

ANNUAL REPORT 2024

SCHOOL OF PHARMACEUTICAL SCIENCES (ISPSO)



INTRODUCTION FROM THE PRESIDENCY

For ISPSO, 2024 was a year of sustained growth and dynamic change. Undergraduate student enrolment continued to rise. We welcomed Professor Valérie Gabelica who reinforces our analytical sciences cluster and Professor Stéphane Guerrier, an expert in data analysis (jointly appointed with the Section of Earth Sciences). We have also learned that we would soon have to say goodbye to two colleagues, Professor Carole Bourquin and Doctor Olivier Dorchies, who would be leaving us for new adventures. Professor Bourquin has accepted the prestigious post of Director of the Department of Pharmacology at the University of Bern. Doctor Dorchies has been appointed Assistant Professor at the Rhône-Alpes University in Grenoble, where he will continue his research into therapies for rare diseases. This proves that ISPSO members are widely recognised and sought after for important positions within prestigious institutions.

Despite the increasing financial challenges, both within the University and from external funding sources, we were able to sustain a solid base of funding for activities in research and training of new pharmacists and pharmaceutical scientists. Another aspect are the turbulent conditions on the international political scene, which also have a considerable impact on the world of science, especially in the life sciences. In a world where des- and misinformation is used for political gain; it is our task to supply the public with facts based on scientific data. ISPSO, together with its partners on the local, national, and international levels is taking on these challenges for the benefit of their patients, students, and the general public.

Pour l'ISPSO, 2024 a été une année où la croissance et les changements se sont poursuivis: le nombre d'étudiant-es de premier cycle a encore augmenté, nous avons eu la nomination de la Professeure Valérie Gabelica pour renforcer notre pôle de sciences analytiques et avons accueilli, en collaboration avec la Section des sciences de la Terre, le Professeur Stéphane Guerrier, un expert en analyse de données. Nous avons également appris que nous allions devoir bientôt dire au revoir à deux collègues, la Professeure Carole Bourquin et le docteur Olivier Dorchies, qui allaient nous quitter pour de nouvelles aventures. La Professeure Bourquin a accepté la nomination au poste prestigieux de Directrice du département de pharmacologie de l'Université de Berne. Le docteur Dorchies sera nommé Professeur assistant à l'Université Rhône-Alpes de Grenoble, où il poursuivra ses recherches sur les thérapies des maladies rares. Cela prouve que les membres de l'ISPSO sont largement reconnus et recherchés pour des postes importants au sein d'institutions prestigieuses.

Malgré des conditions financières de plus en plus difficiles, tant au sein de notre Université que de la part de sources de financements externes, nous avons pu maintenir une base solide pour nos activités de recherche et de formation de nouvelles/nouveaux pharmaciens-nes et scientifiques pharmaceutiques. Un autre aspect à relever est la situation incertaine sur la scène politique internationale, qui a également un impact considérable sur le monde de la science, en particulier dans les sciences de la vie. Dans un monde où la désinformation est utilisée à des fins politiques, il est de notre devoir de fournir au public des faits basés sur des données scientifiques. L'ISPSO, en collaboration avec ses partenaires locaux, nationaux et internationaux, relève ces défis dans l'intérêt de ses patient-es, de ses étudiant-es et du grand public.

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DIRECTION AND ADMINISTRATION

BOARD MEMBERS

Prof Gerrit Borchard, President
Prof Patrycja Nowak-Sliwinska, Vice President
Prof Serge Rudaz, Vice President

ADMINISTRATION

Mrs Françoise Védy, Administrator, 100%
Mrs Danielle Coosemans, Administrative Assistant, 60%
Mrs Sylvia Passaquay Rion, Administrative Assistant, 60%
Mrs Laetitia Pascalín, Secretary, 45%, 75% (01.10.2024-31.12.2024)

STUDENTS SECRETARIES

Mrs Elena Onate, Administrative Assistant, 90%
Mrs Tania Geugnon Seguin, Secretary, 100% (since 01.04.2024)
Mrs Elisa Masson, Secretary, 60%
Mrs Fiona Sanmartín Gonzalez, Secretary, 90%

ACADEMIC ADVISORS

Dr Elisabeth Rivara-Minten, Academic Advisor, 40%
Dr Gaëlle Vacher, Academic Advisor Biomedical Sciences, 10% († 08.04.2024)

IT STAFF

Mr Christophe Francey, Technician informatic support assistant, 100%
Mr Loris Franco, System Administrator, 100%
Mr Yann Manet, System Administrator, 100%

DOCTORAL PROGRAM

Dr Béatrice Kaufmann, Coordinator, 15%
Mrs Florence Von Ow, Secretary, 25%

ABBREVIATIONS

<i>PO</i>	<i>Full Professor</i>
<i>PAS</i>	<i>Associate Professor</i>
<i>PAST</i>	<i>Assistant Professor</i>
<i>PTI</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

ANALYTICAL SCIENCES, BIOMEDICAL AND METABOLOMIC ANALYSIS

Prof Serge RUDAZ, PO
Dr Davy GUILLARME, CC, MER
Dr Julien BOCCARD, CE

BIOMOLECULAR AND PHARMACEUTICAL MODELLING

Prof Francesco Luigi GERVASIO, PO

BIOPHARMACY

Prof Gerrit BORCHARD, PO
Dr Olivier JORDAN, MER

BIOPHYSICAL AND BIOANALYTICAL MASS SPECTROMETRY

Prof Valérie GABELICA, PO (*since 01.01.2024*)
Dr Frederic ROSU (*since 01.01.2024*)

CLINICAL PHARMACOLOGY AND TOXICOLOGY

Prof Caroline SAMER, PAS

CLINICAL PHARMACY SCIENCES

Prof Chantal CSAJKA, PO
Dre Noura BAWAB, SCE
Dr Frédéric GASPARD, SCE (*since 01.02.2024*)

CLINICAL COMMUNITY PHARMACY

Dr Jérôme BERGER, CE
Dr Philippe LAURENT, CC
Dr Martin BERNHARDT, CC

HOSPITAL PHARMACY (HUG / CHUV)

Prof Pascal BONNABRY, PAS
Prof Farshid SADEGHIPOUR, PTI
Dre Christel BRUGGMANN, SCE
Dre Nancy PERROTTET RIES, SCE

IMMUNOPHARMACOLOGY OF CANCER

Prof Carole BOURQUIN, PO

CANCER SYSTEMS PHARMACOLOGY

Prof Patrycja NOWAK-SLIWINSKA, PAS

MOLECULAR THERAPEUTICS DELIVERY GROUP

Prof Yogeshvar KALIA, PO

PHARMACEUTICAL BIOCHEMISTRY

Prof Leonardo SCAPOZZA, PO

MEDICAL IMAGING

Prof Norbert LANGE, PAS

PHARMACEUTICAL TECHNOLOGY

Prof Eric ALLÉMANN, PO

Dre Florence DELIE-SALMON, MER

PHARMACOGNOSY

Prof Muriel CUENDET, PAS

PHYTOCHEMISTRY & BIOACTIVE NATURAL PRODUCTS

Prof Jean-Luc WOLFENDER, PO

Dr Emerson FERREIRA-QUEIROZ, MER

MEDICATION ADHERENCE AND INTERPROFESSIONALITY

Prof Marie-Paule SCHNEIDER, PAS

Dre Anne-Laure BLANC, CE

Dre Alexandra GARNIER, CE (*since 01.07.2024*)

Dr Erik PAUS, CE

DATA ANALYTICS LAB

Prof Stéphane GUERRIER, PAST

SCHOOL OF PHARMACEUTICAL SCIENCES COMMITTEE SITUATION ON JANUARY 1st, 2024

TEACHING COMMITTEE – President: Prof Muriel CUENDET

REGULATIONS AND EQUIVALENCE COMMITTEE – President: Prof Serge RUDAZ

GRADES, EXAMINATIONS AND DEROGATIONS COMMITTEE – President: Dr Elisabeth RIVARA-MINTEN

CONTINUING EDUCATION AND PUBLIC COURSES COMMITTEE – President: Prof Marie Paule SCHNEIDER VOIROL

EXTERNAL DOCTORAL STUDENTS AND TRAINEES ADMISSION COMMITTEE – President: Prof Gerrit BORCHARD

DOCTORAL PROGRAMME COMMITTEE – President: Prof Yogeshvar KALIA

SECONDARY EDUCATION COMMITTEE – President: Mrs Elena ONATE

BUDGET COMMITTEE – President: Mrs Françoise VÉDY

IT COMMITTEE – President: Prof Francesco Luigi GERVASIO

SECURITY AND PREMISES COMMITTEE – President: Prof Eric ALLÉMANN

SCIENTIFIC COMMITTEE – Presidents: Prof Francesco Luigi GERVASIO

GLOBAL PHARMACY COMMITTEE – President: Prof Pascal BONNABRY

SHARED INSTRUMENTATION COMMITTEE – President: Prof Eric ALLÉMANN

PRACTICAL WORK COMMITTEE – President: Dr Emerson FERREIRA QUEIROZ

BIOMEDICAL SCIENCES TEACHING COMMITTEE – Presidents: Prof Pierre COSSON (Medicine) and Prof Leonardo SCAPOZZA

VISIBILITY AND COMMUNICATION COMMITTEE – Prof Patrycja NOWAK-SLIWINSKA

VISITING PROFESSORS ('PROFESSEUR-ES BÉNÉVOLES') GROUP – Prof. Patrycja NOWAK-SLIWINSKA

CMU LIBRARY INSTANCE – Responsible: Prof Serge RUDAZ

GROUPE EXAMENS FEDERAUX – Responsible: Prof Gerrit BORCHARD

STAFF



PROFESSORS

Eric ALLÉMANN, 100%
Pascal BONNABRY, 15% (+HUG)
Gerrit BORCHARD, 100%
Carole BOURQUIN, 80% (+20% Faculty of Medicine, but 100% paid by the Section), 40% (since 01.09.2024)
Chantal CSAJKA, 50% (+UNIL)
Muriel CUENDET, 100%
Francesco Luigi GERVASIO, 100%
Stéphane GUERRIER, 50% (+ 50% GSEM)
Yogeshvar KALIA, 100%
Norbert LANGE, 100%
Patrycja NOWAK-SLIWINSKA, 100%
Serge RUDAZ, 100%
Farshid SADEGHIPOUR, 15% (+CHUV)
Caroline SAMER, 10 % (paid by Faculty of Medicine)
Leonardo SCAPOZZA, 100%
Marie-Paule SCHNEIDER, 75% (+Pharma24)
Jean-Luc WOLFENDER, 100%
Frédéric ZENHAUSERN, 20% (non-numerated)

HONORARY PROFESSORS

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Eric DOELKER
Robert GURNY
Kurt HOSTETTMANN
Urs RUEGG
Jean-Luc VEUTHEY

SENIOR LECTURERS

Florence DELIE-SALMON, 100%
Emerson FERREIRA QUEIROZ, 100%
Davy GUILLARME, 100%
Olivier JORDAN, 100%
Philippe LAURENT, 12.5%
Alain MERKLI, 5%
Emmanuel VARECIO, 50% (+50% Faculty of Sciences)

INVITED PROFESSORS AND RESEARCHERS

Damien CALLAHAN (23.09.2024-23.12.2024)
Jean-Paul DZOYEM (01.03.2024-31.08.2024)
Lee TZONG-HUEI (01.02.2024-31.07.2024)

LECTURERS

Jérôme BERGER, 100% (+Unisanté)
Martin BERNHARD, 20% (until 31.07.2024)
Julien BOCCARD, 100%
Noura BAWAB, 20%
Anne-Laure BLANC, 20%
Christel BRUGGMANN, 10%
Evelina CARDOSO, 60% (since 01.02.2024)
Chin Bin EAP, 10% (+UNIL) (until 31.07.2024)
Pascal FURRER, 100%
Erik PAUS, 10%
Karl PERRON, 40% (+60% BIVEG)
Nancy PERROTTET RIES, 10%
Elisabeth RIVARA-MINTEN, 40%
Philippe LAURENT, 12.5%

PRIVAT DOCENTS

Johnny BENEY
Youssef DAALI (+20% Faculty of Medicine)
Sandrine FLEURY SOUVERAIN
Marco PRUNOTTO
Pierre VOIROL
Nicolas WIDMER

SENIOR RESEARCH ASSOCIATES

Olivier DORCHIES, 100%
Si GOU, 100 %
Hesham HAMED, 30%
Beatrice KAUFMANN, 60 % (+15% Faculty)
Laurence NEFF, 30%
David PEJOSKI, 100%, 30%
Frédéric ROSU, 100%
Sébastien TARDY, 100%
Gaëlle VACHER, 80%, († 08.04.2024)
Magali ZEISSER-LABOUEBE, 80%

SENIOR RESEARCH AND TEACHING ASSISTANTS

Valentina D'ATRI, 100% (until 31.10.2024)
Marie HUMBERT-CLAUDE, 20% (since 01.07.2024)
Nasreddine KANFAR, 100%
Isabel MEISTER, 90%
Viorica PATRULEA, 50%
Valerio RIZZI, 85%
Julie VERIEPE, 100%

