (extra-muros)

Andrea CRISTIANI

Nicole LONGONI (extra-muros)

Natalia TIBERTI (extra-muros)

Laura CURTI (extra-muros)

Alessandra MONACO (until 30.7.13)

Marieke VEURINK (extra-muros)
(until 30.6.2013)

Cécilia DALLAVALLE (extra-muros)

ADMINISTRATIVE AND TECHNICAL STAFF

Sylvie GUINCHARD

Giulia PELLEGRINO

Olivier PETERMANN

Ophélie PATTHEY-VUADENS

GENERAL DESCRIPTION OF THE UNIT

The Pharmaceutical Biochemistry group includes two distinct fields of research (<http://www.unige.ch/sciences/pharm/pb/>).

The first is the Pharmaceutical Biochemistry/Chemistry field in which the research is focused on understanding ligand-macromolecule interactions to develop new therapeutic strategies including new chemical entities, new targets using an interdisciplinary approach based on the combination of Biochemistry/Biophysics and Chemistry with Computational Chemistry/Molecular Modelling.

The second is in the field of drug delivery and focuses on the topical and transdermal delivery of therapeutic agents by investigating the effect of molecular properties on both passive and active transport processes. In addition, innovative approaches to increase the range of therapeutic agents that can be delivered across the skin and so provide new treatment options are also investigated.

SPECIFIC RESEARCH FIELDS

The research in the field of pharmaceutical biochemistry/chemistry covers three main topics, namely Cancer, Neglected Diseases and Antibiotics Research.

- In Cancer Research we have two main objectives, namely the development of a thymidine kinase based safety and monitoring tool for stem cells therapy and the development of inhibitors of the tyrosine kinase domain of oncogenic fusion proteins involved in signalling pathways.
- Within the research area of Neglected Diseases we aim at elucidating and validating new potential drug targets against the major parasitic diseases of the Third World e.g. Malaria, Tripanosomiasis and Leishmaniosis as well as finding potential lead compounds against such diseases.
- The objective of our sinergia-based antibiotics project is to find compounds inhibiting bacterial virulence with novel mechanisms of action.

In addition, a new activity has recently been initiated to develop a molecular recognition-based approach for improving antibody formulation.

The research in the field of cutaneous drug delivery includes:

- Development of new formulations to increase local and systemic bioavailability of topical and transdermal therapeutics.
- Investigation of the influence of physicochemical properties on electrically-assisted transport across the skin.
- Synthesis and characterisation of prodrugs optimised for transdermal iontophoretic administration.
- Development of new techniques for the non-invasive delivery of biotechnology-derived therapeutics across the skin ("pharmaceutical biotechnology").
- Evaluation of dermal exposure, risk assessment and the development of predictive mathematical models.
- Investigation of new therapeutic applications.

OUTSTANDING PUBLICATIONS

Y. WESTERMAIER, M. VEURINK, T. RIIS-JOHANNESSEN, S. GUINCHARD, R. GURNY, L. SCAPOZZA, Identification of aggregation breakers for bevacizumab (Avastin®) self-association through similarity searching and interaction studies. *Eur J Pharm Biopharm.* 2013 Nov;85(3 Pt A):773-80.

H. M. ISMAIL, O. M. DORCHIES, R. PEROZZO, M. K. STROSOVA, L. SCAPOZZA, U. T. RUEGG. Inhibition of iPLA2 β and of stretch-activated channels by doxorubicin alters dystrophic muscle function. *Br. J. Pharmacol.*, 169: 1537-1550, 2013.

T. GRATIERI, Y. N. KALIA, Mathematical models to describe iontophoretic transport in vitro and in vivo and the effect of current application on the skin barrier. *Adv Drug Deliv Rev.* 2013; 65: 315-329.

ANGULO I, VADAS O, GARÇON F, BANHAM-HALL E, PLAGNOL V, LEAHY TR, BAXENDALE H, COULTER T, CURTIS J, WU C, BLAKE-PALMER K, PERISIC O, SMYTH D, MAES M, FIDDLER C, JUSS J, CILLIERS D, MARKELJ G, CHANDRA A, FARMER G, KIELKOWSKA A, CLARK J, KRACKER S, DEBRÉ M, PICARD C, PELLIER I, JABADO N, MORRIS JA, BARCENAS-MORALES G, FISCHER A, STEPHENS L, HAWKINS P, BARRETT JC, ABINUN M, CLATWORTHY M, DURANDY A, DOFFINGER R, CHILVERS

ER, CANT AJ, KUMARARATNE D, OKKENHAUG K, WILLIAMS RL, CONDLIFFE A, NEJENTSEV S., Phosphoinositide 3-kinase δ gene mutation predisposes to respiratory infection and airway damage. Science. 2013 Nov 15;342(6160):866-71

PARTICULAR PROJECTS INITIATED

Swiss Innovation Promotion Agency. CTI-grant no. 16065.1 PFLS-LS (as PI) Pre-clinical evaluation of Rimeporide, an inhibitor of the sodium/proton exchanger type 1, for Duchenne muscular dystrophy, a fatal genetic disorder of childhood onset (CHF 235'880.-)

SMA Europe grant for project entitled "Using RNA secondary structure as a therapeutic target for Spinal Muscular Atrophy: a new drug discovery approach" (€ 122 500) 2014-2016.

2014-2016 SNF Ambizione fellowship for Dr. Oscar Vadas (hosting PI) n° PZ00P3_148269. How kinases define specificity in lipid signaling.

COLLABORATIONS INITIATED WITH INDUSTRY

Creation with Prof. Gambacorti (Milano) and Prof. Goekjian (Lyon) of a start-up GALKEM s.r.l. (4.12.2013) aiming at developing ALK kinase inhibitors overcoming clinical crizotinib resistance. This is the result of the collaborative EU project "ProKinase" Address: GALKEM s.r.l., Via Italia 46, 20900 Monza – Italy

CONGRESSES

L. SCAPOZZA. Co-organizer of the Symposium entitled "Fortschritte in der Pharmakologie" (ca 300 participants) 31. January 2013, Bern (Switzerland)

1. PUBLICATIONS (DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 24)

1.1	Scientific publications (with impact factor)	32
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2. POSTERS PRESENTATIONS (DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 27)

2.1	Posters presentations	25
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3. ORAL PRESENTATIONS (DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 30)

3.1	Congresses & Symposia	19
3.2	Continuing education & open to the public lectures	3

THESIS PRESENTED

INTRA-MUROS THESIS

Pernilla HEUKING

Transgenic Enrichment Strategies for Cardiac Cells Derived from Mouse Embryonic Stem Cells Using HSV1-TK-Ganciclovir and CD-5-Fluorouracil.

Director : Prof. Leonardo SCAPOZZA

Co-director: Dr. Marisa JACONI

University of Geneva – thesis no 4542

Leonardo LAUCIELLO

From Compound to Target: Chemical Proteomics and in silico Screening for Target Identification in Plasmodium falciparum.

Director: Prof. Leonardo SCAPOZZA

Co-director: Dr. Remo PEROZZO

University of Geneva –thesis no 4531

Patricia GRAVEN

Genetic and chemical validation of Trypanosoma brucei adenosine kinase, the intracellular target of 4-[5-(4-phenoxyphenyl)-2H-pyrazol-3-yl]-morpholine.

Director: Prof. Leonardo SCAPOZZA

Co-supervisor: Dr. Remo PEROZZO

University of Geneva –thesis no 4595

Alessandra MONACO

Synthesis of Small Molecules via Click Chemistry for Positron Emission Tomography (PET) Imaging of Tumor Integrin $\alpha v \beta 3$ and/or $\alpha 5 \beta 1$ Expression.

Director: Prof. Leonardo SCAPOZZA

Co-director: Prof. Yann SEIMBILLE

University of Geneva –thesis no 4583

Hesham Mohamed Ismail HAMED

Role of oxidative stress and calcium regulation in Duchennemuscular dystrophy: Pharmacological investigations.

Director: Prof. honoraire Urs RUEGG

Co-director: Prof. Leonardo SCAPOZZA

University of Geneva –thesis no 4607

Marieke VEURINK

Intravitreal Formulations Targeting the Retinal Vasculature in Posterior Segment Eye Diseases.

Directors: Prof. R. GURNY, Prof. L. SCAPOZZA

Co-director: Prof. C. POURNARAS

University of Geneva – Thesis N° 4528

EXTRA-MUROS THESIS

Nicole LONGONI

A Positive Feedback Loop Between ESE1/ELF3 And NF- κ B Promotes Prostate Cancer Progression.

Director: Prof. Leonardo SCAPOZZA

Co-director: Dr. Giuseppina CARBONE

University of Geneva –thesis no 4655

Michela BOI

Genomic Profiling of Anaplastic Large Cell Lymphoma.

Director: Prof. Leonardo SCAPOZZA

Co-director: Dr. Francesco BERTONI

University of Geneva – 2013– thesis no 4586

Lara BRAMBILLA

Targeting STAT3 for Cancer Therapy: Definition of Mechanisms of Action of Direct STAT3 Inhibitors.

Director: Prof. Leonardo SCAPOZZA

Co-director: Dr. Carlo CATAPANO

University of Geneva –thesis no 4598

PUBLIC RESEARCH FUNDS (FNSR, NIH, CTI)



SWISS NATIONAL SCIENCE FOUNDATION

Identification and analysis of the putative AMP-activated protein kinase (AMPK) in blood-stream form of *Trypanosoma brucei* (SNF No. 31003A-140722)

Main applicant: R. PEROZZO

Co-applicant: L. SCAPOZZA

Total allocation: CHF 237'840.-

Allocation 2013: CHF 77'780.-

Duration: 3 years

Starting date: 1.9.2012

Identification and characterization of novel antibacterial compounds using protozoan hosts SNF No CRSI33_130016

Main applicant: L. SCAPOZZA

Co-applicants: T. SOLDATI, P. COSSON, H. HILBI, J. MCKINNEY

Total allocation: CHF 1'638'377.-

Allocation 2013: CHF 359'945.-

Duration: 3 years

Starting date: 1.9.2010



EU FUNDING

Scaffolds for alternative delivery (SADEL) (FP7-HEALTH-2011)

Main applicant: L. SCAPOZZA

Total allocation: Euro 643'544.-

Allocation 2013: Euro 209'956.24

Duration: 5 years

Starting date: 1.1.2012



CTI

CTI-14416.1 PFLS-LS: "Development of a new alcohol-free gel product for the controlled transdermal delivery of testosterone to treat sexual dysfunction "

Main applicant: Y. KALIA

Total allocation: CHF 206'470.-

Allocation 2013: CHF 103'235.-

Duration: 2 years

Starting date: 1.10.2012

CTI-14416.1 FERRING : "Development of a new alcohol-free gel product for the controlled transdermal delivery of testosterone to treat sexual dysfunction"