POSTDOCTORAL SCHOLARS

Mireia ANDREU CARBO, 100%
 Simone AURELI, 100%
 Valentin BENBOUBKER, 100%
 Emilie BERTRAND, 100%, (since 01.04.2024)
 Alberto BORSATTO, 85%, (since 01.07.2024)
 Margot BOUJUT, 100%
 Benjamin BUGNON, 10% (01.04-30.06.2024), 20% (since 01.07.2024)
 Maria Katarzyna BZOWKA, 85%, (since 01.10.2024)
 Evelina CARDOSO, 80% (01.01-31.01.2024)
 Anne CAYRON, 100%, (since 01.10.2024)
 Geoffrey DEPAEPE, 100%, (since 01.07.2024)
 Jonathan FARO BARROS, 100%
 Andreia FERREIRA SARUGA, 100% (since 01.09.2024)
 Thorben FROHLKING, 85%
 Ioannis GALDADAS, 85%
 Mathieu GALMICHE, 100%
 Alexandra GARNIER, 50% (01.04-30.06.2024)
 Margaux HERITIER, 70% (01.03-31.08.2024), 100% (since 01.09.2024)
 Chiara JEIZINER, 90% (since 01.09.2024)
 Mayis KABA LUNGI, 100% (since 01.10.2024)
 Olivier KIRCHHOFFER, 100% (since 01.12.2024)
 Marietta Margareta KORSOS, 80% (01.06-31.10.2024), 100% (since 01.11.2024)
 Jonathan MAURER, 100% (since 01.03.2024)
 Hugo MORIN, 80%
 Inès NIKOLIC, 100%
 Nicola PIASENTIN, 85%
 Emanuel PINTO DE SOUSA, 100% (01.01-28.02.2024)
 Luis QUIROS GUERRERO, 100%
 Rafael RINCON, 100% (01.11-31.12.2024)
 Laurence SCHUMACHER, 30%
 Sarah SERHAL, 95%
 Sofia SPATARO, 70% (01.03-31.05.2024)
 Sandrine VON GRUNIGEN, 85%

RESEARCH AND TEACHING ASSISTANTS

Kenza ABOUIR	Aude COUMAU
Joanna ACHKHANIAN	Claire COUMAU
Mégane AEBISCHER	Célie DA SILVA
Arthur Cyril ALBERT	Meryem DALOUADI
Pol Nicolas BANNASCH	Yassine DHIF
Ana Beatriz BASTOS SOARES DOS SANTOS	Filippo DONATI
Olivia BEJUY	Eloïse DUCREY
William BELLO	Eloïse DUPUYCHAFFRAY
Martijn BEMELMANS	Radhia EL PHIL
Yahia BENNANI	Mathilde ESCAITH
Léa BODEN SOHL DOST	Pedro FEBRER MARTINEZ
Bart BOERSMA	Angelica FERRO
Théo BOISIER	Raphaël FESER
Mirko BONELLI	Mathis FIAULT
Alberto BORSATTO	Paul GARIN
Alexandre BORY	Alexandra GARNIER
Sami CAILLER	Emre GEZER
Anne CAYRON	Othilie GIANNONI
Carla CHEHADE	Sergey GIREL
Rim CHIBA	Coralie GODOT

Paula GONZALEZ FERNANDEZ
Jakub GUBALA
Paola HAEMMERLI
Aya HALMI
Anton HANKE
Emilie HAUSMANN
Margaux HERITIER
Camille HOSOTTE
Laura IACOBUCCI
Bilal JABER
Sacha JACOBS
Mégane JERMINI
Flaela KALEMI
Maurice KARRENBROCK
Olivier Auguste KIRCHHOFFER
Soufiene KRIFA
Karen LANDINO
Honorine LARDEUX
Ferdinand LE BLOC'H
Oliwia MAJCHRZAK
Arjun MANI MALLIKA
Estelle MARET
Aleksandr MELIKOV
Stéphanie MENA
Céline MERMILLOD
Valentin MIEVILLE
Marie-Anaïs MONAT
Elisa MONTORFANI

Luca MORICI
Nathalie NGUYEN
Ivan PANCHENKO
Laeticia PINTO
Pragallabh PURWAR
Alcidia RAMOS BARROS
Noémie RATSIMALAHELO
Rafael RINCON
Paul ROGEBOSZ
Benjamin ROSSIER
Plinio SCAPOZZA
Cindy SCHELKER
Karima SHAMURATOVA
Joanna SOBOCINSKA
Sofia SPATARO
Oriane STRASSEL
Camille SUESS
Erga SYAFITRI
Rayan TROUDI
Athanasios TSALMPOURIS
Maxime TUFEU
Gianluca ULIVI
Tess VOUILLAMOZ
Leqi WANG
Xiaoxiao WANG
Albane ZINGG

JOINTLY SUPERVISED PHD STUDENTS AND JOINTLY SUPERVISED PHD STUDENTS FROM ANOTHER UNIVERSITY

Raphaël BAUDIN
Angélique BOURQUI
Maëlis BRITO
Anthony VOCAT
Sophia HANNOU
Dominykas LUKAUSKIS
Estelle MARET
Yuan PETERMANN
Pierre REPITON
Anne RAVIX
Elfried SALANON (co-direction Julien Boccard pas de doctorat en life science)
Hugue DE VILLIERS DE LA NOUE

RESEARCH ASSISTANTS (ARE)

Mayar ABDALLA
Samuel CHAVES GONCALVES
Joao Pedro CUNNINGHAM CARVALHO
Virginie DAHAN
Romain GUICHONNET
Maryam HARAJ
Soukayna JABLI
Marc JAMAIN
Laira JRADI
Laura JUNUSSOVA
Amina KENDOUCI
Christine KLEIN

Pablo LIATTI
Khadidja MAAMIR
Ines NERODENKOVA
Vivien RAMOS
Yannick TSCHANZ

INTERNSHIP STUDENTS / VISITING SCHOLARS

Selin BAGCI (12.02.2024-12.07.2024)
Elena CANNONE (18.11.2024-13.12.2024)
Chia-Hao CHANG (15.03.2024-15.09.2024)
Yasmine BEN ABDALLAH (07.08.2023-18.08.2023)
Thamires DA CUNCHA (01.06.2024-30.11.2024)
Nathareen CHAIWANGRACH (22.08.2022-31.03.2023)
Sarah DEFARIA (6.08-2024-09.08.2024)
Josédarling DESANE (15.04.2024-30.08.2024)
Beatrice FERRERO (01.09.2024-28.02.2025)
Eva FRANCO (23.05.2024)
Corentin GUILBERT (15.04.2024-12.07.2024)
Goncalo INFANTE CALDEIRA (13.05.2024-31.07.2024)
Sacha JACOBS (08.01.2024-08.07.2024)
Océane KUHARIC (01.04.2024-09.08.2024)
Gabin LEURS 11.03.2024-22.03.2024)
Martina LIOI (08.01-05.07.2024)
Faris MOHAMMAD (01.12.2024)
Ofeli MUJAJ (06.08.2024-09.08.2024)
Camila OLIVEIRA CARDOSO (01.09.2024-28.02.2025)
Claudia PREZIOSO (04.03.2024-03.06.2024)
Clara RIBAS (02.09.2024-31.01.2025)
Selma ROCKNEDDINE (01.10.2024-31.12.2024)
Elfried SALANON (20.03.2024-20.06.2024)
Cintia Cristina SANTI MARTIGNAGO (04.03.2024-31.12.2024)
Victoria TRAP (09.06.2024-03.08.2024)
Nikitha VAVILTHOTA (01.07.2024-15.09.2024)

ADMINISTRATIVE STAFF

Nathalie CHIAVAROLI, 50%
Danielle COOSEMANS, 60%
Lilla EREDICS, 80% (since 01.06.2023)
Cécile GIROD-BURNAND, 20% (since 01.11.2023)
Marilyn FREIRE BARJA ZLASSI, 80%
Elisa MASSON, 60%
Angeles MARTINEZ-CASTRO, 20%, (since 01.11.2023)
Elena ONATE, 90%
Laetitia PASCALIN, 45%, 75% (01.10.2024-31.12.2024)
Sylvia PASSAQUAY-RION, 60%
Mirosława REBETEZ-GRALEWICZ, 80%
Fiona SANMARTIN GONZALEZ, 90%
Natalie SCHREGLE, 80%
Françoise VÉDY, 100%
Florence VON OW, 90% (25% Progdoc + 70% Research unit secretary +5% Secretary CAS)
Anne-Françoise WITTA, 50%, 80% (since 01.04.2023)

IT STAFF

Christophe FRANCEY, 100%

Loris FRANCO, 100%

Yann MANET, 100%

TECHNICAL STAFF

Frédéric BORLAT, 100%

Nathalie BOULENS, 60%

Mathias BUFF, 60%

Carole DUPRAZ, 35%

Sarah GARDI, 100%

Aurélie GOUILLER, 90%

Tayeb JBILOU, 80%

Fersan NUHIJI, 50%

Laurence MARCOURT, 100%

Jessica ORTELLI, 90%

Marco PERDIGAO, 100%

Olivier PETERMANN, 90%

Océane REYMANN, 85% (*since 01.09.2024*)

Colette SAUTY, 25%

Cédric SCHELLING, 100%

Luca SIMULA, 100% (*until 31.08.2024*)

Emmanuelle SUBLET, 70%

Muriel URWYLER, 100%

BUDGET

SALARY AND OPERATIONAL BUDGETS (CHF)	2024	2023	2022	2021	2020
Staff salary (incl. social charges)	12 898 031	12 679 037	12 269 103	12 252 781	12 054 874
Operational budget	1 113 401	1 180 416	1 184 052	1 168 166	1 149 166
Total	14 011 432	13 859 453	13 453 155	13 420 947	13 204 040

INVESTMENT BUDGET (CHF)	2024	2023	2022	2021	2020
Faculty investment	261 977	298 890	308 134	292 653	287 577
Section investment	290 979	290 979	290 979	290 979	290 979
Total	552 956	589 869	599 113	583 632	578 556

EXTERNAL FUNDS (CHF)	2024 (**)	2023 (*)	2022	2021	2020
Research funds (SNSF and others)	6 713 306	7 960 465	6 909 748	7 040 856	6 724 496
Service agreements and related activities	916 345	1 014 920	1 307 638	783 419	890 169
Total	7 629 652	8 975 385	8 217 386	7 824 275	7 614 665

(*) Since 2023: Pre. Samer: activity rate 10% in the Section

(**) Information 2024 not transmitted for FABIP (Pr. Scapozza unit)

TOTAL BUDGET (CHF)	2024 (**)	2023 (*)	2022	2021	2020
Total	22 194 040	23 424 708	22 269 654	21 828 854	21 397 261

(*) Since 2023: Pre. Samer: activity rate 10% in the Section

(**) Information 2024 not transmitted for FABIP (Pr. Scapozza unit)

BUDGET 2024	FTE
Scientific Staff	2.40
Technicians	3.00
Laboratory and Technical Assistants	10.98
Technical and Lab Aides	0.35
Total Technical Staff	16.73
Administration heads, Departments heads, Adm Clerks	1.00
Secretaries, Accountants, Library help	8.90
Total Administrative Staff	9.90
TOTAL Technical and Administrative Staff ('PAT')	26.63
Full Professors	9.00
Associate Professors	4.17
Adjunct Professors	0.00
Subtotal Faculty	13.17
Lecturers, Academic Advisors ('Chargés d'Ens., Cons. Etudes')	4.30
Senior Lecturers ('MER, Chefs de Clinique scient.')	3.95
Senior Lecturers ('Chargés de cours')	0.65
(Senior) Research Associates ('Collab. Scientifiques I et II')	2.30
Subtotal Intermediate Corps	11.20
Total Faculty	24.37
Research and Teaching Fellows	4.20
PhD students, Post-doctoral fellows	35.83
PhD student ('Tax' Rectorate) (2022-2024) (*)	1.00
Subtotal Research and Teaching Fellows, PhD students, Post-docs	41.03
TOTAL Teaching Staff (PENS')	65.40

(*) + 0.7 EPT PhD student on Faculty of Science budget (2022-2024)

STAFF SCHOOL OF PHARMACEUTICAL SCIENCES	2024	2023	2022	2021	2020
Total	240	255	217	239	249

2024 AT A GLANCE

2024 TOTAL BUDGET (CHF)	22 194 040 (*)
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(*) Information 2024 not transmitted for FABIP (Pr. Scapozza unit)

TOTAL STUDENTS	2024	2023	2022	2021	2020
Bachelor Unige (Genève)	365	345	344	367	337
Bachelor Unil (Lausanne)	70	70	78	66	58
Bachelor Unine (Neuchâtel)	28	31	36	39	32
Master	163	155	155	209	182
Master in biomedical sciences (*)	25	26	27	28	13
Master of advanced studies	15	20	20	24	24
Total	666	647	660	733	646

(*) The Master in biomedical sciences was launched in 2020

TOTAL Ph.D STUDENTS AND POSTDOCTORAL FELLOWS	2024	2023	2022	2021	2020
Ph.D. students	97	97	117	102	113
Postdoctoral fellows	33	37	28	18	20
MA	7	10	9	9	9
Total	137	144	154	129	142

SCIENTIFIC ACTIVITIES	2024 (*)	2023	2022	2021	2020
Publications with impact factor	257	230	235	260	251
Publications without impact factor	0	38	24	30	45
Patents	6	5	6	2	9
Books and chapters	5	7	13	5	7
Congresses / conferences organisation	46	50	30	32	21
Posters presentations	190	173	212	127	58
Oral presentations	98	82	108	82	42
Invited oral presentations	112	135	102	98	77
Number of projects at FNRS and assimilated (Research funds)	98	103	92	85	85
Service agreements and related activities	41	34	24	35	23
Ph.D. theses presented	15	27	29	19	22
Awards and distinctions	28	37	34	22	23
Public outreach activities	94	82	79	20	45

(*) Information 2024 not transmitted for FABIP (Pr. Scapozza unit)

2024 KEY EVENTS

In 2024, ISPSO proceeded along the lines of the planning report 2023 – 2026. Priorities mentioned in the plan are the emergence of interdisciplinary areas, preparing for faculty retirements, strengthening existing and developing new areas of research, promoting the School's identity, and fostering equal opportunity.

Our efforts in research have resulted in a large number of scientific publications and an important number of invited presentations of our research at scientific conferences and seminars. This, and several projects, enhanced the embedding of ISPSO in national and international networks and increased its visibility.

Honors

Jean-Luc Wolfender has been appointed a foreign correspondent member of the Royal Academy of Medicine of Belgium.

Serge Rudaz joined the Scientific Advisory Board of MetaboHUB and was elected to the committee of SACAD (Geneva Academic Society).

Patrycja Nowak-Sliwinska accepted a position on the Strategic Board of the Swiss 3R Competence Center. She also joined the University Assembly and the Commission for Animals in Experimental Research (CARE).

Pascal Bonnabry and his team launched The Pharmamobile – the teaching concept that offers innovative training courses on medication for healthcare professionals and patients (co-financed by SNSF).

Awards

The 2024 Award from the Center of Competence in Analytical Chemistry and Toxicology (ccCTA) was presented to Jean-Luc Veuthey.

Stéphane Guerrier, with colleagues, received the Reproducibility Award from the Journal of the American Statistical Association (JASA) for the publication "Assessing COVID-19 Prevalence in Austria with Infection Surveys and Case Count Data as Auxiliary Information".

Nominations

Muriel Cuendet has been promoted to full professor, and Dr. Nicolas Collin, CEO of the Vaccine Formulation Lab (VFL), has been nominated as a volunteer professor at 20%. Youssef Dali passed his tenure review as an associate professor at the Faculty of Medicine.

Carole Bourquin has accepted her appointment as Professor of Pharmacology and Director of the Institute of Pharmacology at the Faculty of Medicine of the University of Bern and left ISPSO.

Educational Highlights

The first edition of the CAS Advanced Therapy Medicinal Products (developed by UNIL and ISPSO, Module 4 (Patrycja Nowak-Sliwinska), Module 7 (Gerrit Borchard)) was launched.

These include our involvement in ULLA, a prestigious consortium of 10 leading European Schools of Pharmaceutical Sciences, which fosters scientific exchange and collaborative European projects for our graduate students and faculty.

A key highlight in 2024 was spearheading the organization of the *ULLA Workshop 2025*, a four-day event to be hosted here in Geneva, bringing together experts and researchers for cutting-edge discussions and networking.

We also continued to contribute to the work on implementation via co-organisation of the 3rd Swiss Implementation Science Conference, organized by the IMPACT (Swiss Implementation Science Network) scientific network.

ANALYTICAL SCIENCES, BIOMEDICAL AND METABOLOMIC ANALYSIS

Professor Serge RUDAZ
Doctor Julien BOCCARD
Doctor Davy GUILLARME

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 and bioanalysis of pharmaceutical substances. New chromatographic supports and sample preparation approaches are evaluated, and original strategies to gain selectivity and/or sensitivity of the analytical process are developed. Reduction of the total analysis time is also studied. Special focus is given to the analytical characterization of biopharmaceutical products, including monoclonal antibodies and related compounds, as well as oligonucleotides.

The research of this group also aims at the development of new strategies for targeted and untargeted workflows in metabolomics with a focus on the analysis of low molecular weight compounds in biological matrices. Since 2010, the group is also investigating original approaches dedicated to the analysis of data produced by MS couplings, including CE. The use of chemometric tools for developing analytical methods, determining optimized or robust conditions, as well as for analysing data with pattern recognition techniques are applied in many projects within the School of Pharmaceutical Sciences and numerous external academic and/or industrial collaborations. Aspects of dimensionality reduction and multi-block analysis are addressed through collaborative projects in the fields of toxicology, biology, biochemistry, and pharmacology.

Specific research fields

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

2024 at a glance

- Publications: 30
- Patents: 0
- Book and chapters: 2
- Congresses / conferences organisation : 1
- Posters presentations: 21
- Oral presentations: 6
- Invited oral presentations: 18

- Number of projects at FNRS and assimilated (Research funds): 10
- Service agreements and related activities: 1
- Ph.D. Theses presented in 2024: 2
- Awards and distinctions: 3
- Public outreach activities: 0

Research funds

BAYER

Industry

Development of innovative analytical strategies for therapeutic peptides, oligonucleotides and radionuclide conjugates

Main applicant: Davy Guillarme

Total funding of the project: CHF 195'840.-

Total duration of the project: 3 years

Allocation 2024: CHF 58'123.20

Starting date: 01.08.2021

ROCHE-SEC-AAV

Industry

Improving the analytical methods for AAVs characterization

Main applicant: Davy Guillarme

Total funding of the project: CHF 53'341.20.-

Total duration of the project: 1 year

Allocation 2024: CHF 37'921.-

Starting date: 01.10.2023

SANOFI

Industry

Characterization and Analytical method development on mRNA products

Main applicant: Davy Guillarme

Total funding of the project: CHF 225'335.-

Total duration of the project: 1,5 years

Allocation 2024: CHF 162'257.-

Starting date: 01.03.2024

OMICS4TOOL

Institutional

Main applicants: Serge Rudaz, Julien Boccard

Total funding of the project: CHF 16'896.-

Total duration of the project: 4 years

Allocation 2024: 0.-

Starting date: 01.06.2022

SCAHT4-GL-21-01

Institutional

Bioanalytical and metabolomic readouts for toxicology

Main applicant: Serge Rudaz

Total funding of the project: CHF 420'000.-

Total duration of the project: 3 years

Allocation 2024: CHF 210'000.-

Starting date: 01.01.2021

SCAHT RV-AV 23-02

Institutional

Pathways of toxicity – mapping the underlying cell metabolism to support toxicant mixture effect investigations

Main applicants: Serge Rudaz, Isabel Meister

Total funding of the project: CHF 120'000.-
Total duration of the project: 2 years
Allocation 2024: CHF 70'000.-
Starting date: 01.01.2023

CONFIRM RC09-18

Institutional

Exploring apicomplexan diversity to discover vulnerabilities in metabolite acquisition

Main applicants: Dominique Soldati-Favre, Amandine Guerrin, Serge Rudaz

Total funding of the project: CHF 600'000.-

Total duration of the project: 3 years

Allocation 2024: CHF 15'000.-

Starting date: 01.01.2024

ME12223

SNSF

Mindfulness-Based Intervention to reduce stress and improve prosocial skills for health-care students: a translational RCT integrating clinical, neuroimaging and biomedical outcomes.

Main applicants: Camille Nemitz-Piguet, Serge Rudaz, Françoise Jermann

Total funding of the project: CHF 630'000.-

Total duration of the project: 4 years

Allocation 2024: CHF 144'182.-

Starting date: 01.02.2022

IZSEZO_225973

SNSF

Scientific Exchanges - 34th International Symposium PBA 2024

Main applicant: Serge Rudaz

Total funding of the project: CHF 17'500.-

Total duration of the project: 1 year

Allocation 2024: CHF 17'500.-

Starting date: 01.08.2024

FNS-mRNA

SNSF

Main applicant: Davy Guillarme

Total funding of the project: CHF 333'080.-

Total duration of the project: 4 years

Allocation 2024: CHF 82'770.-

Starting date: 01.11.2024

Total amount for all research funds for 2024: CHF 797'753.20.-

Service agreements and related activities

Waters-Fekete - Industry

Main applicant: D. Guillarme

Total funding of the project: CHF 39'298.-

Total duration of the project: 4 years

Allocation 2024: CHF 34'406.87.-

Starting date: 01.04.2021

Total amount (for all service agreements and related activities) for 2024: CHF 34'406.87.-

Scientific publications

Aebischer, M. K.; Chapel, S.; Guillarme, D.; Heinisch, S.

Theoretical and practical guidelines for solvent dilution between the two dimensions in online comprehensive two-dimensional liquid chromatography.

J Chromatogr A 2024, 1718, 464725.

Alberione, M. P.; Gonzalez-Ruiz, V.; von Rohr, O.; Rudaz, S.; Soldati-Favre, D.; Izquierdo, L.; Kloehn, J. N-acetylglucosamine supplementation fails to bypass the critical acetylation of glucosamine-6-phosphate required for Toxoplasma gondii replication and invasion.

PLoS Pathog 2024, 20 (6), e1011979.

Arnold, K.; Gomez-Mejia, A.; de Figueiredo, M.; Boccard, J.; Singh, K. D.; Rudaz, S.; Sinues, P.; Zinkernagel, A. S.

Early detection of bacterial pneumonia by characteristic induced odor signatures.

BMC Infect Dis 2024, 24 (1), 1467.

Bello, W.; Pezzatti, J.; Rudaz, S.; Sadeghipour, F.

Development of a generic sample preparation method using dispersive liquid-liquid microextraction for the monitoring of leachable compounds in hospital pharmacy-prepared prefilled drug products.

Anal Methods 2024, 16 (11), 1697-1707.

Bello, W.; Pezzatti, J.; Rudaz, S.; Sadeghipour, F.

Study of leachable compounds in hospital pharmacy-compounded prefilled syringes, infusion bags and vials.

J Pharm Sci 2024, 113 (11), 3227-3237.

Bouvarel, T.; Camperi, J.; Guillarme, D.

Multi-dimensional technology - Recent advances and applications for biotherapeutic characterization.

J Sep Sci 2024, 47 (5), e2300928.

D'Atri, V.; Galy, G.; Buff, M.; Imiolek, M.; Hubner, M.; Undurraga, M.; Labidi-Galy, S. I.; Guillarme, D.; Carrez, L.

Assessment of chemical stability of monoclonal antibody and antibody drug conjugate administered by pressurized intraperitoneal aerosol chemotherapy.

J Pharm Biomed Anal 2024, 251, 116410.

D'Atri, V.; Imiolek, M.; Quinn, C.; Finny, A.; Lauber, M.; Fekete, S.; Guillarme, D.

Size exclusion chromatography of biopharmaceutical products: From current practices for proteins to emerging trends for viral vectors, nucleic acids and lipid nanoparticles.

J Chromatogr A 2024, 1722, 464862.

D'Atri, V.; Lardeux, H.; Goyon, A.; Imiolek, M.; Fekete, S.; Lauber, M.; Zhang, K.; Guillarme, D.,

Optimizing Messenger RNA Analysis Using Ultra-Wide Pore Size Exclusion Chromatography Columns.

Int J Mol Sci 2024, 25 (11).

Dumas, T.; Gomez, E.; Boccard, J.; Ramirez, G.; Armengaud, J.; Escande, A.; Mathieu, O.; Fenet, H.; Courant, F.

Mixture effects of pharmaceuticals carbamazepine, diclofenac and venlafaxine on Mytilus galloprovincialis mussel probed by metabolomics and proteogenomics combined approach.

Sci Total Environ 2024, 907, 168015.

Feinberg, M.; Cléménçon, S.; Rudaz, S.; Boccard, J.

Kernel-Based Bootstrap Synthetic Data to Estimate Measurement Uncertainty in Analytical Sciences.

J Chemometr 2024, 38 (12).

Galmiche, M.; Monat, M. A.; Lopez, D. A.; Lamboley, C.; Connolly, P.; Girel, S.; Guillarme, D.; Meister, I.; Rudaz, S.

Substantial benefits of an inert biphenyl column for the analysis of steroids and their phase II metabolites in biological samples.

J Sep Sci 2024, 47 (16), e2400436.

Girel, S.; Markin, P. A.; Tobolkina, E.; Boccard, J.; Moskaleva, N. E.; Rudaz, S.; Appolonova, S. A. Comprehensive plasma steroidomics reveals subtle alterations of systemic steroid profile in patients at different stages of prostate cancer disease.

Sci Rep 2024, 14 (1), 1577.