Main applicant: Y. KALIA

Total allocation: CHF 60'105.- (Industrial partner contribution to CTI no. 14416.1)

Allocation 2013: CHF 30'052.-

Duration: 2 years

Starting date: 1.10.2012

CTI-14334.1 PFLS-LS : "Peptides based on animal venom constituents as new active ingredients for cosmetic products"

Main applicant: M. CUENDET

Co-applicant: Y. KALIA

Total allocation: CHF 194'400.-

Allocation 2013: CHF 97'200.-

Duration: 2 years

Starting date: 1.10.2012

CTI-14334.1 ACTIVEN: Peptides based on animal venom constituents as new active ingredients for cosmetic products"

Main applicant: M. CUENDET

Co-applicant: Y. KALIA

Total allocation: CHF 27'000.- (Industrial partner contribution to CTI no. 14334.1)

Allocation 2013: CHF 13'500.-

Duration: 2 years

Starting date: 1.10.2012

CTI-13933.2 PFLS-LS: "Development of novel hydrocolloid patches for use with P.L.E.A.S.E.® fractional laser ablation system for the intraepidermal "needle-less" delivery of biotechnology therapeutics"

Main applicant: Y. KALIA

Total allocation: CHF 431'148.-

Allocation 2013: CHF 258'689.-

Duration: 2 years

Starting date: 1.9.2013

CTI-13933.2 NGX: "Development of novel hydrocolloid patches for use with P.L.E.A.S.E.® fractional laser ablation system for the intraepidermal "needle-less" delivery of biotechnology therapeutics"

Main applicant: Y. KALIA

Total allocation: CHF 141'200.- (Industrial partner contribution to CTI no. 13933.2)

Allocation 2013: CHF 70'600.-

Duration: 2 years

Starting date: 1.9.2013

CTI-14931.1 PFLS-LS: "Development of a physiological model for drug permeation in the gastrointestinal tract using porcine intestinal mucosa: A new efficient method for drug screening and identification of lead candidates"

Main applicant: Y. KALIA

Total allocation: CHF 200'640.-

Allocation 2013: CHF 100'320.-

Duration: 2 years

Starting date: 1.7.2013

CTI-14931.1 DEBIO: "Development of a physiological model for drug permeation in the gastrointestinal tract using porcine intestinal mucosa: A new efficient method for drug screening and identification of lead candidates"

Main applicant: Y. KALIA

Total allocation: CHF 40'000.- (Industrial partner contribution to CTI no. 14931.1)

Allocation 2013: CHF 40'000.-

Duration: 2 years

Starting date: 1.7.2013



MISC

Société Académique de Genève 2013

CHF 7 500 – Equipment grant

(Principal Investigator)

RESEARCH FUNDS (INDUSTRY AND ASSIMILATED)

Code	Service Development Research	Amount 2013 (CHF)	end
IND-1	R&D	9'800	
IND-2	R&D	7'800	
IND-3	R&D	20'476	
IND-4	R&D	62'827	
IND-5	R&D	20'105	
IND-6	R&D	22'357	
IND-7	R&D	13'209	
IND-8a	R&D	6'852	
IND-8b	R&D	14'873	

PATENTS

S. KADERLI, O. JORDAN, R. GURNY. Hybrid hydrogels
IP: US Pat Appl. 61693803

S.KADERLI, R.GURNY, M. MÖLLER, L. SCAPOZZA. Hyaluronic acid - antioxidant conjugates and their uses
IP: Preliminary US Pat. Appl. 61739047 and PCT Pat. Appl. 20131218

PHARMACEUTICAL TECHNOLOGIES



FULL PROFESSOR

Eric ALLEMANN

SENIOR LECTURER

Florence DELIE-SALMON

Norbert LANGE

LECTURER

Pascal FURRER

EXCELLENCE FELLOWSHIP

Imène ATEB

Prakash SAHU

POSTDOCTORAL SCHOLAR

Andrej BABIC

Cédric THAUVIN

Maria Fernanda ZULUAGA
ESTRADA

Karine MONDON

RESEARCH AND TEACHING ASSISTANT

Jordan BOUILLLOUX

Pierre MAUDENS

Nawal SEKKAT

Vineetha CHELLAKUDAM

Ioanna MYLONAKI

Nathalie STRANSKY-HEILKRON

Christian FENCZ (until 31.01.13)

Bénédicte PETIT

Céline XAYAPHOUMMINE

Viktorija HERCEG

Julie PRADAL

ADMINISTRATIVE AND TECHNICAL STAFF

Nathalie BOULENS

Carole DUPRAZ

Florence VON OW

Brigitte DELAVY

Marco PERDIGAO

GENERAL DESCRIPTION OF THE UNIT

Research at the unit of Pharmaceutical Technology is focused on the delivery of therapeutic agents and contrast agents for medical imaging at the right site on the right time. Eric Allémann has activities in nanomedicine, energy-activated drug delivery systems, targeted-contrast agents for medical imaging. Florence Delie leads research in nanomedicine and vectorization. Norbert Lange leads research in photodetection, photodynamic therapy and enzymatically activated prodrugs. In 2013, various collaborations were continued with the University Hospital of Geneva and the EPFL. Collaboration projects with established companies were continued and new ones initiated.

SPECIFIC RESEARCH FIELDS

- The specific fields of research are:
- Development of drug formulations for intra-articular delivery
- Development of treatment modality for stroke by sonothrombolysis
- Enzymatically-activated prodrugs and supramolecular constructs
- Development of new contrast agents for MRI
- Polymeric photosensitizers projects
- Imaging of β -cells and amyloids

OUTSTANDING PUBLICATIONS

M.F. ZULUAGA, N. SEKKAT, D. GABRIEL, H. VAN DEN BERGH, N. LANGE. Selective photodetection and photodynamic therapy for prostate cancer through targeting of proteolytic activity, *Mol Cancer Ther*, 12, 306-313 (2013)

COLLABORATIONS INITIATED WITH INDUSTRY

Eric ALLEMANN initiated a collaboration with Servier (France) on the development of different formulations of microparticles for osteoarthritis treatment.

1. PUBLICATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 32)

1.1	Scientific publications (with impact factor)	6
1.2	Scientific publications (without impact factor)	3

2. POSTERS PRESENTATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 33)

2.1	Posters presentations	9
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3. ORAL PRESENTATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013– PAGE 34)

3.1	Congresses & Symposia	8
3.2	Continuing education & open to the public lectures	4

PUBLIC RESEARCH FUNDS (FNSR, NIH, CTI)



SWISS NATIONAL SCIENCE FOUNDATION

Peptidic scaffolds for targeted delivery of photosensitizer prodrugs in photodynamic therapy - (205320-138309/1)

Main applicant : N. LANGE

Allocation 2013 : CHF 63'210.-

Duration : 3 years

Starting date : 2011

Non-invasive in vivo imaging of pancreatic beta cells: developing and testing innovative ligands and MRI contrast agents - (CR32I3-129987)

Main applicant : N. LANGE

Allocation 2013 : CHF131'326.20

Duration : 4 years

Starting date : 2010

Targeted photoablation of breast cancer through urokinase-sensitizer prodrugs - (CR32I3-147018)

Main applicant : Prof. H. ACHA-ORBEA

Co-applicant : N. LANGE

Allocation 2013 : CHF 71'050

Duration : 3 years

Starting date : 2013

Topical delivery of photosensitizers to atherosclerotic plaques and intra-arterial photodynamic therapy: a pre-clinical study (CR32I3-150271)

Main applicant : Prof. S. COOK

Co-applicant : N. LANGE

Allocation 2013 : CHF 66'240.-

Duration : 3 years

Starting date : 2013

Amyloid peptide grafted to Gd-nanoparticle for amyloidosis diagnosis

Main applicant : Dr. X. MONTET

Co-applicant : E. ALLEMANN

Allocation 2013 : CHF102'376

Duration : 3 years

Starting date : 2012

RESEARCH FUNDS (INDUSTRY AND ASSIMILATED)

Code	Service Development Research	Amount end 2013 (CHF)
Divers Intérêts	Service	42'375
Tech & Gal	Service	23'752
Meyer	Service	5'826

PHARMACOCHEMISTRY



FULL PROFESSOR

Pierre-Alain CARRUPT

LECTURER

Davy GUILLARME

SENIOR RESEARCH ASSOCIATE

Julieta GRADINARU

Sophie MARTEL

EXCELLENCE FELLOWSHIP

Alessandra NURISSO

SENIOR RESEARCH AND TEACHING ASSISTANT

Claudia SIMOES AVELLO

POSTDOCTORAL SCHOLAR

Carolina DOS SANTOS PASSOS

Karine VUIGNIER

RESEARCH AND TEACHING ASSISTANT

Alban BUJARD

Nils OBERHAUSER

Lionel SACCONNAY

Philippe EUGSTER

Charlotte PETIT

Karine VUIGNIER

Céline LE BOURDONNEC
PASSELEU

Stéphanie ROMAND

Vincent ZWICK

Nathalie DESCHAMPS

Lucie RYCKEWAERT

CO-SUPERVISION (CO-TUTELLE)

Cecilia FORTUGNO

Florine LECERF-SCHMIDT

ADMINISTRATIVE AND TECHNICAL STAFF

Virginie BEYELER (technical
apprentice)

Fabrice GILLERAT

Sylvia PASSAQUAY RION

Christophe FRANCEY

Irena NIKOLOVA

Emilie REGINATO

GENERAL DESCRIPTION OF THE UNIT

The team of pharmacochimistry developed original theoretical and experimental methods able to quantify intermolecular interactions of a drug with its biological partners such as therapeutic targets or biological membranes. This research intended to accelerate the discovery of chemical compounds of therapeutic interest and to optimize the effectiveness, the selectivity and the safety of the selected drug candidates.

They were centered on the development and validation of in silico and in vitro HTS filters to characterize physicochemical properties, passive membrane permeation and cellular efflux of new chemical entities.

Virtual and in vitro HTS screening approaches were optimized to study the interactions with some specific bio-targets involved in neurodegenerative diseases like Alzheimer and Parkinson's diseases were measured in order to identify multifunctional drug candidates.

SPECIFIC RESEARCH FIELDS

Biochemical screening: enzyme Inhibition; antioxidant profiling of NCEs; antiapoptotic properties of NCEs; enzymatic hydrolysis of drugs and prodrugs; inhibition of hERG channel; inhibition of HDAC and SIRT proteins.

Molecular modelling: Intermolecular interaction fields; indirect molecular modelling; direct molecular modelling; quantum chemistry.

Physicochemical screening: Physicochemical profiling; antioxidant properties.