Girel, S.; Meister, I.; Glauser, G.; Rudaz, S.

Hyphenation of microflow chromatography with electrospray ionization mass spectrometry for bioanalytical applications focusing on low molecular weight compounds: A tutorial review.

Mass Spectrom Rev 2024.

Hemida, M.; Barrientos, R. C.; Singh, A. N.; Losacco, G. L.; Wang, H.; Guillarme, D.; Larson, E.; Xu, W.; Appiah-Amponsah, E.; Regalado, E. L.

Automated multicolumn screening workflow in ultra-high pressure hydrophilic interaction chromatography for streamlined method development of polar analytes.

J Chromatogr A 2024, 1733, 465266.

Imiolek, M.; Fekete, S.; Rudaz, S.; Guillarme, D.

Ion exchange chromatography of biotherapeutics: Fundamental principles and advanced approaches.

J Chromatogr A 2025, 1742, 465672.

Jager, M. C.; Gonzalez-Ruiz, V.; Joos, F. L.; Winter, D. V.; Boccard, J.; Degenhardt, T.; Brand, S.; Rudaz, S.; Thompson, G. R., 3rd; Odermatt, A.

Assessment of the potential risk of oteseconazole and two other tetrazole antifungals to inhibit adrenal steroidogenesis and peripheral metabolism of corticosteroids.

Front Pharmacol 2024, 15, 1394846.

Langer, T.; Nicoli, R.; Guillarme, D.; Schweizer-Grundisch, C.; Rudaz, S.; Grabherr, S.; Kuuranne, T.; Musenga, A.

A novel ultra-high-performance supercritical fluid chromatography hyphenated to tandem mass spectrometry method for the analysis of urinary endogenous steroids in the anti-doping context.

J Chromatogr A 2024, 1734, 465224.

Lardeux, H.; D'Atri, V.; Guillarme, D.

Recent advances and current challenges in hydrophilic interaction chromatography for the analysis of therapeutic oligonucleotides.

TrAC, Trends Anal Chem 2024, 176.

Lardeux, H.; Stavenhagen, K.; Paris, C.; Dueholm, R.; Kurek, C.; De Maria, L.; Gnerlich, F.; Leek, T.; Czechtizky, W.; Guillarme, D.; Jora, M.

Unravelling the Link between Oligonucleotide Structure and Diastereomer Separation in Hydrophilic Interaction Chromatography.

Anal Chem 2024, 96 (24), 9994-10002.

Lioi, M.; Tengattini, S.; D'Atri, V.; Massolini, G.; Daly, S.; Temporini, C.; Guillarme, D.

Evaluating the potential of hydrophilic interaction liquid chromatography for collagen peptide mapping analysis.

J Chromatogr A 2024, 1738, 465473.

Marcellin-Gros, R.; Hevin, S.; Chevalley, C.; Boccard, J.; Hofstetter, V.; Gindro, K.; Wolfender, J. L.; Kehrli, P.

An advanced metabolomic approach on grape skins untangles cultivar preferences by *Drosophila suzukii* for oviposition.

Front Plant Sci 2024, 15, 1435943.

Nguyen, N.; Vallet, V.; Bouchoud, L.; Falaschi, L.; Rudaz, S.; Bonnabry, P.; Fleury-Souverain, S. Assessment of the surface contamination of the primary packaging of oral antineoplastic drugs and secondary packaging of chemotherapy preparations at a Swiss hospital.

J Oncol Pharm Pract 2024, 10781552241250010.

Perez-Robles, R.; Fekete, S.; Kormany, R.; Navas, N.; Guillardme, D.

Improved sample introduction approach in hydrophilic interaction liquid chromatography to avoid breakthrough of proteins.

J Chromatogr A 2024, 1713, 464498.

Poinot, H.; Dupuychaffray, E.; Arnoux, G.; Alvarez, M.; Tachet, J.; Ezzar, O.; Moore, J.; Bejuy, O.; Olesti, E.; Visconti, G.; Gonzalez-Ruiz, V.; Rudaz, S.; Tille, J. C.; Voegel, C. D.; Nowak-Sliwinska, P.; Bourquin, C.; Pommier, A.

Activation of endogenous glucocorticoids by HSD11B1 inhibits the antitumor immune response in renal cancer.

Oncoimmunology 2024, 13 (1), 2286820.

Queiroz, E. F.; Guillardme, D.; Wolfender, J. L.

Advanced high-resolution chromatographic strategies for efficient isolation of natural products from complex biological matrices: from metabolite profiling to pure chemical entities.

Phytochem Rev 2024, 23 (5), 1415-1442.

Ribay, V.; Charrier, B.; Croyal, M.; Cariou, B.; Hadjadj, S.; Boccard, J.; Cannet, C.; Dumez, J. N.; Letertre, M. P. M.; Giraudeau, P.

Hyperpolarized (13)C NMR Metabolomics of Urine Samples at Natural Abundance Applied to Chronic Kidney Disease.

J Am Chem Soc 2025, 147 (1), 644-650.

Salanon, E.; Comte, B.; Centeno, D.; Durand, S.; Pujos-Guillot, E.; Boccard, J.

An alternative for the robust assessment of the repeatability and reproducibility of analytical measurements using bivariate dispersion.

Chemometr Intell Lab 2024, 250.

Visconti, G.; de Figueiredo, M.; Monnier, J.; Shea, J.; Rudaz, S.; Glauser, G.

Fast neonicotinoid quantification in honey using the one-point internal calibration approach.

Food Chem X 2024, 23, 101565.

Rudaz, S., PBA 2024: 34th International Symposium on Pharmaceutical and Biomedical Analysis (PBA 2024), Chimia 2024, 78 (12), 889-890.

Books or books chapters

Feinberg, M.; Rudaz, S., Quantification, Validation and Uncertainty in Analytical Sciences: An Analyst's Companion, Wiley-VCH Verlag GmbH, 2024.

De Figueiredo, M.; Rudaz, S.; Boccard, J., Workflow for Knowledge Discovery from Metabolomic Data Using Chemometrics. In A Practical Guide to Metabolomics Applications in Health and Disease: From Samples to Insights into Metabolism, Ivanisevic, J.; Giera, M., Eds. Springer International Publishing: Cham, 2024; pp 161-183. Congresses / conferences and Symposia

- Congresses / conferences organisation: 1
- Posters presentations: 21
- Oral presentations: 6
- Invited oral presentations: 18

Ph.D. Theses presented in 2024

William Bello

Extractable and leachables in polymeric primary packaging
Serge Rudaz et Farshid Sadeghipour

Honorine Lardeux

Development of innovative chromatographic strategies for the analysis of oligonucleotides
Jean-Luc Veuthey et Davy Guillaume

Awards and distinction

Fiault, M.; Mieville V., Schelling C., Rudaz S., Nowak-Sliwinska P., Meister I., Synergistic effects of the anti-cancer drugs erlotinib-HCl and tubacin in 3D cell model of kidney cancer with metabolomics and lipidomics, **2024 Best Poster Award**. European PBA2024, September 9 - 12, 2024, Geneva (Switzerland).

Fiault, M.; Mieville V., Schelling C., Rudaz S., Nowak-Sliwinska P., Meister I., Metabolomics and lipidomics to characterize synergistic effects of the anti-cancer drugs erlotinib-HCl and tubacin in 3D cell model of kidney cancer, **2024 Best Poster Award**. European RFMF 2024, June 3 - 6 2024, Saint-Malo (France).

Guillaume, D., was elected among the **60 leaders and influencers in analytical science whose work is transforming the world around us for the better** – ranking in the category “human health heroes” and reported in the analytical scientist magazine, 2024.

BIOMOLECULAR AND PHARMACEUTICAL MODELLING

Professor Francesco Luigi GERVASIO

General description of the Unit

The Biomolecular & Pharmaceutical Modelling Group (FAMOB), led by Prof. Francesco Luigi Gervasio, focusses on the development of methods for drug discovery and biomolecular simulations with emphasis on enhanced sampling simulation methods and free energy calculations. The group significantly contributed to the development of methods for overcoming the timescale problem of molecular simulations (metadynamics, parallel-tempering metadynamics, path collective variables, OneOPES) which are widely used across different fields ranging from drug discovery and biophysics to nanotechnology. The group has also developed algorithms to sample hidden (cryptic) drug binding pockets in 'undruggable' proteins, such as SWISH and SWISH-X. The research group applies these methods to develop new drugs and to study a multitude of complex biophysical phenomena, including protein dynamics and folding, ligand binding, allostery, activation mechanisms in GPCRs and protein kinases, the formation of cryptic binding sites and the modes of action of cancer-causing mutations. The simulations conducted by the group have guided the design of allosteric inhibitors. The group has a number of successful collaborations with pharmaceutical companies (such as Janssen and AstraZeneca).

Specific research fields

- Understanding the regulation of proteins by allosteric mechanisms and post-translational modification.
- Developing methods to compute accurate absolute ligand binding free energies and kinetics.
- Understanding cryptic binding sites and predicting their location on pharmaceutical targets.
- Understanding the activation mechanisms of drug targets such as kinases and GPCRs.
- Combining experiments and simulations to model the dynamics of biomacromolecules.
- Combining modelling and simulations to clarify the mode of action of drug-like molecules.
- Quantifying the effects of genetic mutations on protein structure and function.
- Multi-scale simulation approach to engineer nanocarriers.

2024 at a glance

- Publications: 13
- Patents: 0
- Book and chapters: 0
- Congresses / conferences organisation: 2
- Posters presentations: 16
- Oral presentations: 5
- Invited oral presentations: 10
- Number of projects at FNRS and assimilated (Research funds): 7
- Service agreements and related activities: 1
- Ph.D. Theses presented in 2024: 3
- Awards and distinctions: 1
- Public outreach activities: 1

Research funds

FNSF

MITOpore

Main applicants: Enrica Bordignon

Co-applicants: Francesco Luigi Gervasio, Stefan Raunser

Total funding of the project: CHF 2'378'056.-

Total duration of the project: 4 years

Allocation 2024: CHF 167'603.-

Starting date: 01.12.2023

FNSF

Understanding and Modelling Cryptic Binding Pockets for Biology and Drug Discovery

Main applicant : Francesco Luigi Gervasio

Total funding of the project: CHF 679'870.-

Total duration of the project: 4 years

Allocation 2024: CHF 130'098.-

Starting date: 01.03.2022

FNSF

Development of a fragment library for efficient hotspot identification in mixed-solvent simulations

Main applicant: Francesco Luigi Gervasio

Total funding of the project: CHF 9'080.-

Total duration of the project: 3 months

Allocation 2024: CHF 9'080.-

Starting date: 01.12.2024

FNSF BRIDGE

ABCD Antibodies: Recombinant antibodies for research

Main applicant : Pierre Cosson,

Co-applicant: Francesco Gervasio

Total funding of the project: CHF 446'224.- (CHF 200'112.-)

Total duration of the project: 2 years

Allocation 2024: CHF 0.-

Starting date: 01.05.2022

H2020-EU MC ITN

ALLOstery in Drug Discovery

Main applicant: Zoe Cournia

Total funding of the project: EUR 3'669'354.-

Total duration of the project: 4 years

Allocation 2024: CHF 47'000.-

Starting date: 01.09.2021

CSCS Swiss National Supercomputing Centre Production Project

Understanding the mechanism of association of the MKK6-p38 α complex (s1169)

Main applicant : Francesco Luigi Gervasio

Total funding of the project: CHF 317'131.- (792'829 node hours)

Total duration of the project: 1 year

Allocation 2024: CHF 237'849.-

Starting date: 01.04.2024

CSCS Swiss National Supercomputing Centre Production Project
Understanding the mechanistic basis of Wnt signalling on class F GPCRs (s1228)
Main applicant : Francesco Luigi Gervasio
Total funding of the project: CHF 160'000.- (400'000 node hours)
Total duration of the project: 1 year
Allocation 2024: CHF 40'000.-
Starting date: 01.04.2023

Total amount for all research funds for 2024: CHF 631'630.-

Service agreements and related activities

Science and Technology Facilities Council (STFC)
Total amount for 2024: CHF 78'876.-

Total amount (for all service agreements and related activities) for 2024: CHF 78'876.-

Scientific publications

Calderón, J.C.; Plut, E.; Keller, M.; Cabrele, C.; Reiser, O.; Gervasio, F.L.*; Clark T.
Extended Metadynamics Protocol for Binding/Unbinding Free Energies of Peptide Ligands to Class A G-Protein-Coupled Receptors
J. Chem. Inf. Model. 2024, 64, 205–218.

Karrenbrock, M.; Rizzi, V.; Procacci, P.; Gervasio, F.L.,*
Addressing Suboptimal Poses in Nonequilibrium Alchemical
Calculations J. Phys. Chem. B 2024, 128, 1595-1605.