Permeation screening: passive permeation profiling using PAMPA-membranes to mimic the skin, the intestinal barrier and the blood-brain barrier. 3D-QSAR models associated with proteins responsible of cellular efflux in membrane permeation or multi-drug resistance.

OUTSTANDING PUBLICATIONS

Cl. SIMOES-PIRES, V. ZWICK, A. NURISSE, E. SCHENKER, P.-A. CARRUPT, M. CUENDET, "HDAC6 as a target for neurodegenerative diseases: what makes it different from the other HDACs?", Mol. Neurodegeneration, 2013, 8:7.

L. SACCONNAY, D. SMIRLIS, E.F. QUEIROZ, J.-L. WOLFENDER, M.B. SOARES, P.-A. CARRUPT, A. NURISSE, "Structural insights of SIR2rp3 proteins as promising biotargets to fight against Chagas disease and leishmaniasis". Coverart du journal J. Mol. Biosyst.

C. PASSELEU-LE BOURDONNEC, P.-A. CARRUPT, J.M. SCHERRMANN, S. MARTEL. Methodologies to assess drug permeation through the blood-brain barrier for pharmaceutical research. Pharm.Res., 2013, 30: 2729-2756

PARTICULAR PROJECTS INITIATED

Prof. AHCÈNE BOUMENDJEL, Prof. Attilio DI PIETRO: "Identification of ABCg2 binding sites by ligand-based approaches (Bourse Professeur invité, Université Joseph Fourier, Grenoble).

Prof. AHCÈNE BOUMENDJEL: "Pharmacomodulation of chalcones as selective HDAC6 inhibitors" (Université de Grenoble)

Dr. Marco CATTO: "Hydroxamic acid derivatives as selective HDAC6 inhibitors" (Université de Bari).

1. PUBLICATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 36)

1.1	Scientific publications (with impact factor)	16
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2. POSTERS PRESENTATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 37)

2.1	Posters presentations	13
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3. ORAL PRESENTATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 38)

3.1	Congresses & Symposia	6
3.2	Continuing education & open to the public lectures	3
3.3	Radio/Television Intervention	1

THESIS PRESENTED

INTRA-MUROS THESIS

Céline LE BOURDONNEC PASSELEU

Prediction of Passive Blood-Brain Barrier. Permeability with PAMPA: from Small Molecules to Complex Formulations.

Director : Prof. Pierre-Alain CARRUPT

University of Geneva – Thesis N° 4573

Philippe EUGSTER

Strategies for high resolution profiling of natural extracts: UHPLC-MS and physicochemical approaches for early metabolite identification.

Director : Prof. Pierre-Alain CARRUPT

Co-director: Prof. Jean-Luc WOLFENDER

University of Geneva – Thesis N° 4589

PUBLIC RESEARCH FUNDS (FNSR, NIH, CTI)

CTI

Establishment of a predictive model for chemical permeation across the human airway epithelium in vitro using MUcilAir™ (No 14000.1 PFLS-LS)

Main applicant: EPITHELIX

Co-applicant: Pierre-Alain CARRUPT

Total Allocation: CHF 242'027.-

Allocation 2013: CHF 193'622.-

Duration : 18 months - Starting Date: 2012

RESEARCH FUNDS (INDUSTRY AND ASSIMILATED)

Code	Service Development Research	Amount (CHF)
Indu-1		13'459.-
Indu-2		1'194.-
Indu-3		4'000.-
Indu-4		11'840.-
CTI		193'622.-
TOTAL		224'115

AWARDS & DISTINCTIONS

Alessandra NURISSO, Bourse d'Excellence, "The role of the jiggling and wiggling of atoms in pharmaceutical chemistry: a focus on aging-related disorders".

Lionel SACCONNAY, Mélissa ANGLEVIEL, Marco Giuseppe RANDAZZO, M.M. FERREIRA QUEIROZ, Emerson FERREIRA QUEIROZ, Jean-Luc WOLFENDER, Pierre-Alain CARRUPT, Alessandra NURISSO, "Antitrypanosomal Natural Compounds and Epigenetics: an In Silico Target-Fishing Approach involving Sirtuins". Prix meilleur poster au SwissPharmaDay.

Lionel SACCONNAY, Despina. SMIRLIS, Emerson F. QUEIROZ, Jean-Luc WOLFENDER, M.B. SOARES, Pierre-Alain CARRUPT, Alessandra NURISSO, "Structural insights of SIR2rp3 proteins as promising biotargets to fight against Chagas disease and leishmaniasis". Coverart du journal J. Mol. Biosyst.

Claudia SIMOES-PIRES, Vincent ZWICK, Alessandra NURISSO, Esther SCHENKER, Pierre-Alain CARRUPT, Muriel CUENDET, "HDAC6 as a target for neurodegenerative diseases: what makes it different from the other HDACs?", Mol. Neurodegeneration, 2013, 8:7. Highly accessed paper in 2013.

PHARMACOGNOSY



ASSOCIATE PROFESSOR

Muriel CUENDET

SENIOR LECTURER

Philippe CHRISTEN

SENIOR RESEARCH AND TEACHING ASSISTANT

Claudia SIMOES AVELLO

EXCELLENCE FELLOWSHIP

Eike REICH, Camag

Moritz RUBNER, Bionorica

POSTDOCTORAL SCHOLAR

Sarah BERNDT

Amina HAOUALA

Andreas NIEVERGELT-MEIER

Sylvian CRETTON

RESEARCH AND TEACHING ASSISTANT

Olivier CICLET

Caroline MATHON

Chantal WALTER

Mélanie HOERLE

Aymeric MONTEILLIER

Vincent ZWICK

Mark ISSA

ADMINISTRATIVE AND TECHNICAL STAFF

Frédéric BORLAT

Colette SAUTY

Natalie SCHREGLE

Martine CABO

GENERAL DESCRIPTION OF THE UNIT

The team of pharmacognosy is focused on the discovery of bioactive natural products. Compounds with cancer chemopreventive and antiparasitic activity are of particular interest. In these areas, the development of new and better drugs remains a principal need. As established by ample precedent, nature provides broad chemical diversity. Prevention is well developed in the field of cardiovascular disease, but similar drugs that could prevent cancer on this scale are still a long way off. A panel of in vitro bioassays indicative of inhibiting major stages of carcinogenesis (initiation, promotion and progression) is used. Mechanistic studies are then pursued with the most promising compounds. Also, most antiparasitic drugs available on the market (when available) have a limited efficacy and strong

side effects. Some plant extracts having shown good in vitro and in vivo activity are currently being investigated to uncover the compounds responsible for the activity and their mechanism of action. The absorption and the metabolism of pure compounds and phytopreparations are also being evaluated in vitro and in vivo.

Another area of interest is the appearance of botanical preparations on the market with medicinal claims which escape to registration because they are voluntarily sold as conventional food derived products. Nowadays, such herbal remedies are sold in health food stores, supermarkets or over the internet without seriously questioning their potential activity, side effects or toxicity. Furthermore, there is a misconception and general belief that these plant derived preparations are natural and therefore are perceived as "safe", regardless of potential dangers. Thus there is an urgent need to assess the safety of botanicals and establish a compendium of botanical ingredients which may be of health concerns when used in food derived products. To support food safety authorities, adequate screening approaches and analytical methods are being developed to provide chemical evidence of the presence of an undesired botanical or toxicant. The authenticity of the ingredients is also checked.

SPECIFIC RESEARCH FIELDS

- Cancer chemopreventive screening of natural products: quinone reductase induction, epigenetic modulation, anti-inflammatory and anti-angiogenic activity
- Antiparasitic activity
- Activity-guided fractionation
- Absorption and metabolism studies of phytopreparations and pure natural products using Caco-2 cells and in vivo models
- In depth studies to uncover the mechanism of action of pure natural products and phytopreparations
- Development of a LC-MS/MS method able to screen simultaneously for 62 species whose presence in food might be problematic

OUTSTANDING PUBLICATIONS

C. MATHON, M. DURET, M. KOHLER, P. EDDER, S. BIERI, Ph. CHRISTEN. Multi-targeted screening of botanicals in food supplements by liquid chromatography with tandem mass spectrometry. *Food Chemistry* (2013), 138 (1), 709-717.

C. SIMOES-PIRES, V. ZWICK, A. NURISSO, E. SCHENKER, P.-A. CARRUPT, M. CUENDET. HDAC6 as a target for neurodegenerative diseases: what makes it different from the other HDACs? *Molecular Neurodegeneration* (2013), 8, 7.

PARTICULAR PROJECTS INITIATED

Interaction and collaboration with various participants of COST Actions TD0905 (Epigenetics: Bench to Bedside) and CM1106 (Chemical Approaches to Targeting Drug Resistance in Cancer Stem Cells)

Project with Niger: Contribution to the knowledge of traditional medicine from Niger.

1. PUBLICATIONS (DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 41)

1.1	Scientific publications (with impact factor)	11
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2. POSTERS PRESENTATIONS (DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 42)

2.1	Posters presentations	14
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3. ORAL PRESENTATIONS (DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 43)

3.1	Congresses & Symposia	5
3.2	Continuing education & open to the public lectures	1

PUBLIC RESEARCH FUNDS (FNSR, NIH, CTI)



SWISS NATIONAL SCIENCE FOUNDATION

Functional genome analysis in a genetically intractable system: an interdisciplinary proof-of-concept study (CRSII3_141837)

Main applicant: P. Viollier, HUG. Total Allocation for the Synergia project: CHF 1'200'000.--.

Co-applicant: M. CUENDET

Total allocation: CHF 335'016.--

Allocation 2013: CHF 132'868.00

Duration: 3 years

Starting date: 2012.

Evaluation of the health of Brazilian fruits and vegetables for the development of safe and valuable functional foods. Brazilian Swiss Joint Research Program - BSJRP.

Applicants: J.-L. WOLFENDER, M. CUENDET, E. FERREIRA-QUEIROZ

Total allocation: CHF 112'000.--

Allocation 2013: CHF 53'000.00

Duration: 2 years with extension accepted to 2015

Starting date: 2012



CTI

Peptides based on animal venom constituents as new active ingredients for cosmetic products

CTI-Projet 14334.1 PFLS-LS

Main applicant: M. CUENDET - Co-applicant: Y. KALIA

Total allocation: CHF 194'400.00

Allocation 2013: CHF 65'984.70

Duration: 2 years

Peptides based on animal venom constituents as new active ingredients for cosmetic products

CTI-Projet 14334.1 ACTIVEN

Main applicant: M. CUENDET - Co-applicant: Y. KALIA

Total allocation: CHF 27'000.00

Allocation 2013: CHF 13'000.00

Duration: 2 years

Starting date: 2012



EU FUNDING

Integrated technologies for the discovery and development of cosmeceutical agents from plant biodiversity
NATPROTEC

IAPP-Marie Curie

Main applicant: M. CUENDET - Co-applicant: J.-L. WOLFENDER

Total allocation: CHF 263'225.23

Allocation 2013: CHF 128'923.05

Duration: 4 years

Starting date: 2012



MMV

Argemone Mexicana

MMV 11/0003– Medicines for Malaria Venture

Applicants: Ph. CHRISTEN and M. CUENDET

Total allocation: CHF 289'505.32

Allocation 2013: CHF 59'802.86

Duration: 3 years

Starting date: 2011



PROJET NIGER

Contribution à la sauvegarde des savoirs traditionnels sur les plantes médicinales nigériennes: analyse et validation des données ethnobotaniques.