Iyer, R. S.; Needham, S. R.; Galdadas, I.; Davis, B. M.; Roberts, S. K.; Man, R. C. H.; Zanetti-Domingues, L. C.; Clarke, D. T.; Fruhwirth, G. O.; Parker, P. J.; Rolfe, D. J.; Gervasio F. L.*; Martin-Fernandez M. L.
Drug-resistant EGFR mutations promote lung cancer by stabilizing interfaces in ligand-free kinase-active EGFR oligomers
Nature Comm. 2024, 15, 2130.

Calderón, J.C.; Ibrahim, P.; Gobbo, D.; Gervasio, F.L.; Clark, T.
Determinants of Neutral Antagonism and Inverse Agonism in the β 2-Adrenergic Receptor
J. Chem. Inf. Model. 2024, 64, 2045-2057.

Needham, S. R.; Iyer, S.; Davis, B. M.; Galdadas, I.; Roberts, S. K.; Domingues, L. C. Z.; Clarke, D. T.; Gervasio, F. L.; Rolfe, D. J.; Martin-Fernandez, M.
Drug-Resistant EGFR Lung Cancer Mutations Promote Tumor Growth by Stabilizing Interfaces in Ligand-Free Signaling-Competent EGFR Oligomers.
Biophys. J. 2024, 123 (3), 100a–101a.

Borsatto, A.; Gianquinto, E.; Rizzi, V. Gervasio F.L.
SWISH-X, an Expanded Approach to Detect Cryptic Pockets in Proteins and at Protein–Protein Interfaces
J. Chem. Theory Comput. 2024, 20, 3335-3348.

Ding, X.; Aureli, S.; Vaithia, A.; Lavriha, P.; Schuster, D.; Khanppnavar, B.; Li, X.; Blum, T. B.; Picotti, P.; Gervasio, F. L.*; Korkhov V. M.
Structural basis of connexin-36 gap junction channel inhibition
Cell Disc., 2024, 10, 68.

Fröhlking, T.; Bonati, L.; Rizzi, V.; Gervasio, F. L.
Deep learning path-like collective variable for enhanced sampling molecular dynamics
J. Chem. Phys., 2024, 160, 174109.

Fröhlking, T.; Rizzi, V.; Aureli, S.; Gervasio F. L.
DeepLNE++ leveraging knowledge distillation for accelerated multi-state path-like collective variables
J. Chem. Phys. 2024, 161, 114102.

Karrenbrock, M.; Borsatto, A.; Rizzi, V.; Lukauskis, D. Aureli, S.; Gervasio F. L.
Absolute Binding Free Energies with OneOPES
J. Phys. Chem. Lett. 2024, 15, 9871–9880.

Febrer Martinez, P.; Rizzi, V.; Aureli, S.; Gervasio, F.L.
Host–Guest Binding Free Energies à la Carte: An Automated OneOPES Protocol
J. Chem. Theory Comput. 2024, 20, 10275-1028.

Amaro, R. et al. The need to implement FAIR principles in biomolecular simulations, arXiv preprint
arXiv:2407.16584, 2024

Tribello, G.A., et al., PLUMED tutorials: A collaborative, community-driven learning ecosystem
arXiv preprint arXiv:2412.03595, 2024

Congresses / conferences and Symposia

- Congresses / conferences organisation: 2
- Posters presentations: 16
- Oral presentations: 5
- Invited oral presentations: 10

Ph.D. Theses presented in 2024

Margaux Heritier
Computer-aided Drug Design in the Era of Cryptic Pockets, Allostereism and Event-driven Pharmacology
Prof. Leonardo Scapozza, Prof. F.L. Gervasio

Alberto Borsatto
Understanding Cryptic Binding Pockets for Biology and Drug Discovery
Prof. F.L. Gervasio

Maurice Karrenbrock
Investigating the Role of Sampling on Absolute Ligand Binding Free Energy Predictions
Prof. F.L. Gervasio

Awards and distinction

Bemelmans, M.; Gervasio, F.L., Hunting for cryptic pockets through enhanced sampling of protein dynamics **Best poster award**. ULLA Summer School 2024 Jun 29 – Jul 6 2024, Leiden (The Netherlands).

Public outreach activities (radio, television and other media, community service)

Galdadas, I.; Gervasio, F.L.; Juyoux, P. When two kinases go for a dance, TheScienceBreaker
10 (3), 2024

BIOPHARMACY

Professor Gerrit BORCHARD
Doctor Olivier JORDAN

General description of the Unit

The Biopharmacy lab focuses on the understanding on complex drugs of biological and non-biological origin such as therapeutic proteins, nanomedicines and vaccines by using physico-chemical characterization of complex drugs, developing *in vitro* models representing tissues involved in absorption, metabolism and immune response, and by *in vivo* studies.

We strive to optimize the interaction between complex drugs and biological systems in terms of an enhanced efficacy and safety. With regard to the technological part, we are engaged in the development of new formulations and vectors for complex drug applications in a targeted and individualized manner. Such vectors are based on the synthesis of novel (bio) polymers functionalized with functional targeting moieties such as peptides, antibody fragments, and aptamers. From a therapeutic point of view, we are focusing on vaccination against infectious diseases and new approaches for cancer (immuno)therapy. Finally, our technical knowledge and scientific expertise allow us to be involved in discussions on complex medicines with regulatory authorities and pharmacopoeias.

Specific research highlight

Antimicrobial resistance threatens the effective prevention and treatment of an ever-increasing range of infected patients, underscoring the urgent need for next-generation treatments. In this context, in collaboration with peptide chemists at University of Bern and clinicians at CHUV, we developed novel nanocarriers based on biopolymer conjugates of antimicrobial peptides (AMPs).

Our innovative conjugation strategy potentiates the antimicrobial effect, enabling a prolonged antibacterial action. The cationic AMP derivatives possess a high potency against *P. aeruginosa*, resulting in extremely low side effects such as haemolysis, benefiting from a synergistic effect between the chitosan carrier and the AMP. The results made the back cover of Advanced Healthcare Materials this year

2024 at a glance

- Publications: 32
- Patents: 2
- Book and chapters: 0
- Congresses / conferences organisation: 5
- Posters presentations: 20
- Oral presentations: 10
- Invited oral presentations: 19
- Number of projects at FNRS and assimilated (Research funds): 7
- Service agreements and related activities: 1
- Ph.D. Theses presented in 2024: 0
- Awards and distinctions: 4
- Public outreach activities: 1

Research funds

VIFOR

Category: Institutional

Bio-Nano Interface Study (BINIS)

Main applicant: Gerrit Borchard

Total funding of the project: CHF 197'653.50.-

Total duration of the project: 2 years

Allocation 2024: CHF 59'510.-

Starting date: 01.01.2024

FNRS P5R5PM-214509

Category: SNSF

Revamping 3D-Bioprinted Skin Scaffolds for Long-Term

Cryopreservation and Lyophilisation

Main applicant: Viorica Patrulea

Total funding of the project: CHF 131'692.-

Total duration of the project: 1.5 years

Allocation 2024: CHF 0.-

Starting date: 01.02.2023

FNRS LAAGP0-215787

Category: SNSF

Pharmascope: an interactive pedagogical approach to drive pharmaceutical sciences closer to secondary school students

Main applicants: Gerrit Borchard, Pascal Bonnabry

Total funding of the project: CHF 197'232.-

Total duration of the project: 3 years

Allocation 2024: CHF 41'745.-

Starting date: 01.11.2023

UNITHER DEVELOPPEMENT BORDEAUX

Category: Institutional

Main applicant: Gerrit Borchard

Total funding of the project: CHF 19'156.83.-

Total duration of the project: 3 years

Allocation 2024: CHF 3'248.93.-

Starting date: 01.07.2022

OPI (Office de Promotion des Industries et des Technologies)

Category: OPI

Title of the research project: Antimicrobial peptides and regenerative medicine

Main applicants: Viorica Patrulea, Louna Regenerative S.A.

Total funding of the project: CHF 38'000.-

Total duration of the project: 1 year

Allocation 2024: CHF 15'000.-

Starting date: 01.05.2024

INNOSUISSE 110.129 IP-LS

Category: Institutional

Title: Artemix, an innovative drug delivery formulation to fight vessel stenosis after vascular surgery

Applicants: Olivier Jordan, Laurent Vinet

Total funding of the project: CHF 431'362.-

Total duration of the project: 18 + 3 months

Allocation 2024: CHF 215'681.-

Starting date: 01.01.2024

INNOSUISSE 104.575 IP-LS

Category: Institutional

Title: LBL Coated Vascular Grafts

Main applicant: Philippe Reymond

Co-applicant: Olivier Jordan

Total duration of the project: 18 months

Allocation 2024-2025: CHF 15'700.-

Starting date: 01.02.2024

Total amount for all research funds for 2024: CHF 350'884.93.-

Service agreements and related activities

Innogap Fund

Total amount for 2024 CHF 30'000.-

Jordan Industrie

Total amount for 2024 CHF 37'370.66.-

Frankfurt Foundation Quality of Medicines (FFQM)

Total amount for 2024 CHF 15'133.71.-

Total amount for all research funds for 2024: CHF 82'504.37.-

Scientific publications

Marques, C.; Borchard, G.; Jordan, O.

Unveiling the challenges of engineered protein corona from the proteins' perspective.

Int J Pharm 2024 vol. 654, p. 123987

doi: 10.1016/j.ijpharm.2024.123987

Brito, M.; Sorbier, C., Mignet, N.; Boudy, V.; Borchard, G.; Vacher, G.

Understanding the Pathophysiological mechanisms of age-related macular degeneration and the impact of polyunsaturated fatty acids on the disease: a review

Int. J. Mol. Sci. 2024 vol. 25, no. 7, p. 4099

doi: 10.3390/ijms25074099

Petrović, M.; Majchrzak, O.B.; Amreen Mohamed Hachime Marecar, R.; Laingoniaina, A.;

Walker, P.R.; Borchard, G.; Jordan, O.; Tankov, S.

Combining of anti-miR-25 and cGAMP nanocomplexes enhances immune responses via M2 macrophage reprogramming.

Int J. Mol. Sci. 2024 vol. 25, no. 23, p. 12787

doi: 10.3390/ijms252312787

Tankov, S.; Petrović, M.; Lecoultré, M.; Espinoza Rojas, F.I.; El Harane, N.; Bes, V.; Chliate, S.; Martinez Bedoya, D.; Jordan, O.; Borchard, G.; Migliorini, D.; Dutoit Vallotton, V. Walker, P.R.

Hypoxic glioblastoma-cell-derived extracellular vesicles impair CGAS-STING activity in macrophages.

Cell commun Signal. 2024 vol. 22, 144

doi: 10.1186/s12964-024-01523-y

Nikolić, I.; Doković, J.; Mehn, D.; Guerrini, G.; Savic, S.; Jordan, O.; Borchard, G.

When conventional approach in toxicity assays falls short for nanomedicines: a case study with nanoemulsions.

Drug Deliv. and Translat. Res 2025.

doi:10.1007/s13346-024-01776-7

- Peletta, A.; Marmy, S.; Guzelj, A.; Ramos Barros, A.; Jakopin, Ž.; Borchard, G.
Preliminary results on novel adjuvant combinations suggest enhancement immunogenicity of whole inactivated pandemic influenza vaccines.
Front. Drug Deliv. 4 (2024)
doi: 10.3389/fddev.2024.1382266
- Caputo, F.; Favre, G.; Borchard, G.; Calzolari, L.; Fisicaro, P.; Frejafon, E.; Günday-Türeli, N.; Koltsov, D.; Minelli, C.; Nelson, B.C.; Parot, J.; Prina Mello, A.; Zou, S.; Ouf, F.-X.
The international standardization roadmap for nanomedicine.
Drug Del. Translat. Res. (2024)
doi: 10.1007/s13346-024-01646-2
- Micheels, P.; Porcello, A.; Bezzola, T.; Perrenoud, D.; Quinodoz, P.; Yogeshvar, K.; Allémann, E.; Laurent, A.; Jordan, O.
Clinical perspectives on the injectability of cross-linked hyaluronic acid dermal fillers: A standardized methodology for commercial product benchmarking with inter-injector assessments.
Gels 2024 vol. 10, no. 2, 101
doi: 10.3390/gels100201101
- Rossier, B.; Jordan, O.; Allémann, E.; Rodriguez-Nogales, C.
Nanocrystals and nanosuspensions: an exploration from classic formulations to advanced drug delivery systems.
Drug Deliv. and Transl. Res., vol. 14, no 12, P. 3438-3451
doi: 10.1007/s13346-024-01559-0
- Gonzalez Fernandez, P.; Simula, L.; Jenni, S.; Jordan, O.; Allémann, E.
Hyaluronan-based hydrogel delivering glucose to mesenchymal stem cells intended to treat osteoarthritis.
Int J Pharm, vol. 657, 124139
doi: 10.1016/j.ijpharm.2024.124139
- Morici, L.; Allémann, E.; Rodríguez-Nogales, C.; Jordan, O.
Cartilage-targeted drug nanocarriers for osteoarthritis therapy.
Int J Pharm. 2024 Oct 16; 666:124843
doi: 10.1016/j.ijpharm.2024.124843
- Morici, L.; Gonzalez-Fernandez, P.; Jenni, S.; Porcello, A.; Allémann, E.; Jordan, O.; Rodriguez-Nogales, C.
Nanocrystal-chitosan particles for intra-articular delivery of disease-modifying osteoarthritis drugs.
Int J Pharm 2024. 651:123754
- Jordan, O.; Gan, B.H.; Perron, K.; Alwan, S.; Sublet, E.; Ducret, V.; Ye, H.; Borchard, G.; Reymond, J.-L.; Patrúlea, V.
Highly potent cationic chitosan derivatives coupled to antimicrobial peptide dendrimers to combat pseudomonas aeruginosa.
Adv Healthcare Mat 2024, e2304118
doi: 10.1002/adhm.202304118
- Fuenteslópez, C. V.; Gray, M.; Bahcevanci, S.; Martin, A.; Smith, C. A. B.; Coussios, C.; Cui, Z.; Ye, H.; Patrúlea, V.
Mesenchymal stem cell cryopreservation with cavitation-mediated trehalose treatment. Communications Engineering 2024, 3 (129)
doi: 10.1038/s44172-024-00265-6

Flahaut, M.; Laurent, A.; Fuenteslópez, C. V.; Cui, Z.; Ye, H.; Scaletta, C.; Hirt-Burri, N.; Applegate L. A.; Patrúlea, V.