Applicant: Ph. CHRISTEN

Allocation 2013: CHF 90'000.00

Duration: 1 year

Starting date: 2014

RESEARCH FUNDS (INDUSTRY AND ASSIMILATED)

Code	Service Development Research	Amount (CHF)	end 2013
Fonds Intérêts (M. Cuendet)	Research & Service	9'229.11	
Fonds Industrie (J.-L. Wolfender, M. Cuendet)	Research & Service	376'986.10	

PHYTOCHEMISTRY AND BIOACTIVE NATURAL PRODUCTS



FULL PROFESSOR

Jean-Luc WOLFENDER

SENIOR LECTURER

Emerson FERREIRA-QUEIROZ

LECTURER

Elisabeth RIVARA-MINTEN

EXCELLENCE FELLOWSHIP

Marcos FERREIRA-QUEIROZ

Rodrigo SANT'ANA CABRAL

Maria-Luiza ZERAIK

Helena MANNOCHIO-RUSSO

Shuqi WANG

Jiaozheng ZHANG

Mariam MNATSAKANYAN

POSTDOCTORAL SCHOLAR

Pierre-Marie ALLARD

Lise BREANT

Guillaume MARTI

Samuel BERTRAND

RESEARCH AND TEACHING ASSISTANT

Adlin AFZAN

Soura CHALLAL

Quentin FAVRE-GODAL

Antonio AZZOLLINI

Adeline CHAUVIN

Daniel MAAG

Nadine BOHNI

Philippe EUGSTER

Véra OLDRATI

ADMINISTRATIVE AND TECHNICAL STAFF

Laurence MARCOURT

Natalie SCHREGLE

GENERAL DESCRIPTION OF THE UNIT

The main research activities of the unit are related to the development of methodologies for the rapid isolation identification and bioactivity characterisation of natural products (NPs) at the microgram scale. State-of-the-art LC-MS and LC-MS/MS as well as microNMR techniques are used for dereplication purposes or de novo identification of NPs in crude extracts from different origins (plants, fungi, and microorganisms). Microfractionation methods in 96 well plates allow bioassays to be performed on LC peak in crude extracts, quantitative estimation of the well content and further structural determination by CapNMR. Rational large scale isolation strategies are developed for the rapid

obtention of pure NPs in the mg scale for further testing bioactivities and mode of action. The range of biological activities studied in house or in collaboration covers mainly antifungal, antiprotozoal, antiinflammatory and antiepileptic activities. The interest of the group is also focused on plant metabolomics, in this respect the focus is on the investigation of bioactive NPs dynamically induced in various stress situations (fungi confrontation, biotic and abiotic stresses, metabolite elicitation...). With the idea to generate original sources of bioactive NPs other strategies including biotransformation or chemical derivatisation of crude extracts from common sources are also investigated. Finally the analytical and metabolomic methods are also used for studying the metabolism of crude extracts in view of a better understanding of the mode of action (synergy, prodrugs) and the potential toxicity of phytopharmaceuticals or nutraceuticals.

SPECIFIC RESEARCH FIELDS

- Search for new lead compounds from natural sources
- On-line identification of natural products by LC-UV-NMR-MS (dereplication)
- Rapid microfractionation of crude extracts for chemical and bioactivity profiling
- Plant metabolomics
- Search for original bioactive stress-induced natural products of various origin
- Study of antifungal compounds from pathogen fungi in co-culture
- Qualitative quantitative analysis of phytotherapeutics
- Study of the metabolism of phytopreparation by metabolomics in relation with their mode of action
- Investigation of natural products involved in diseases associated with problems of ageing
- Search for new lead compounds for use against tropical parasitic diseases

OUTSTANDING PUBLICATIONS

S. BERTRAND, O. SCHUMPP, N. BOHNI, A. BUJARD, A. AZZOLLINI, M. MONOD, K. GINDRO, J.-L. WOLFENDER Detection of metabolite induction in fungal co-cultures on solid media by high-throughput differential ultra-high pressure liquid chromatography–time-of-flight mass spectrometry fingerprinting. *J Chromatogr A*, 1292, 219-228 (2013)

S. BERTRAND, O. SCHUMPP, N. BOHNI, M. MONOD, K. GINDRO, J.-L. WOLFENDER De Novo Production of Metabolites by Fungal Co-culture of *Trichophyton rubrum* and *Bionectria ochroleuca*. *J. Nat. Prod.*, 76, 1157-1165 (2013)

A. BOUMENDJEL, G. SOTOING TAIWE, E. NGO BUM, T. CHABROL, C. BENEY, V. SINNIGER, R. HAUDECOEUR, L. MARCOURT, S. CHALLAL, E. FERREIRA QUEIROZ, F. SOUARD, M. LE BORGNE, T. LOMBERGET, A. DEPAULIS, C. LAVAUD, R. ROBINS, J.-L. WOLFENDER, B. BONAZ, M. DE WAARD Occurrence of the Synthetic Analgesic Tramadol in an African Medicinal Plant. *Angew. Chem. Int. Ed.*, 52, 11780-11784 (2013)

N. BOHNI, A. M. MALDONADO, D. SIVERIO-MOTA, L. MARCOURT, S. MUNCK, A. KAMUHABWA, C. ESGUERRA, P. DE WITTE, A. CRAWFORD, J.-L. WOLFENDER Integration of Microfractionation, qNMR and Zebrafish Screening for the In Vivo Bioassay-Guided Isolation and Quantitative Bioactivity Analysis of Natural Products. *PLOS One*, 8, e64006. doi:64010.61371/journal.pone.0064006 (2013)

A. CHAUVIN, D. CALDELARI, J. L. WOLFENDER, E. E. FARMER Four 13-lipoxygenases contribute to rapid jasmonate synthesis in wounded *Arabidopsis thaliana* leaves: a role for lipoxygenase 6 in responses to long-distance wound signals. *New Phytol.*, 197, 566-575 (2013)

PARTICULAR PROJECTS INITIATED

2013-2015 (24 m) WOLFENDER J.-L. Farmer T. Rudaz S. Swiss National Science Foundation, Division II: "Targeted and non-targeted metabolomic study of the wound response in *Arabidopsis*: investigation of the role of 13-lipoxygenases in long distance signalling" N° 200020_146200 - 229'857 CHF

2013-2015 (36m) WOLFENDER J.-L. Gindro K. Ferreira Queiroz E. Sanglard. D. Swiss National Science Foundation, interdisciplinary program: Identification of novel modes of action of plant natural products targeting fungal human and phytopathogens CR2313_143733 / 1500'000 CHF

1. PUBLICATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 45)

1.1	Scientific publications (with impact factor)	20
1.2	Scientific publications (without impact factor)	1
1.3	Books or books chapters	4

2. POSTERS PRESENTATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 47)

2.1	Posters presentations	23
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3. ORAL PRESENTATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 49)

3.1	Congresses & Symposia	31
3.2	Continuing education & open to the public lectures	6

THESIS PRESENTED

INTRA-MUROS THESIS

Philippe EUGSTER

Strategies for High Resolution Profiling of Natural Extracts: UHPLC-MS and Physicochemical Approaches for early Metabolite Identification.

Director : Prof. Jean-Luc WOLFENDER

Co-director : Prof. Pierre-Alain CARRUPT

University of Geneva - thesis no 4589

PUBLIC RESEARCH FUNDS (FNSR, NIH, CTI)



SWISS NATIONAL SCIENCE FOUNDATION

Identification of novel modes of action of plant natural products targeting fungal human and phytopathogens (CR2313_143733)

Main applicant: J.-L. WOLFENDER

Co-applicants : D. SANGIARD, CHUV, K. GINDRO, ACW-Changins

Total allocation: CHF 500'000.00

Allocation 2013: CHF 155'000.00

Duration: 2 years

Starting date: 2013

Targeted and non-targeted metabolomic study of the wound response in Arabidopsis: investigation of the role of 13 lipoxygenases in long distance signalling" (200020_146200)

Main applicant: J.-L. WOLFENDER

Co-applicant: S. RUDAZ

Total allocation: CHF 229'857.00

Allocation 2013: CHF 164'557.00

Duration: 2 years

Starting date: 2013



SINO SWISS SCIENCE AND TECHNOLOGY COOPERATION - SSSTC

Collaboration between the School of Pharmaceutical Sciences of the University of Shandong and Geneva
Sino Swiss Science and Technology Cooperation Program (SSSTC) IP18-092011

Main applicant: J.-L. WOLFENDER

Total allocation: CHF 31'100.00

Allocation 2013: CHF 10'000.00

Duration: 3 years

Starting date: 2012



SECRETARIAT D'ETAT A L'EDUCATION ET A LA RECHERCHE (SER)

Evaluation of the Health Benefits of Brazilian Fruits and Vegetables for the Development of Safe and Valuable Functional Food

Brazilian Swiss Joint Research Program – BSJRP

Applicants: J.L. WOLFENDER, M. CUENDET, E. FERREIRA-QUEIROZ

Total funding: CHF 173'400.00

Total allocation: CHF 112'000.00

Allocation 2013: CHF 53'000.00

Duration: 2 years

Starting date: 2012

RESEARCH FUNDS (INDUSTRY AND ASSIMILATED)

Code	Service Development Research	Amount (CHF)	end 2013
Fonds Industrie (J.-L. Wolfender, M. Cuendet)	Research & Service	376'986.10	
Fonds Industrie (J.-L. Wolfender, M. Cuendet, Ph. Christen)	Research & Service	67'111.37	

PATENTS

C. QUINTINO DA ROCHA, W. VILEGAS, E. F. QUEIROZ, J.-L. WOLFENDER, L. MARCOURT No BR 10 2013 031925 2: Método de obtenção de compostos a partir de extratos da Arrabidaea brachypoda, compostos e composições farmacêuticas compreendendo os mesmos,

C. QUINTINO DA ROCHA, W. VILEGAS, E. F. QUEIROZ, J.-L. WOLFENDER, L. MARCOURT, A. REGINA MONTEIRO SOUZA BRITO, F. MEIRA DE FARIA No BR 10 2013 031926 0: Uso de compostos obtidos a partir de extratos da Arrabidaea brachypoda como antiulcerogênico,

C. QUINTINO DA ROCHA, W. VILEGAS, E. F. QUEIROZ, J.-L. WOLFENDER, M. BOTELHO PERREIRA SOARES, L. MARCOURT No BR 10 2013 031927 9: Uso de compostos obtidos a partir de extratos da Arrabidaea brachypoda como antiparasitário,

CLINICAL PHARMACY



PROFESSOR ASSOCIATE

Chantal CSAJKA

SENIOR RESEARCH ASSOCIATE

Monia GUIDI

Alice PANCHAUD

RESEARCH AND TEACHING ASSISTANT

Elyes DAHMANE

Verena GOTTA (until 8.05.2013)

Etienne WEISSKOPF

ADMINISTRATIVE AND TECHNICAL STAFF

Dominique HUNZIKER

GENERAL DESCRIPTION OF THE UNIT

The activities of the group are divided into two main aspects that comprises (i) drug individualization through population pharmacokinetic, pharmacodynamic and pharmacogenetic modelling that allows characterisation of the dose-concentration-response relationships of drugs and (ii) drug optimization in vulnerable populations, such as paediatrics, geriatrics or critically ill patients. The population approach is a very suitable method to capture the combined effects of multiple demographic, environmental, or genetic factors that can influence drug levels and potentially modulate drug response or toxicity. The group's interests are also focused on dose adjustment strategies for drugs followed by therapeutic drug monitoring.

Our group is working in close collaboration with several research groups and clinical units for specific research projects and is participating to local, national and international clinical studies. Several important projects in the area of anti-infective, oncologic and psychotropic treatments are on-going.

The group is also mandated by industrial companies to conduct population pharmacokinetic studies for drugs during their clinical development phases. Our expertise allows for drug analyses and simulations, which can provide a more global understanding of the drug kinetics along with intersubject variability and covariate effect, which is of major interest for the clinical development of new compounds.

The group is also involved into the pregraduate teaching of clinical pharmacy at the Master level and is supervising master theses and doctoral theses in the field of clinical pharmacy.

SPECIFIC RESEARCH FIELDS

Population Pharmacokinetic analyses

Anticancer agents: several projects conducted within the frame of two PhD theses have been completed in 2013. These studies provided insight into the concentration-effect and toxicity relationship for imatinib. A first randomized study evaluating the benefit of randomized therapeutic drug monitoring for this drug has been recently finalized. In addition, several papers on the pharmacokinetics and metabolite profile of tamoxifen in relation to genetics have been published or are in preparation.

Antiinfective drugs: Two studies focused on vitamin D in HIV-infected patients and darunavir population pharmacokinetic analysis have been finalized. Several analyses on antimalarial drugs have been conducted within the frame of the DnDi (Drug for Neglected Disease Initiative) project (artemeter and lumefantrine in pregnant and non-pregnant women; mefloquine, piperazine and artemeter/lumefantrine in Cambodian and Tanzania malaria patients; artesunate-mefloquine in african children). In addition, a study on meropenem pharmacokinetics in intensive care patients with relation to efficacy outcome is ongoing.

Psychoactive agents: Several projects on the pharmacokinetic and pharmacogenetic analyses of psychoactive drugs have been performed in collaboration with the pharmacogenetics and psychopharmacology unit of the CHUV (Prof CB Eap). The collaborative multicentric study evaluating the exposure of antidepressant drugs through breastmilk is still ongoing.

Pharmacoepidemiology:

A research field for drug optimization during pregnancy and lactation has been set up in collaboration with the Maternity Hospital at the CHUV. It comprises several studies involving drug optimization in this population (characterization of the pharmacokinetic-pharmacodynamic relationship of nifedipine used as a tocolytic during pregnancy, algorithm for treatment reconciliation). A cohort safety study on metformin in pregnancy is collaboration with ENTIS (European Network of Teratogen Information Services) and the Motherisk Program of Toronto is being conducted by our group. Finally, a web-designed study on patterns and determinants of drug use in Swiss pregnant women has been initiated within the frame of an international collaborative project.

PARTICULAR PROJECTS INITIATED

Participation of the setting up of a Maternal and Offspring Biobank at the CHUV maternity enabling the prospective collection of drug concentration data in pregnant and lactating women.

Initiation of a comprehensive research program evaluating targeted anticancer drugs used in solid tumors, in collaboration with the Laboratory of clinical Pharmacology and the Department of Oncology at the CHUV.

COLLABORATIONS INITIATED WITH INDUSTRY

- DebioPharm International
- Merck Serono S.A

1. PUBLICATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 53)

1.1	Scientific publications (with impact factor)	14
1.2	Scientific publications (without impact factor)	5

2. POSTERS PRESENTATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 55)

2.1	Posters presentations	8
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3. ORAL PRESENTATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 55)

3.1	Oral presentations Congresses & Symposia	2
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THESIS PRESENTED

INTRA-MUROS THESIS

Verena GOTTA

Clinical usefulness of therapeutic drug monitoring intervention for imatinib in chronic myeloid leukemia patients. School of Pharmaceutical Sciences,

Director : Chantal CSAJKA

University of Geneva and Lausanne – thesis N° 4561

E. DAHMANE

Evaluation of the impact of genetic polymorphisms in the pharmacokinetic profile of tamoxifen and of its metabolites in breast cancer patients. School of Pharmaceutical Sciences,
directors : Chantal CSAJKA (UniGe), Laurent DECOSTERD (Unil)
University of Geneva and University of Lausanne – Thesis N° 4617

PUBLIC RESEARCH FUNDS (FNSR, NIH, CTI)



SWISS NATIONAL SCIENCE FOUNDATION

FN 320030-135650. Prediction of infant drug exposure to antidepressant drugs through breastfeeding using population pharmacokinetic modeling and simulation.

Applicant : Prof C. CSAJKA

FN 324730 141234_1. Clinical Pharmacology and Pharmacogenetics In the Complex Care of HIV and HIV/HCV co-infected Individuals.

Co-applicant : Prof C. CSAJKA

RESEARCH FUNDS (INDUSTRY AND ASSIMILATED)

Code	Service Development Research	Amount end 2013 (CHF)
Debiopharm International	Research	28'000 CHF

COMMUNITY PHARMACY



ASSOCIATE PROFESSOR

Olivier BUGNON

PHARMACISTS, LECTURER, SENIOR RESEARCH ASSOCIATES

Jérôme BERGER

Marie-Paule SCHNEIDER

Anne NIQUILLE-CHARRIERE

Jean-François LOCCA

Sophie DU PASQUIER

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Isabelle ANGUISH

Anthony GROGNOZ

Yves MICHIELS

Jennifer CELIO

Mélanie LELUBRE

Minette-Joëlle ZEUKENG-ZEBAZE

Aurélie GERTSCH

Julien MARQUIS

PHARMACY STUDENTS, INTERNATIONAL EXCHANGE

Delphine MAESTRALI (from
University of Dijon, France

PHARMACISTS, COMMUNITY PHARMACY

Marie-José BARBALAT

Anne-Sophie FAVRE

Line OCHSENBEIN

Jérôme BERGER

Noëlie GENRE

Vanessa PAVON CLEMENT

Aline BOURDIN

Denise HUGENTOBLE-HAMPAI

Elodie RESENTERRA

Catherine BREMOND

Suzan MEJDI

Muriel SCHUETZ

Jennifer CELIO

Jérémy NAYAK

Sandrine VON GRUENIGEN

Jeremy DE MOOIJ

Laure NICOLET

ADMINISTRATIVE STAFF AND PHARMACY TECHNICIANS

Sebastian AMICO

Séverine GORGERAT

Nadia MARTEL

Christelle BADINO-BRAS

Véronique GROGNOZ

Raphaël NAOUX

Stéphanie BURNAT-TORRI

Dominique HUNZIKER

Matthias REYMERMIER

Lauriane CURTET

Nathalie ISCHER

Miriam RUFENACHT

Sonia DESSELBERGER

Noëlle KAECH

Ljiljana SCHLAEFLI

Abnore DULA

Stefania MAGNO

Stéphanie SUDAN

GENERAL DESCRIPTION OF THE UNIT

The fact of prescribing, recommending or swallowing a drug seems banal and yet there are many traps: side effects, insufficient effectiveness, too high costs, non-adherence, waste, lack of motivation, altered quality of life, etc. These topics, as well as the evolution of advanced pharmacy services are considered as priorities of action for academic and clinical activities of the Pharmacy of the PMU (Policlinique Médicale Universitaire), a unique place in Switzerland, which combines practice, research, development and education.

Olivier Bugnon, chief pharmacist, is on the other hand an Associate Professor of the School of pharmaceutical sciences (University of Geneva, University of Lausanne); like this, he participates in the development of Community Pharmacy practice, a pharmaceutical science which respects the public health priorities and the central role of the patient. His main teaching responsibility is the organization of the second year of the Master in Pharmacy (year of assistantship). He supervises the examinations of the Master and is member of the Federal Committee for the State Exam in Pharmacy. His research activities (6 PhD students in pharmaceutical sciences in 2013) explore ways of collaboration between physicians, pharmacists and other professionals to improve the responsible use of medicines (effectiveness, safety, efficiency, patients related outcomes).

Internationally, the group of community pharmacy is represented especially within the International Pharmaceutical Federation (FIP), the European Society of Clinical Pharmacy (ESCP), the Pharmaceutical Care Networks in Europe (PCNE) and the European Society for Patient Adherence, Compliance and Persistence (ESPACOMP).

SPECIFIC RESEARCH FIELDS

The research of the Group of Community Pharmacy Practice covers the three following areas:

PEOPLE- AND PERSON-CENTERED INTEGRATED CARE

The global trend for health systems is people- and person-centeredness, coordination, networking and continuity of care. Pharmacists are at the interface of the treatments prescribed by the physicians and the OTC treatments. The evolution of their role turns towards collaborative pharmacy practice and e-health strategies, aiming at the global quality of the care and control of the costs. In 2012, the area « integrated care » of the Pharmacy of the PMU worked on the following topics and projects:

- Quality circles physicians-pharmacists-nurses in nursing homes (cantonal projects in Fribourg and Vaud)
- *Risk evaluation and mitigation strategies – REMS* and patient programs (e.g. Patient with cardiovascular risk; patients with oral anticancer medications, multiple sclerosis patients, home-based subcutaneous immunoglobulin)
- *Exploration of e-Health* strategies facilitating the interprofessional collaboration and the person-centeredness
- *Exploration of change management strategies facilitating the implementation of advanced cognitive pharmacy services*
- Animation of the network of the pharmacists specialized in Addiction Medicine in the French-speaking part of Switzerland - COROPHA (project supported by the FOPH)

The research on integrated care is closely linked to the two other areas « medication adherence » (e.g. oncology, multiple sclerosis) and « safety and cost effectiveness of drugs » (e.g. in geriatrics). This research involves cross-sectional scientific collaborations between pharmaceutical, medical, human and economic sciences.