Reassessing Long-Term Cryopreservation Strategies for Improved Quality, Safety, and Clinical Use of Allogeneic Dermal Progenitor Cells.

J Invest Dermatol 2024, 144 (10), 2125-2135

doi: 10.1016/j.jid.2024.06.1285

Marquet, F.; Hagen, H.; Stanchieri, M.; Serre Beinier, V.; Grasso, G.; Danani, A.; Patrúlea, V.; Borchard, G.

Clickable polyethyleneimine incorporated into triblock copolymeric micelles as an efficient platform in the delivery of siRNA to NSCLC cells.

Int J Pharm 2024, 649, 123632

doi: 10.1016/j.ijpharm.2023.123632

INSIDE BACK COVER: Jordan, O.; Gan, B. H.; Alwan, S.; Perron, K.; Sublet, E.; Ducret, V.; Ye, H.; Borchard, G.; Reymond, J.-L.; Patrúlea, V.

Highly potent cationic chitosan derivatives coupled to antimicrobial peptide dendrimers to combat pseudomonas aeruginosa.

Adv Healthcare Mater 2024, 13: 2470124

doi: 10.1002/adhm.202470124

Yahiaoui, S.; Kati, D.E.; Chaalal, M.; Mohamed Ahmed Ali, L.; El Cheikh, K.; Depaepe, G.; Morère, A.; Menut, C.; Bettache, N.; Mostapha, B.B.

Antioxidant, antiproliferative, anti-inflammatory, and enzyme inhibition potentials of Ficus carica wood bark and related bioactive phenolic metabolites.

Wood Sci Technol 58, 1051–1075 (2024)

doi: 10.1007/s00226-024-01549-y

Sales, A.F.S.; Dos Santos, J.S.K.; De Souza, A.; Bonifacio, M.; Araújo, T.A.T.; De Almeida Cruz, M.; Costa, M.B.; Ribeiro, D.A.; Assis, L.; Martignago, C.C.S.; Rennó, A.C.

Association of a skin dressing made with the organic part of marine sponges and photobiomodulation on the wound healing in an animal model.

Marine biotechnology, 2024, 26 (2), 276-287

doi: 10.1007/s10126-024-10295-y

Bonifacio, M.; Garcia-Motta, H.; Martignago, C.C.S.; Souza-Silva, L.C.; Parisi, J.R.; Andrade, A.L.M.; Assis, L.; Ribeiro, D.A.; Rennó, A.C.

Mesenchymal stem cell-enriched hydrogels for the treatment of knee joint disorders: A Systematic Review. Regenerative Engineering And Translational Medicine, 2024, 1-19

doi: 10.1007/s40883-024-00339-z

Martignago, C.C.S.; Bonifacio M.; Ascimann L.T.; Vassão P.G.; Parisi J.R.; Renno A.P.; Garcia L.A.; Ribeiro D.A.; Renno A.C.M.

Efficacy and safety of intense pulsed light in rosacea: A systematic review.

Indian J Dermatol Venereol Leprol. 2024, 90(5), 599-605

doi: 10.25259/IJDVL_1029_2022

Dos Santos A.K.F.; Martignago C.C.S.; de Andrade A.L.M.; Assis, L.; Pessoa, R.S.; Costa, D.A.; Dos Santos, L.; Tim, C.

A clinical study on the efficacy of high frequency therapy on nasolabial and periorbital wrinkles. J Cosmet Laser Ther. 2024 Nov 14:1-8

doi: 10.1080/14764172.2024.2427018

de A Cruz M; Sousa K.S.J.; Avanzi I.R.; De Souza, A.; Martignago, C.C.S.; Delpupo, F.V.B.; Simões, Mariana C.; Parisi, J.R.; Assis, L.; De Oliveira, F.; Granito, R.N.; Laakso, E.; Renno, A.C.

In vivo effects of Biosilica and spongin-like collagen scaffolds in the healing process in osteoporotic rats.

Mar Biotechnol. 2024, 26 (5), 1053-1066

doi: 10.1007/s10126-024-10356-2

Godoi S.; Sant'Ana E.; Renno A.C.M.; Martignago, C.C.S.; Tim, C.R.; Assis, L.
Evaluation of the photothermal effects of the subdermal high-power laser in the skin of an experimental rat model. *Lasers Med Sci.* 2024, 39 (1), 230
doi: 10.1007/s10103-024-04182-0

Camargo C; Tim C; Martignago C.C.S.; Renno, A.C.M.; Silva, P.C.E.; Andrade, A.L.M.; Pichara, J.; Morato, E.C.P.; Souza, J.R.; Assis, L.
Clinical evaluation of combined autologous Platelet-Rich Plasma and Volume-Controlled Ozone Therapy in Facial Rejuvenation: A randomized controlled Pilot Study.
An Acad Bras Cienc. 2024;96
doi: /10.1590/0001-3765202420240402

Macedo, J.B.; Macedo, D.B.; Martignago, C.C.S.; Renno, A.C.M.; Sanfelice, R.C.; Tim, C.R.; Assis, L.; Pavinatto, A.
Probing the effects of chitosan-based membranes with different molecular weights on their biocompatibility and antimicrobial activity.
Polymer Bulletin, 2024
doi: 10.1007/s00289-024-05619-w

Pichara Morais, J.; Kido, H.W.; Tim, C.R.; Martins, A.L.M.; Martignago, C.C.S.; Renno, A.C.M.; Cogo, J.; Amaral, M.M.; Marcos, R.L.; Bezerra Santana, V.; Baptista, A.; Dos Santos Batista Bittencourt, E.; Liebano R.E.
In vitro investigation of the antimicrobial potential and cell viability of different dosages of ozone therapy.
Ozone-Science & Engineering, 2024, 1-12
doi: 10.1080/01919512.2024.2336977

Santos, L.H.G.; Assis, L.; Tim, C.R.; Tir, S.; Martignago, C.C.S.M.; Bonifacio, M.; Vasilceac, F.; Trevisan, M.S.; Ribeiro, D.A.; Cunha, L.C.L.; Parizotto, N.A.; Renno, A.C.M.R.
Effectiveness of photobiomodulation and resistive exercise on cartilage tissue in osteoarthritic rats. *LASER THERAPY*, 2024, 31 (2).

Yahiaoui, S., Kati, D.E., Chaalal, M. et al.
Antioxidant, antiproliferative, anti-inflammatory, and enzyme inhibition potentials of *Ficus carica* wood bark and related bioactive phenolic metabolites. *Wood Sci Technol* 58, 1051–1075 (2024).

Guidelines

RNA vaccines for human use (5.36), covering mRNA packaged in lipid nanoparticles, i.e. mRNA-LNP medicinal products. 12th Edition of the European Pharmacopoeia (online).

mRNA substances for the production of mRNA vaccines for human use (5.39), covering mRNA active substances used in the manufacture of mRNA vaccines. 12th Edition of the European Pharmacopoeia (online).

DNA template for the preparation of mRNA substances (5.40), covering the linear DNA template used as the starting material for the preparation of mRNA substances. 12th Edition of the European Pharmacopoeia (online).

Patents

Morere, A.; Depaepe, G.; Basile I.; Maynadier, M.; Morere, E.; El Cheikh, K.; Garcia M., Conjugates targeting the cation-independent mannose 6-phosphate receptor and bone tissue 2024, Patent number WO2024184607A1.

Morere, A.; Depaepe, G.; Morere E.; Basile I.; Daurat, M.; Maynadier, M.; El Cheikh, K.; Garcia M., Pro-ligands in the form of analogues of mannose 6-phosphate or mannose, conjugates comprising said pro-ligands, and uses thereof for therapeutic applications 2024, Patent number WO2024246474A1.

Congresses / conferences and Symposia

- Congresses / conferences organisation: 5
- Posters presentations: 20
- Oral presentations: 10
- Invited oral presentations: 19

Awards and distinction

Majchrzak, O.; Jordan, O.; Borchard, G.

Targeting Cancer Stem Cells in Triple Negative Breast Cancer with Polymeric Nanoparticles, **TOP Poster Award**, Controlled Release Society Annual Meeting and Expo, 8-12 July 2024, Bologna, Italy

Patrulea, V.

Nominated as Woman in Science and Scientist accomplishing “The Next Impossible” by Merck, FEB 2024

Patrulea, V. et Louna Regenerative S.A.

Antimicrobial peptides and regenerative medicine. Pitch Event **Prix OPI**, 3 October 2024, Geneva (Switzerland)

Patrulea, V., et Louna Regenerative S.A.

Dynamiser la régénération de la peau. **Prix Coup de Cœur OPI**, 26 November 2024, Geneva (Switzerland)

Public outreach activities (radio, television and other media, community service)

Patrulea, V., et Louna Regenerative S.A.

Dynamiser la régénération de la peau. OPI Video for Prix Coup de Cœur, November 13th, 2024, Geneva (Switzerland) ; website: https://www.opi.ch/fr/actualites/prix-coup-de-coeur-2024-louna_unige/

BIOPHYSICAL AND BIOANALYTICAL MASS SPECTROMETRY

Professor Valérie GABELICA

General description of the Unit

Our team develops advanced mass spectrometry methods for biophysics (folding, drug-target interaction) and biomolecule analysis, especially nucleic acids. One of our specialties is “native” mass spectrometry (the study of non-covalent interactions by mass spectrometry) of nucleic acids structures and their complexes. The three main areas of research are fundamental developments in mass spectrometry for structural analysis (ion mobility spectrometry, ion fragmentation with electrons or lasers, and development of ion spectroscopy approaches to probe chirality), in oligonucleotide characterization (natural modifications of RNA and especially tRNA, oligonucleotide therapeutics top-down sequencing and higher-order structure characterization), and in drug discovery (drug regulation of gene expression by targeting DNA or RNA, in particular G-quadruplexes, and other applications in drug-target biophysical characterization with mass spectrometry). Although rooted in analytical chemistry, our work is multi-disciplinary, spanning from fundamental research (molecular recognition, manipulating isolated ions in the mass spectrometer) to biological and biomedical sciences (drug design and screening, biophysics, biological therapeutics). Our top-notch instrumentation includes three high resolution ion mobility mass spectrometers, and one ion trap mass spectrometer coupled with lasers.

Specific research fields

- Mass spectrometry (MS)
- Ion mobility spectrometry (IMS)
- Laser spectroscopy
- Oligonucleotides
- Drug-target interactions
- Biophysics

2024 highlights

- The lab was started in January 2024 and now has 7 members (the PI, a senior research associate, four PhD students and 1 post-doc). The final installation of all instruments in renovated spaces is planned for the end of 2026.
- We acquired and installed in November 2024 a unique prototype mass spectrometer with an Omnitrap. Under a collaboration agreement with Bruker Switzerland AG, we have privileged access to R&D information and help of R&D personnel to customize the Omnitrap platform for oligonucleotide characterization.
- We published an important original article on interpreting collision-induced unfolding profiles to deduce relative intramolecular binding forces in nucleic acid structures.