MEDICATION ADHERENCE

The daily and prolonged taking of medicine is difficult for chronic patients, especially in case of side effects, complex treatments, lack of motivation, incomprehension or refusal of the treatment. To sometimes forget to take one's medicine is nevertheless a normal human behavior. The medication adherence defines itself as a dynamic active process in which the patient works to maintain his health in collaboration with the medical team.

The researchers of the Pharmacy of the PMU, in collaboration with various physicians and nurses, are interested in the scientific support and evaluation of the medication adherence in the routine care in domains like for example high blood pressure, VIH infections, oral anticancer medications, transplantations. The adherence programs are concretized by:

- *Motivational, semi-structured interviews, lead by a pharmacist;*
- *The measure of medication adherence through an electronic medication pillbox and it's relation with the effects of the therapy;*
- *The sharing of data collected in pharmacies (e.g. persistence, implementation, side effects, preferences of patients and their relatives) within the healthcare workforce.*

The research on the adherence also contributes to the goals of the area « integrated care ».

SAFETY AND COST EFFECTIVENESS OF DRUGS

Drugs represent the option most frequently used by the physicians. The prescription formalizes the therapeutic plan with the concordance of the patient; it represents an essential communication tool for the collaboration with the pharmacist. Drug related problems experienced by the patients and medication errors are too frequent. They are usually a sign of system failure, a cost factor and breaks of the seamless care: many good reasons to study scientifically the provided services likely to manage drug risk as well as to improve safety, effectiveness and efficiency of the medicines.

This research area is naturally closely linked with the two other areas « medication adherence » and « integrated care ».

OUTSTANDING PUBLICATIONS

A. GERTSCH, O. MICHEL, I. LOCATELLI, O. BUGNON, M. RICKENBACH, M. CAVASSINI, M. P. SCHNEIDER Adherence to Antiretroviral Treatment Decreases During Postpartum Compared to Pregnancy: A Longitudinal Electronic Monitoring Study. AIDS PATIENT CARE and STDs. April 2013, 27(4): 208-210.

M. P. SCHNEIDER, A. GERTSCH, O. BUGNON Cyberhealth serving to support individual intake of medication. Med Wkly. 2013; 143: w13827.

J. MARQUIS, M. P. SCHNEIDER, V. PAYOT, A. C. CORDONIER, O. BUGNON, K. E. HERSBERGER, I. ARNET. *Swallowing difficulties with oral drugs among polypharmacy patients attending community pharmacies.* Int J Clin Pharm. December 2013; 35(6): 1130-1136.

SPECIFIC PROJECTS INITIATED AND RECOGNITIONS

Since 1st August 2013, consolidation of the Community Pharmacy Practice Group in the School of pharmaceutical sciences (University of Geneva, University of Lausanne) by the appointment of Dr Jérôme Berger as “chargé d’enseignement” (20%). Dr Berger was responsible in 2013 to supervise the clinical and academic development of two innovative projects: 1) an interdisciplinary therapy management program for home-based immunoglobulin self-infusion; 2) a person-centered and integrated care model for promoting safety and medication adherence among Multiple Sclerosis patients treated by fingolimod.

In 2013, the Pharmacie de la PMU goes successfully through the following certification/accreditation steps: 1. Renewal of the certification ISO 9001:2008 / Healthmark – 2. Intermediate QMS-Pharmacy pseudo-patient visit (OTC request) in accordance with the professional standard ISAS QMS-Pharma 2010.

O. BUGNON, representative of the School of pharmaceutical sciences (University of Geneva, University of Lausanne) in the Federal Committee in charge of the organization of the annual State Exam in Pharmacy, as requested by the federal law on the medical professions (LPMed).

O. BUGNON, president of the national working group PAP (“Plattform Ausbildung Pharmazie”) of pharmaSuisse (Swiss society of pharmacists) aiming at the coordination in pre-graduate education between the universities (Basel, Bern, Fribourg, Geneva, Neuchâtel, Zürich), the Swiss association of pharmacy students (asep), the Federal Office of Public Health (FOPH) and the professional associations and other interest groups (pharmaSuisse, Swiss society of hospital pharmacists, Swiss society of industry pharmacists); meetings in Bern (03.06.2013 and 29.10.2013).

O. BUGNON, mandated for the development, teaching and evaluation of the module “Risk Management” for the Executive MBA in Healthcare Specialisation launched by the « Institut d’économie et management de la santé (IEMS) » (University of Lausanne): « Risk management strategies for optimizing the performance of health care system, providers and industries. », Lausanne, 23-24.08.2013.

CONGRESS ORGANISED

O. BUGNON, member of the conference committee and workshop leader of the 8th Pharmaceutical Care Network in Europe (PCNE) Working Conference [Collaborative pharmaceutical care in research and practice], 6-8 February 2013 in Berlin [www.pcne.org].

O. BUGNON and N. MARTEL, responsible for the organization, chairman and speaker of the 7th annual interdisciplinary symposium related to the cantonal project about pharmaceutical care in nursing homes, on the topic « Oncogériatrie: nouveau défi pour l'assistance pharmaceutique des EMS ». Continuing education training for physicians, pharmacists and nurses, supported by the DSAS (Direction de la santé et des affaires sociales) of the canton of Fribourg, the association of nursing homes of the canton of Fribourg (AFIPA), the medical association of the canton of Fribourg and the pharmacists association of the canton of Fribourg, 7.3.2013, Fribourg (Switzerland).

O. BUGNON, chairman and speaker of the Symposia Pharmacy on Top, organized by MEPHA Pharma SA with the support of SISPha SA, considering the challenge of professional change management : « Développement personnel : comment améliorer sa performance au travail en toute sécurité » in Lausanne-Bussigny (15.03.2013), in Montreux (19.04.2013) and in Lugano (06.05.2013).

O. BUGNON, member of the symposium committee and speaker for the interdisciplinary symposium organized by the Policlinique Médicale Universitaire (PMU) and the Association Vaudoise d'Aide et de Soins à Domicile (AVASAD) : « Suivi ambulatoire de la personne âgée, Prescription et Prise de medication à domicile », Lausanne, 5.12.2013.

1. PUBLICATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 57)

1.1	Scientific publications (with impact factor and e-pub)	6
1.2	Scientific publications (without impact factor)	7
1.3	Publications extramuros	5
1.4	Books or books chapters	10

2. POSTERS PRESENTATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 59)

2.1	Posters présentations	2
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3. ORAL PRESENTATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 59)

3.1	Congress & Symposia	19
3.2	Continuing education & open to the public lectures	70

PUBLIC RESEARCH FUNDS (FNSR, NIH, CTI)



FEDERAL OFFICE OF PUBLIC HEALTH (FOPH)

Réseau médecins-pharmaciens dans le domaine de l'addiction – Formation et intégration du pharmacien dans le réseau interdisciplinaire de prévention et de prise en charge de l'addiction.

"Consolidation des acquis d'études précédentes et développement des standards de qualité pour la pratique officinale s'appliquant à la prise en charge des problématiques d'addiction (drogue, alcool et tabac)" - (Contrat No. 09.004964 / 204.0001 / - 650)

[Integration of pharmacists in the interdisciplinary network for the management of addictions]

Main applicant: O. BUGNON

Co-applicant: S. DU PASQUIER

Total allocation : CHF 79'000

Allocation 2013: CHF 8'000

Duration: 4 years

Starting date: 2009

Elaboration de l'Examen fédéral en Pharmacie : participation des experts de la Section des sciences pharmaceutiques (Université de Genève, Université de Lausanne) - (Contrat No. 12.002085 / 704.0001 / - 592) - [Elaboration of the Federal Exam for Pharmacy 2013]
 Main applicant: O. BUGNON
Allocation 2013: CHF 196'675
 Duration: 1 year

 CANTONAL OFFICE OF PUBLIC HEALTH – VAUD

Encadrement scientifique d'un programme d'assistance pharmaceutique des établissements médico-sociaux pour personnes âgées (EMS) Vaudois
 [Development, implementation and evaluation of a new cantonal collaborative care management programme in nursing homes (physicians-nurses-pharmacists quality circles)]
 Main applicant: O. BUGNON
 Total allocation : CHF 180'000
Allocation 2013: CHF 30'000
 Duration: 6 years
 Starting date: 2007

RESEARCH FUNDS (INDUSTRY AND ASSIMILATED)

Code	Mandats de prestations et de recherche	Montants pour 2013 (CHF)
ME5	Recherche et développement	25'000
SAN6	Recherche et développement	20'000
SI6	Recherche et développement	10'000
SOVAPH	Recherche et développement	10'000
TAS11	Recherche et développement	32'000
AS11	Formation	4'000
CP3	Formation	7'500
G3	Formation	2'000
ME5	Formation	4'500
PHA11	Formation	7'000
SAN6	Formation	2'000
TE4	Formation	4'000
		128'000

* Les fonds de recherche du Prof. O. Bugnon sont officiellement contrôlés par l'unité des Finances, PMU, Lausanne.

HOSPITAL PHARMACY (CHUV)



ASSOCIATE PROFESSOR

André PANNATIER, CHUV Pharmacy

RESEARCH AND TEACHING ASSISTANT

Jean-Christophe DEVAUD

David PALMERO

Hanitra RAVELOJAONA

Anne HENRY

ADMINISTRATIVE AND TECHNICAL STAFF

Dominique HUNZIKER

GENERAL DESCRIPTION OF THE UNIT

The CHUV hospital pharmacy group works in close collaboration with the HUG pharmacy and other hospital pharmacies to develop research and education activities in hospital and clinical pharmacy.

The undergraduate education is mainly focused on a full course (32 h) of hospital pharmacy dispensed during the 3rd year of the baccalaurean cursus. A post-graduate education (MAS) in hospital pharmacy is also proposed since 1999 on the HUG and CHUV sites, in collaboration with the Valais hospital. This three years program is a complete specialization in hospital pharmacy, associating theoretical and practical teachings, as well as a one year research project.

CHUV pharmacy also proposes positions for PhD students in pharmaceutical sciences, either for pharmacists having achieved their MAS, or in direct access. The topics are diversified among the research fields described below.