2024 at a glance

- Publications: 4
- Patents: 0
- Book and chapters: 0
- Congresses / conferences organisation: 0
- Posters presentations: 4
- Oral presentations: 1
- Invited oral presentations: 7
- Number of projects at FNRS and assimilated (Research funds): 7
- Service agreements and related activities: 2
- Ph.D. Theses presented in 2024: 0
- Awards and distinctions: 0
- Public outreach activities: 0

Research funds

SEFRI - UE9-MOBILITRAIN-MSCA

Institutional

Mesures transitoires relatives au paquet Horizon 2021-2027

Financement de la participation du/de la bénéficiaire au projet « MobiliTraiN » du programme-cadre pour la recherche et l'innovation de l'Union européenne Horizon Europe sur le mode « projet par projet >> (24.00091, 101119562)

Main applicant: V. Gabelica

Total funding of the project: CHF 298'800.-

Total duration of the project: 4 years

Allocation 2024: CHF 149'400.-

Starting date: 01.02.2024

SNSF R'Equip

SNSF

The Omnitrap platform coupled to a high-resolution mass spectrometer: a Swiss army knife to dissect complex molecular structures

Main applicant: V. Gabelica

Total funding of the project: CHF 573'000.-

Total duration of the project: 1 year

Allocation 2024: CHF 573'000.-

Starting date: 01.07.2024

Fondation Ernst et Lucie Schmidheiny

Institutional

Cofinancement de l'acquisition d'un spectromètre de masse haute résolution doté d'un Omnitrap

Main applicant: V. Gabelica

Total funding of the project: CHF 40'000.-

Total duration of the project: 6 months

Allocation 2024: CHF 40'000.-

Starting date: 01.06.2024

Fondation Boninchi

Institutional

Cofinancement de l'acquisition d'un spectromètre de masse haute résolution doté d'un Omnitrap

Main applicant: V. Gabelica

Total funding of the project: CHF 50'000.-

Total duration of the project: 6 months

Allocation 2024: CHF 50'000.-

Starting date: 01.06.2024

SACAD

Institutional

Cofinancement de l'acquisition d'un spectromètre de masse haute résolution doté d'un Omnitrap

Main applicant: V. Gabelica

Total funding of the project: CHF 50'000.-

Total duration of the project: 6 months

Allocation 2024: CHF 50'000.-

Starting date: 01.06.2024

COMAD

Institutional

Cofinancement de l'acquisition d'un spectromètre de masse haute résolution doté d'un Omnitrap

Main applicant: V. Gabelica

Total funding of the project: CHF 70'000.-

Total duration of the project: 6 months

Allocation 2024: CHF 70'000.-

Starting date: 01.06.2024

Fonds Général de l'Université

Institutional

Cofinancement de l'acquisition d'un spectromètre de masse haute résolution doté d'un Omnitrap

Main applicant: V. Gabelica

Total funding of the project: CHF 30'000.-

Total duration of the project: 6 months

Allocation 2024: CHF 30'000.-

Starting date: 01.06.2024

Total amount for all research funds for 2024: CHF 962'400.-

Service agreements and related activities

Bruker Switzerland AG

Industry

Refining and understanding the operation of trapped ion mobility spectrometry

Main applicant: V. Gabelica

Total funding of the project: CHF 0.- (in kind: instrument installed in our laboratory and time commitment of R&D personnel at Bruker Switzerland AG and Bruker Daltonics GmbH)

Total duration of the project: 5 years

Allocation 2024: CHF 0.-

Starting date: 01.04.2024

Bruker Switzerland AG

Industry

Using a mass spectrometry platform incorporating trapped ion mobility and Fasmatech's Omnitrap to characterize bio-oligomers

Main applicant: V. Gabelica

Total funding of the project: CHF 0.- (special discount on the timsTOF-Omnitrap and time commitment of R&D personnel at Bruker Switzerland AG and Fasmatech in Athens)

Total duration of the project: 4 years

Allocation 2024: CHF 0.-

Starting date: 08.11.2024

Total amount for all research funds for 2024: CHF 0.-

Scientific publications

Benabou, S.; de Juan, A.; Gabelica, V.

Probing the Intramolecular Folding of Nucleic Acids with Native Ion Mobility Mass Spectrometry: Strategies and Caveats. *Anal. Chem.* 2024, 96 (49), 19277-19285.

Guzman-Lorite, M.; Rosu, F.; Marina, M. L.; Garcia, M. C.; Gabelica, V.

miRNA and DNA analysis by negative ion electron transfer dissociation and infrared multiple-photon dissociation mass spectrometry. *Anal. Chim. Acta* 2024, 1299, 342431.

Di Carluccio, C.; Cerofolini, L.; Moreira, M.; Rosu, F.; Padilla-Cortes, L.; Gheorghita, G. R.; Xu, Z.; Santra, A.; Yu, H.; Yokoyama, S.; et al.

Molecular Insights into O-Linked Sialoglycans Recognition by the Siglec-Like SLBR-N (SLBR(UB10712)) of *Streptococcus gordonii*. *ACS Cent. Sci.* 2024, 10, 447-459.

Juribasic Kulcsar, M.; Gabelica, V.; Plavec, J.

Solution-State Structure of a Long-Loop G-Quadruplex Formed Within Promoters of *Plasmodium falciparum* B var Genes. *Chem. Eur. J.* 2024, 30, e202401190.

Congresses / conferences and Symposia

- Congresses / conferences organisation: 0
- Posters presentations: 4
- Oral presentations: 1
- Invited oral presentations: 7

CLINICAL PHARMACOLOGY AND TOXICOLOGY

Professor Caroline SAMER

General description of the Unit

FATOX Unit aims at personalizing and securing drug therapies (personalized or precision medicine approach) by measuring gene-environment-disease interactions at the pharmacokinetic level (drug interactions, in-vitro / in-vivo / in-silico prediction) and exploiting advances of various -omics technologies, including pharmacogenomics. We study in particular the variation of drug responses by evaluating drug transport and enzymes involved in the metabolism of xenobiotics such as cytochromes P450.

Specific research fields

a) Development and optimization of tools and models for pharmacological and toxicological applications: in vitro models for assessing drug metabolism and transport (hepatic microsomes, 3D cell models), physiology-based pharmacokinetic prediction and simulation models (PBPK) of drug-genetic-disease interactions, in-vivo tools for the characterization of metabolism and drug transport (phenotyping cocktail).

b) Research of "omic" biomarkers of sensitivity and exposure to xenobiotics. The therapeutic substances studied (Phase I and IV clinical trials) are in particular opioid analgesics and paracetamol as well as thienopyridines antiaggregants and oncology treatments, as well as evaluating the role of genomics in the assessment of adverse drug reactions,

c) Computerized decision support and prescription security tools, as well as the contribution of linguistic data analysis (AI) with the help of data science specialists.

We promote translational research by strengthening synergies between basic science and clinical medicine. We have active collaborations with many research groups and clinical services (e.g., the faculty center for translational research in biomarkers, oncopediatrics, internal medicine, hemostasis, anesthesia, medical information sciences) and at the interfaculty level with ISPSO, as well as national and international collaborations.

In more detail, our collaborations with ISPSO are the following:

Prof. Carole Bourquin

Prof. Patrycja Nowak

Prof. Serge Rudaz

Prof. Jean-Luc Wolfender

Prof. Emerson Queiroz

Other collaborations are underway with different groups at the HUG and the Faculty of Medicine:

Prof. P. Fontana and Prof. J.L. Reny's Geneva Platelet group

Dr Markus Kosel's psychiatric group

Prof. Christian Lovis's group

Prof. Marc Ansari's oncopediatric group

Prof. Olivier Michielin's group

Dr Fadi Haidar (nephrology)

Dr Benjamin Assouline (ICU)

National and International collaborations:

Prof. Aurelien Thomas' group (Lausanne University, CURML); Swiss Center for Applied Human Toxicology;

Prof. Brahim Achour Certara (Simcyp) and the University of Manchester UK, and Rhode Island University USA.

2024 at a glance

- Publications: 27
- Patents: 3
- Book and chapters: 1
- Congresses / conferences organisation: 2
- Posters presentations: 7
- Oral presentations: 3
- Invited oral presentations: 8
- Number of projects at FNRS and assimilated (Research funds): 5
- Service agreements and related activities: 1
- Ph.D. Theses presented in 2024: 1
- Awards and distinctions: 1
- Public outreach activities: 7

Research funds

FNS 32003B_215662 / 1

Division biologie et médecine

Metabolomic approaches for the discovery of new biomarkers of cytochrome P450 activity

Main Applicants: Youssef Daali, Caroline Samer, Aurélien Thomas

Total funding of the project: CHF 720'000.-

Total duration of the project: 4 years

Allocation 2024: CHF 224'929.-

Starting date: 01.04.2023

Hôpitaux Universitaires de Genève

Projet de Recherche et Développement 16-2022-I

Impact du polymorphisme génétique sur les interactions médicamenteuses impliquant le cytochrome P450 (CYP) 2C19: Risque de phénoconversion chez les individus sains dont le genotype du CYP2X19 suggère un statut de métaboliseur rapide, normal et intermédiaire

Main Applicants: Caroline Samer, Youssef Daali

CHF 50'000.-

Total duration of the project: 3 years

Allocation 2024: CHF 0.-

Starting date: 13.06.2022

Hôpitaux Universitaires de Genève

Projet de Recherche et Développement

Thrombotic risk in patients with nephrotic syndrome: will better pathophysiological insight improve current predictive tools?

Main Applicant: Jean Terrier

CHF 50'000.-

Total duration of the project: 3-5 years

Allocation 2024: CHF 4'698.12.-

Starting date: 01.01.2020

Hôpitaux Universitaires de Genève

Fondation privée des HUG

Projet Patient-Processus

Drug prescription in adults with intellectual disability: current practice and impact of the Tool to improve prescription in intellectual disability (TOP-ID)

Main Applicant: Marie Besson

CHF 200'000.-

Allocation 2024: CHF100'000.-

Starting date: 01.03.2023

2 years

Hôpitaux Universitaires de Genève

Développement et validation d'un modèle pharmacologique basé sur la physiologie pour prédire le passage central des antipsychotiques

Main Applicant: Myriam El Biali

CHF 10'000.-

Allocation 2024: CHF 10'000.-

Starting date: 01.11.2024

3 years

Total amount for all research funds for 2024: CHF 339'627.12.-

Service agreements and related activities

SCAHT for the coordination MAS TOX

Total amount for 2024: CHF 20'000.-

Total amount (for all service agreements and related activities) for 2024: CHF 20'000.-

Scientific publications

Balaphas, A.; Sempoux, C.; Samer, CF.; Chtioui, H.; Saadi, A.

Roux-en-Y gastric bypass in a patient with Wilson's disease and obesity.

J Hepatol 2024, Dec.

Gloor, Y.; Mouterde, M.; Terrier, J.; Lenoir, C.; Gosselin, P.; Rollason, V.; Reny, JL.; Boukouvala, S.; Al-Yahyaee, S.; Yimer, G.; Cerny, V.; Poloni, ES.; Samer, CF.; Daali, Y.

Cytochrome P450 phenotyping using the Geneva cocktail improves metabolic capacity prediction in a hospitalized patient population.

Br J Clin Pharmacol 2024, Dec 19.

Bennani, Y.; Ben Hassine, K.; Gencaslan, M.; Boudal-Khoshbeen, M.; Samer, C.; Ansari, M.; Daali, Y.; Satyanarayana Uppugunduri, CR.

In vitro screening of UGT2B10 in silico prioritized putative ligands from drugs used in the pediatric hematopoietic stem cell transplantation setting.

Pharmacol Res Perspect 2024, Dec 12 (6).

Abouir, K.; Varesio, E.; Déglon, J.; Samer, C.; Daali, Y.

Improving CYP2C19 phenotyping using stereoselective omeprazole and 5-hydroxy-omeprazole metabolic ratios.

Basic Clin Pharmacol Toxicol 2024, Dec 135(6), 755-766.

Martischang, R.; Nikolaou, A.; Daali, Y.; Samer, CF.; Terrier, J.

Guidance on Selecting Optimal Steady-State Tacrolimus Concentrations for Continuous IV Perfusion : Insights from Physiologically Based Pharmacokinetic Modeling.

Pharmaceuticals 2024, 17(8) :1047

Abouir, K.; Exquis, N.; Gloor, Y.; Daali, Y.; Samer, CF.

Phenoconversion Due to Drug-Drug Interactions in CYP2C19 Genotyped Healthy Volunteers. Clin Pharmacol Ther 2024, Oct ;116(4) :1121-1129

Suppan, M.; Suppan, L.; Beckmann, TS.; Samer, CF.; Savoldelli, GL.

Enhancing Response Rates in Web-Based Surveys: The Impact of Direct Participant Contact.

Healthcare 2024, Jul 19 ;12(14)

Elangovan, H.; Stokes, RA.; Keane, J.; Chahal, S.; Samer, C.; Agoncillo, M.; Yu, J.; Chen, J.; Downes, M.; Evans, RM.; Liddle, C.; Gunton, JE.

Vitamin D Receptor Regulates Liver Regeneration After Partial Hepatectomy in Male Mice.