For more information: CHUV pharmacy: <http://www.chuv.ch/pha>

SPECIFIC RESEARCH FIELDS

Drug risk management

- Prospective risk analysis in hospital processes (FMECA method)
- Impact of information technologies on patient safety at prescription, dispensing and administration of drugs
- Impact of human factors on error rates at different steps of the medication use process.

Optimization of clinical use of drugs

- Securing and optimizing the drug use process by developing a clinical pharmacy activity
- Evaluation and improvement of specific administration techniques (i.e. enteral feeding tubes, nebulisation, intrathecal).
- Detection, prevention, management and evaluation of drug incompatibilities
- Development of ready-to-use formulations adapted to hospital specificities, and validation of production processes.
- Continuity of care at hospital discharge

Pharmaceutical analysis

- Development and validation of generic separation methods for the dosage of active ingredients contained in hospital pharmaceutical formulations.

- Evaluation of cost-benefit ratios of treatments.

OUTSTANDING PUBLICATIONS

C. PLÜSS-SUARD, A. PANNATIER, A. KRONENBERG , K. MÜHLEMANN, G. ZANETTI. Impact of antibiotic use on carbapenem resistance in *Pseudomonas aeruginosa*: Is there a role for antibiotic diversity ? Antimicrob Agents Chemother, 2013 Apr;57(4):1709-13. doi: 10.1128/AAC.01348-12. Epub 2013 Jan 28. (IF = 4.6)

PARTICULAR PROJECTS INITIATED

The CHUV pharmacy continued to be active in the field of global pharmacy. A thesis is currently performed by a madagascan pharmacist co-directed with the University of Grenoble

COLLABORATIONS INITIATED WITH INDUSTRY

A collaboration has been initiated with NovoNordisk in the field of incompatibilites of insulin aspart with other drugs.

CONGRESSES

André PANNATIER and Bertrand HIRSCHI: Respectively Scientific and organizing committee of the Journées franco-suisse de pharmacie hospitalière, 18th meeting, Montreux, 2013.

1. PUBLICATIONS (DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 67)

1.1	Scientific publications (with impact factor)	6
1.2	Scientific publications (without impact factor)	4

2. POSTERS PRESENTATIONS (DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 68)

2.1	Posters presentations	13
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3. ORAL PRESENTATIONS (DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 69)

3.1	Congresses & Symposia	9
3.2	Continuing education & open to the public lectures	37
3.3	Radio/Television Intervention	1

RESEARCH FUNDS (INDUSTRY AND ASSIMILATED)

Code	Service Development Research	Amount (CHF)	end 2013
CGRB 10174	CHUV Pharmacy Fund	124'922	

AWARDS & DISTINCTIONS

Dr Valia HUMBERT-DELALOYE: B Braun Research Award for the work entitled "In vitro compatibility of various drugs during simulated Y-site administration".

HOSPITAL PHARMACY (HUG)



ASSOCIATE PROFESSOR

Pascal BONNABRY, HUG Pharmacy

RESEARCH AND TEACHING ASSISTANT

Marco ANASTASI

Delphine CARLI

Olivia FRANCOIS

Anne-Laure BLANC

Mapi FLEURY

Laure-Zoé KAESTLI

Laurent CARREZ

CO-SUPERVISION (CO-TUTELLE)

Jean-Christophe DEVAUD

Anne HENRY

Hanitra RAVELOJAONA

ADMINISTRATIVE AND TECHNICAL STAFF

Dominique HUNZIKER

GENERAL DESCRIPTION OF THE UNIT

The HUG hospital pharmacy group works in close collaboration with the CHUV pharmacy and other hospital pharmacies to develop research and education activities in hospital and clinical pharmacy.

The undergraduate education is mainly focused on a full course (32 h) of hospital pharmacy dispensed during the 3rd year of the baccalaurean cursus. A post-graduate education (MAS) in hospital pharmacy is also proposed since 1999 on the HUG and CHUV sites, with a collaboration with the Valais hospital. This three years programme is a complete specialization in hospital pharmacy, associating theoretical and practical teachings, as well as a one year research project.

HUG pharmacy also proposes positions for PhD students in pharmaceutical sciences, either for pharmacists having achieved their MAS, or in direct access. The topics are diversified among the research fields described below.

For more information: HUG pharmacy: <http://pharmacie.hug-ge.ch>

SPECIFIC RESEARCH FIELDS

Drug risk management

- Prospective risk analysis in hospital processes (FMECA method)
- Use of simulation to analyze factors that may influence the rate of preparation and administration errors
- Interests and risks of information technologies in risk management at the hospital.

Optimization of clinical use of drugs

- Securing the drug use process in high risk care units
- Detection, prevention, management and evaluation of drug incompatibilities
- Development of decision support, by a clinical pharmacy activity or the dematerialization in computerized systems
- Continuity of care at hospital discharge

Development of hospital pharmaceutical forms

- Validation of production processes

- Development of ready-to-use pharmaceutical forms
- Formulation of pediatric parenteral nutritions

Pharmaceutical analysis

- Development and validation of generic separation methods for the dosage of active ingredients contained in hospital pharmaceutical formulations.
- Analysis of cytotoxic drugs (quality control and traces in the environment)
- Analysis of monoclonal antibodies

Pharmacoeconomics and pharmacoepidemiology

- Analysis of drug use by means of time series methodology
- Modeling the use of antibiotics in relation with the evolution of resistance
- Evaluation of the spill-over effect between the hospital and the community settings

OUTSTANDING PUBLICATIONS

N. VERNAZ, G. HALLER, F. GIRARDIN, B. HUTTNER; C. COMBESCURE, P. DAYER, D. MUSCIONICO, J-L SALOMON, P. BONNABRY. Patented drug extension strategies on healthcare spending : a cost-evaluation analysis. PLOS Medicine, June, doi: 10.1371/journal.pmed. 1001460 (IF=16)

PARTICULAR PROJECTS INITIATED

The HUG pharmacy continued to be active in the field of global pharmacy. In 2013, an ambitious project was initiated to develop a collaborative platform in hospital pharmacy for developing countries, including e-learning educational resources.

COLLABORATIONS INITIATED WITH INDUSTRY

Several collaborations have been initiated with industry in the field of information technologies for hospital pharmacy. In particular, a collaboration was started with Fresenius for the development and the evaluation of an automated system for the preparation of cytotoxics.

CONGRESSES

Scientific committee of the congress of the European Association of Hospital Pharmacists (EAHP), 18th annual congress, Paris, 2013.

Scientific and organizing committee of the Journées franco-suisse de pharmacie hospitalière, 18th meeting, Montreux, 2013.

1. PUBLICATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 73)

1.1	Scientific publications (with impact factor)	10
1.2	Scientific publications (without impact factor)	4

2. POSTERS PRESENTATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 74)

2.	Posters presentations	24
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3. ORAL PRESENTATIONS

(DETAILS IN SCIENTIFIC PRODUCTIONS 2013 – PAGE 76)

3.1	Congresses & Symposia	8
3.2	Continuing education & open to the public lectures	19
3.3	Radio/Television Intervention	3

RESEARCH FUNDS (INDUSTRY AND ASSIMILATED)

Code	Service Development Research	Amount end 2013 (CHF)
Code CGR 70609	Service Development Research HUG pharmacy fund	Amount (CHF) 120'400

PHD PROGRAM



DIRECTOR:

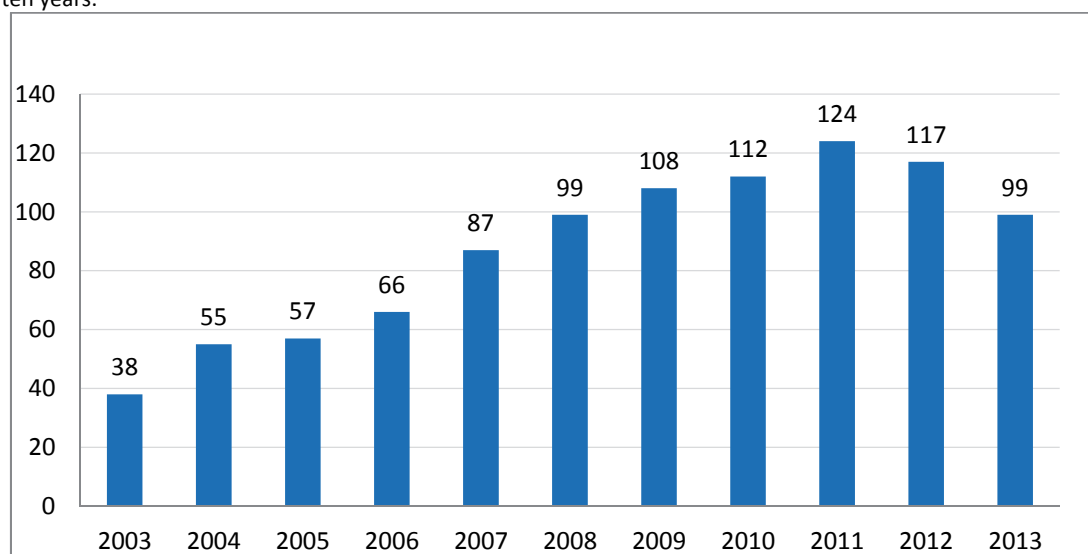
Leonardo SCAPOZZA

RESEARCH AND TEACHING ASSISTANT

The annual information meeting for the PhD students who started the program in 2013 was held on the 25th november 2013 in the lecture room 4-457.

After a slight increase during the last years, the number of PhD students enrolled at the EPGL reached 99 at the end of 2013. This decrease is accompanied by an exceptional increase of the number of PhD defenses in 2013 (20). All of them are submitted to the bylaw that foresees the participation to the PhD program and the acquisition of at least 30 credits before the defense of the thesis. An interesting note is that most of the PhD students have more than 30 credits at the end of their PhD indicating their active participation to the PhD program (Table 1, Table 2, Table 3). The participation was good with a mean value of 10.3 PhD students per course, which is excellent. If we consider all the participants including postdocs and pre-grad this mean-value increases to more than 13.5 participants.

The Fig. below shows the evolution of number of PhD Students registered at the Doctoral School in Pharmaceutical Sciences over the past ten years.



ADMINISTRATIVE AND TECHNICAL STAFF

Florence von Ow, secretary

GENERAL DESCRIPTION OF THE UNIT

The PhD Program in Pharmaceutical Sciences provides a solid theoretical and practical training in all aspects of the Pharmaceutical Sciences and fosters interdisciplinary research and provides opportunities for scientific exchange via lectures, symposia and networking activities.

The PhD Program aims to increase career opportunities for graduates from the School of Pharmaceutical Sciences.

COURSES AND SYMPOSIA

In 2013, 15 courses were proposed to the registered PhD Students. The total of hours given within the 2013 PhD program was 317 (including all activities). Two types of courses were proposed, namely weekly (Hebdo) and bloc (Table 1). Within the framework of the PhD program, the PhD day and the extra-muros seminar have also been organized with success (Table 2 and 3). The "Symposium Pharmapeptides" was not held in 2013 (Table 2). Concerning the networking events (Table 4): "Rencontre avec l'Industrie" was cancelled by the concerned partner, and "Career Day", was also cancelled due to the overload of the organizing PhD Students. The next Career Day is scheduled for May, 12th 2014.

In order to increase the exchange among PhD students and between PhD students and other scientists, the eighth PhD day was organized on the 31st of May 2013 by the PhD students of the group of pharmaceutical analytical chemistry. The PhD day was organized in Hermance at the Brocher Foundation with a program including 1 external and 14 PhD students speakers. 55 PhD students, 1 speaker, 17 post-doc and professors for a total of 72 participants participated at this event. The quality of the talks and discussion as well as the organization were very good fulfilling the objectives of this day. The next PhD day is scheduled at the 13th of June 2014 and will be organized by the PhD students of the groups of biopharmacy and pharmaceutical technology.

The PhD students attended regularly the conferences (conferences spécialisées) proposed within the PhD program. 11 seminars have been given by international researchers from academia and industry. A total of 237 participants attended these lecture series including 102 PhD students, 10 pre-graduates, 53 post-docs and 72 senior scientists.

The 38th yearly « extra-muros » meeting for Ph.D. students in pharmaceutical sciences was held as usual at the Parkhotel Beausite (Zermatt, VS). It took place from September 9 to 13, 2013 and was organized by Prof. Pierre-Alain Carrupt, Drs Claudia Avello Simoes Pires, Alessandra Nurisso, Sophie Martel and Mrs Sylvia Passaquay Rion. This year meeting was entitled "Innovation in Medicinal Chemistry: from Biomass to Safe and Potent Drug Candidates" and reviewed some of the recent development in the field of medicinal chemistry and drug discovery applied to pharmaceutical sciences. Twenty-four national and international speakers active in academia and industry presented recent trends in various topics ranging from diversity-oriented synthesis to pharmacokinetics aspects biological activities, target validation and clinical applications in drug discovery and development.

Lectures on the first two days were mainly focused on "innovation in medicinal chemistry: from biomass to safe and potent drug candidates" with special highlights on "new trends in design and synthesis of drug candidates" via several cases studies from industry and academy worlds. The third day was devoted to "innovation to optimize the ADME-Tox profiles of drug candidates" illustrated by several examples from industry, academy and clinics. The fourth day was focused on "innovation in target identification related to epigenetic and cooperative effects". This relatively new research field was presented in details and illustrated with examples from cancer chemoprevention strategies and novel mechanisms related to neurodegenerative diseases. The last day was devoted to "new trends in the optimization of ligand-protein interactions" with a well-balanced mix of technical and applications presentations. Novel facilities in the Arc Alpin for the experimental determination of the structure of small and large molecules were also nicely reviewed.

Besides the presentations from the invited speakers, a round table was held focused on how to enhance the quality of PhD curricula in order to better fit the needs for the future jobs. This was very much appreciated by all participants. This important part of the workshop was maintained at a high quality level thanks to the impressive input of several industrial and academy speakers.

The meeting was attended by 69 persons (speakers included). Thirty-two participants came from the EPGL and the University hospitals of Geneva and Lausanne. Administrative people from the research unit and also professors from foreign universities attended too. As usual the meeting was evaluated by the participants. The participants were very satisfied by the scientific content of the program and appreciated the presentations of the speakers. They were very satisfied by the round table, as well as the setup of the meeting. This international "extra-muros" meeting offers PhD students various opportunities for networking since most of the speakers spent a lot of time for informal discussions outside of the conference room.

Summarizing, the key points of the activity of the PhD Program in Pharmaceutical Sciences are a program covering the broad range of fields of Pharmaceutical Sciences with 16 courses and symposia (26, if considering each "conférence sur sujet spécialisé" separately) for a total of 317 hours, the very good participation of the PhD students to all five activities of the PhD program in Pharmaceutical Sciences.

The schedule, the content of the courses, hours and credits as well as all indications concerning the PhD program in Pharmaceutical Sciences are stored in a MySQL database and posted dynamically on the web page of the PhD program ([http://epgl.unige.ch/pharm/fr/ \[Etudes/programme doctoral\]](http://epgl.unige.ch/pharm/fr/[Etudes/programme%20doctoral])). Furthermore, the information relative to the program 2013 was sent by E-mail to all PhD students and supervisors well ahead of the beginning of the courses.

Efforts have been made for transferring the platform of the PhD Program to myCUSO in order to be operative in 2014.

TABLE 1

List of courses organized within the PhD Program in Pharmaceutical Sciences 2013 and number of participants

Name of courses 2013	# of Course	Responsible professor	# of Hours	Credits	Students
Spectrométrie en masse	1506BCR	G. Hopfgartner E. Varesio	28	3	6
Spectrométrie de masse (exercices)	1506BEX	G. Hofgartner S. Michalet E. Varesio	14	1	(6)
Thèmes de pharmacologie et toxicologie cliniques	19H003	P. Bonnabry	18	3	13, total 18
Assurance Qualité (AQ): Rôle, activités et exigences au sein d'une industrie pharmaceutique	19H004	E. Allémann S. Campione	16	2.5	5
Drug development : Regulatory Aspects and Clinical Trials	19H009	L. Scapozza A. McAllister J.-Y. Le Cotonnec S. Latour	20	3.5	19
Financement de la santé, médico-économie et flux du médicament (Pharm. Hosp. Comm. 2)	19H012	A. Pannatier	18	3	6, total 31
Pharm. Hosp. Comm. 3	19H015	J. Beney	18	3	CANCELLED
Introduction to the Pharmaceutical Industry : History, Structures and Challenges	19H017	L. Scapozza D. Hotz	30	5	8
Les brevets dans la recherche - source d'information et moteur de l'innovation	19H018	L. Scapozza P. Heuzé P. Ducor D. Kraus L. Miéville R. Tschudin P. Weibel	22	3.5	5
Essentials in molecular and applied pharmacology	19H019	U. Rüegg	14	2.5	9
Pratique des plans d'expérience	19H022	S. Rudaz J. Boccard	16	2.5	13

Solving Ligand-Target Structure for Understanding Pharmacology at Molecular Level	19H027	O. Vadas D. Kostrewa	30	5	7, total 8
Use of fluorescence spectroscopy in the study of drugs, protein and membrane	19H032	T. Arvinte	16	3	25, total 29
Validation des méthodes analytiques	19H034	S. Rudaz J. Schappler	18	3	13
Therapeutic Drug Monitoring and its Application in Diagnostics and Clinical Research	19H045	L. Decosterd	6	1	11
Initiation aux méthodes d'analyse multivariées en sciences pharmaceutiques	19H046	S. Rudaz J. Boccard	12	2	8
NMR Practical Aspects	19H048	E. Rivara-Minten K. Ndjoko	7	1	5
TOTAL	15		257		119 Ph 35 others

*) The course description can be found under the web page of the School of Pharmaceutical Sciences, EPGL <http://epgl.unige.ch/pharm/fr/>

TABLE 2

List of symposia organized within the PhD Program in Pharmaceutical Sciences 2013 and number of participants.

Name of course 2013-2014	# course	Responsible Professor	# of hours	credits	# Students
Symposium Pharmapeptides	19H001	G. Borchard	6	1	CANCELLED
PhD Day	19H020	L. Scapozza	8	1 or 2	55 PhD, 9 post-doc +8 profs / others
Conférences sur sujets spécialisés		G. Hopfgartner	11 days (22 hrs)	1,5 for 5 conf.	102 PhD (237 total)

TABLE 3

Name of course 2013-2014	# course	Responsible Professor	# of hours	credits	# Students
Séminaire extra-muros Zermatt	19H024	P.-A. Carrupt	30	1 or 2	29 PhD total 39

TABLE 4

List of networking activities organized within the PhD Program in Pharmaceutical Sciences 2013 and number of participants.

Name of course 2012-2013	# course	Responsible Professor	# of hours	credits	# Students
Rencontre avec l'Industrie	19H050	L. Scapozza	6	1	CANCELLED
Career day	19H007	L. Scapozza	6	1	CANCELLED

PUBLIC RESEARCH FUNDS (CUSO)

Conférence Universitaire de Suisse Occidentale (CUSO)

End of 2012, the 2013 program as well as the budget were submitted to the CUSO who accepted them. The budget in 2013 for the five activities (Seminar Extra-Muros, Conférence spécialisées, Cours, Symposia as well as Networking activities) was of 90'850.- CHF covered by the fund allocated by the CUSO.

The costs for 2013 for all the activities were 73'467.59 CHF, thus leaving 17'382.41.- CHF unused. We spent less than budgeted.

The difference between the budget and the costs is due to cancellation of some events (career day, budgeted at 1'500.-, course 19h015 (Pharm Hosp. Comm. 3), budgeted at 1'800.-, course 19h050 (rencontre avec l'industrie), budgeted at 1'600.-, course 19h001 (symposium Pharmapeptides), budgeted at 1'500.-, course 19h014 (Therapeutic proteins: current topics), budgeted at 500.-), as well as lower expenses for some courses (course 19H004 with a budget of CHF 2'900.00, used only 2'426.05.-; course 19h003 with a budget of 1'800.- used only 1'287.09.-; course 19h009, with a budget of 3'600.-, used only 2'812.15.-; course 19h019, with a budget of 900.-, used only 605.-; course 19h048, with a budget of 1'200.-, used only 1'153.-; course 19h045, with a budget of 100.- used only 80.40.-; course 19h032, with a budget of 1'500.-, used only 365.-; the costs for "conférences sur sujets spécialisés" were only 3'400.85.-, instead of 6'000.00.- budgeted; the costs for the seminar extra-muros were less than the 36'650. CHF budgeted and amounted to 31'740.60.-; the costs for "frais généraux" were only 7'009.70.-, instead of the 11'500.- budgeted initially.

It has to be noted that these decrease in expenses could compensate for the budgeted positions for which the expenses were higher than the amounts budgeted (i.e. course 19h012: expenses of 1'844.45.- for 1'800.- budgeted; course 19h017: expenses of 6'712.00.- for 3'200.- budgeted; course 19h018: expenses of 6'324.55.- for 5'800.- budgeted; course 19h020: expenses of 3'625.- for 3'500.- budgeted; course 19h027: expenses of 4'081.75.- for 3'500.- budgeted).

We take the opportunity in this report to thank the CUSO for the past and future financial support allowing offering an outstanding program to the PhD students in Pharmaceutical Sciences.