Endocrinology 2024, Jul 1 :65(8)

Waters, ML.; Dargan, PI.; Yates, C.; Dines, AM.; Eyer, F.; Giraudon, I.; Heyerdahl, F.; Hovda, KE.; Liechti, ME.; Miro, O.; Vallersnes, OM.; Anseeuw, K.; Badaras, R.; Bitel, M.; Bonnici, J.; Brvar, M.; Caganova, B.; Calyskan, F.; Ceschi, A.; Chamoun, K.; Daveloose, L.; Galicia, M.; Gartner, B.; Gorozia, K.; Grenc, D.; Gresnigt, FMJ.; Hondebrink, L.; Jürgens, G.; Konstari, J.; Kutubidze, S.; Laubner, G.; Liakoni, E.; Liguts, V.; Lyphout, C.; McKenna, R.; Mégarbane, B.; Moughty, A.; Nitescu, GV.; Nosedá, R.; O'Connor, N.; Paasma, R.; Ortega Perez, J.; Perminas, M.; Persett, PS.; Pöld, K.; Puchon, E.; Puiguriguer, J.; Radenkova-Saeva, J.; Rulisek, J.; Samer, C.; Schmid, Y.; Scholz, I.; Stasinskis, R.; Surkus, J.; Van den Hengel-Koot, I.; Vigorita, F.; Vogt, S.; Waldman, W.; Waring, WS.; Zacharov, S.; Zellner, T.; Wood, DM.
Clinical effects of cannabis compared to synthetic cannabinoid receptor agonists (SCRAs): a retrospective cohort study of presentations with acute toxicity to European hospitals between 2013 and 2020.
Clin Toxicol 2024, Jun ;62(6) :378-384

Exquis, N.; Dionisi, B.; Samer, CF.; Rollason, V.; Curtin, F.; Zekry, D.; Graf, C.; Prendki, V.; Ing Lorenzini, K.
Antiviral Use in Mild-to-Moderate SARS-CoV-2 Infections during the Omicron Wave in Geriatric Patients.
Viruses 2024, May 28 :16(6) :864

Robinson, KM.; Eum, S.; Desta, Z.; Tyndale, RF.; Gaedigk, A.; Crist, RC.; Haidar, CE.; Myers, AL.; Samer, CF.; Somogyi, AA.; Zubiaur, P.; Iwuchukwu, OF.; Whirl-Carrillo, M.; Klein, TE.; Claude, KE.; Donnelly, RS.; Kharasch, ED.
Clinical Pharmacogenetics Implementation Consortium Guideline for CYP2B6 Genotype and Methadone Therapy.
Clin Pharmacol Ther 2024, Oct 116(4); 932-938

Rivas Velarde, MC.; Lovis, C.; Ienca, M.; Samer, C.; Hurst, S.
Consent as a compositional act – a framework that provides clarity for the retention and use of data.
Philos Ethics Humanit Med 2024, Mar 6 ;19(1): 2

Samer, C.; McWilliam, HEG.; McSharry, BP.; Velusamy, T.; Burchfield, JG.; Stanton, RJ.; Tschärke, DC.; Rossjohn, J.; Villadangos, JA.; Abendroth, A.; Slobedman, B.
Multi-targeted loss of the antigen presentation molecule MR1 during HSV-1 and HSV-2 infection.
Science 2024, Jan 4 ;27(2)

Fubini, PE.; Savoldelli, GL.; Beckmann, TS.; Samer, CF.; Suppan, M.
Impact of a Mobile App (LoAD Calc) on the Calculation of Maximum Safe Doses of Local Anaesthetics: Protocol for a Randomized Controlled Trial.
J MIR Res Protoc 2024, Jan 3 ;13

Abouir, K.; Samer, C.; Landry, R.; Varesio, E.; Daali, Y.
Stereoselective separation of omeprazole and 5-hydroxy-omeprazole using dried plasma spots and a heart-cutting 2D-LC approach for accurate CYP2C19 phenotyping.
J Chromatogr B Analyt Technol Biomed Life Sci 2024, Jan 1 ;1232-123962

Ben Hassine, K.; Daali, Y.; Gloor, Y.; Nava, T.; Théroët, Y.; Krajcinovic, M.; Bittencourt, H.; Satyanarayana Uppugunduri, CR.; Ansari, M.
Simulation-Based Optimization of Sampling Schedules for Model-Informed Precision Dosing of Once-Daily and 4-Times-Daily Busulfan in Pediatric Patients.
Ther Drug Monit 2024, Jun 14 ;46(6) :786-96

Ben Hassine, K.; Seydoux, C.; Khier, S.; Daali, Y.; Medinger, M.; Halter, J.; Heim, D.; Chalandon, Y.; Schanz, U.; Nair, G.; Cantoni, N.; Passweg, JR.; Satyanarayana Uppugunduri, CR.; Ansari, M.
Pharmacokinetic Modeling and Simulation with Pharmacogenetic Insights Support the Relevance of Therapeutic Drug Monitoring for Myeloablative Busulfan Dosing in Adult HST.
Transplant Cell Ther 2024, Mar ;30(3) :332

Mercier, C.; Rollason, V.; Eshmaewy, M.; Mendes, A.; Frisoni, GB.
The treatment of behavioural and psychological symptoms in dementia: pragmatic recommendations.
Psychogeriatrics 2024, Jul ;24(4) :968-982

Song, W.; Lam, M.; Liu, R.; Simona, A.; Weiner, SG.; Urman, RD.; Mukamal, KJ.; Wright, A.; Bates, DW.
A genome-wide Association study of the Count of Codeine Prescriptions.
Sci Rep 2024, Oct 1; 14(1)

Song, W.; Simona, A.; Zhang, P.; Bates, DW.; Urman, RD.
Stimulant Drugs and Stimulant Use Disorder.
Anesthesiol Clin 2024, Mar;42(1):103-115

El Bali, M.; Wölfl-Duchek, M.; Jackwerth, M.; Mairinger, S.; Weber, M.; Bamminger, K.; Poschner, S.; Rausch, I.; Schindler, N.; Lozano, IH.; Jäger, W.; Nics, L.; Tournier, N.; Hacker, M.; Zeitlinger, M.; Bauer, M.; Langer, O.
St. John's wort extract with a high hyperforin content does not induce P-glycoprotein activity at the human blood-brain barrier.
Clin Transl Sci 2024, May;17(5)

Coumau, C.; Gaspar, F.; Terrier, J.; Schulthess-Lisibach, A.; Lutters, M.; Le Pogam, MA.; Csajka, C.
Drug-drug interactions with oral anticoagulants: information consistency assessment of three commonly used online drug interactions databases in Switzerland.
Front Pharmacol 2024, Apr 2;15

Maret, E.; Wiskott, K.; Shipley, T.; Gilardi, F.; Augsburg, M.; Thomas, A.; Fracasso, T.; Sajic, T.
Activity-Based Proteome Profiling of Serum Serine Hydrolases: Application in Pediatric Abusive Head Trauma.
Proteomics Clin Appl 2024, Dec 20

El Biali, M.; Breuil, L.; Jackwerth, M.; Mairinger, S.; Weber, M.; Wölfl-Duchek, M.; Bamminger, K.; Rausch, I.; Nics, L.; Hacker, M.; Rodrigo, S.; Bouilleret, V.; Zeitlinger, M.; Pataria, E.; Tournier, N.; Bauer, M.; Langer, O.
Metoclopramide PET can detect a seizure-induced up-regulation of cerebral P-glycoprotein in epilepsy patients.
Fluids Barriers CNS 2024, Oct 28 ;21(1)

Terrier, J.; Abouir, K.; Gaspar, F.; Daali, Y.; Samer, CF.
The Impact of Dexamethasone and Prednisone on Apixaban and Rivaroxaban Exposure in COVID-19 Patients: A Physiologically Based Pharmacokinetic Modeling Study.
Clin Pharmacol Ther 2024, Nov 13

Dos Santos Rocha, A.; Betello, M.; Nikolaou, A.; Südy, R.; Albu, G.; Schiffer, E.
Failure of neuromuscular blockade despite high doses of rocuronium and atracurium in a patient with colorectal carcinoma – a case report.
European Journal of Anaesthesiology 2024, Oct 7

Rei Pereira, C.; Donzé, Y.; Gérard, I.; Besson, M.; Jackson, YL.
Management of acute pain in an outpatient setting. Rev Med Suisse 2024, Sep 25 :1699-1701

Patents

Evans, RM.; Downes, M.; Liddle, C.; Samer, C.
The Salk Institute for Biological studies and The University of Sydney, Use of vitamin D receptor agonists and precursors to treat fibrosis, Patent number 12/266513

Evans, RM.; Downes, M.; Liddle, C.; Subramaniam, N.; Samer, C.
The Salk Institute for Biological studies and The University of Sydney, Use of Vitamine D receptor agonists, ligands, and precursors to treat pancreatic fibrosis, Patent number 20110014126.

Desmeules, J.; Zeilhofer, HU.; Besson, M.; Daali, Y.; Matthey, A.
Use of N-desmethyloclobazam in the treatment of chronic pain disorders and related method 2016, Patent number PCT/IB2016/051158.

Books or books chapters

Mercier, C, Mendes, A.; Rollason, V.; Frisoni, GB.

La prise en charge pharmacologique – Traitements des SCPD [In] Démence – Maladies d’Alzheimer et syndromes apparentés. RMS Editions, 2024,145-153

Congresses / conferences and Symposia

- Congresses / conferences organisation: 2
- Posters presentations: 7
- Oral presentations: 3
- Invited oral presentations: 8

Ph.D. Theses presented in 2024

Kenza Abouir

Impact of CYP2D6 genetic polymorphisms on the vulnerability to drug-drug interactions with tramadol: a gene-environment interaction study.

Youssef Daali, Caroline Samer, Jules Desmeules

Awards and distinction

Nikolaou, A., Subside Tremplin, Service égalité et diversité de l’Université de Genève, année académique 2024-2025 (CHF 27’800.-)

Public outreach activities (radio, television and other media, community service)

Samer, C., Trop de paracétamol abîme le foie, parfois irrémédiablement, Le Matin Dimanche, Planète santé, May 2024, Geneva (Switzerland)

Samer, C., X mis sous enquête, Le Courrier, February 2024, Geneva (Switzerland)

Nikolaou, A., Les effets de la cortisone. Radio RTS, Emission CQFD, February 2024, Geneva (Switzerland)

Nikolaou, A., Le point sur la cortisone. Planète Santé #53, magazine d’éditions médecine & hygiène, June 2024, Geneva (Switzerland)

Ing Lorenzini, K., Contre le rhume – Médicaments en question. Télévision RTS, Le journal 19h30, 17 December 2024, Geneva (Switzerland)

El Biali, M., Du mercure dans le thon en boîte, en Suisse aussi ? Télévision RTS, A bon entendeur, 19 November 2024, Geneva (Switzerland)

El Biali, M., Le thon en conserve largement contaminé au mercure en Europ, dénoncent des ONG. Télévision RTS, Le journal 19h30, 29 October 2024, Geneva (Switzerland)

CLINICAL PHARMACY SCIENCES

Professor Chantal CSAJKA
Doctor Noura BAWAB
Doctor Frédéric GASPAR (since 01.02.2024)

General description of the Unit

The research of the clinical pharmacy science group is focused on post-approval drug optimisation. The overall goal is to increase the knowledge on the pharmacokinetics and pharmacodynamic relationships of commercialized drugs and to improve drugs' safety and efficacy in clinical practice.

The first research axe is the therapeutic individualisation of drugs to optimize dosage regimens for at risk drugs or in at-risk populations (paediatrics, geriatrics, oncology, psychoactive agents, pregnancy and lactation) for whom few data are available. We develop clinical trials to assess the contribution of demographic, physiopathologic, environmental or genetic determinants influencing drug exposure and therefore drugs' therapeutic response or toxicity. The second axe comprises research programs focusing on reducing drug toxicity, which comprise artificial intelligence-based innovative methodologies for the detection of adverse drug events in hospitalized patients. The third research focus is to translate the results of our research into clinical-decision tools and guidelines for the clinic. The methods used are based on quantitative and qualitative techniques, including modelling and simulations and biostatistics.

Specific research fields

The following achievements have taken place in 2024:

- **Drug security and efficacy.** As part of the SNF-funded Swiss Monitoring of Adverse Drug Events (SWISSMADE study) we developed and validated an automatic tool for the detection of haemorrhages in a population of geriatric inpatients treated by antithrombotics using structured data mining and natural language processing. The pipeline integrates rule-based algorithms associated with machine learning techniques applied on medical free texts and routinely collected clinical data from the electronic medical records. This pipeline will be integrated in hospital risk management programs to improve quality of care. In collaboration with the Family Medicine of the University of Fribourg and funded by the Leenaards Foundation within the Santeinegra program, a pragmatic clinical trial aiming at evaluating the efficacy of a medicinal herb in the treatment of acute bronchitis is ongoing. This study aims at demonstrating that complementary medicine can be integrated within conventional care. Whether it could be an interesting alternative to the often-inappropriate use of antibiotics in this indication is of major interest. In collaboration with the phytochemistry group of the School of Pharmaceutical Sciences, University of Geneva, an ancillary project to assess the quality of herbal products sold on the Swiss market and through internet has shown suboptimal quality of many drugs, which raises concerns.
- **Drug individualisation.** Several projects on the population pharmacokinetic, pharmacokinetic-pharmacodynamic or pharmacokinetic-adherence characterisation of oncologic (tyrosine kinase inhibitors), antibiotics and antiretrovirals have been fulfilled. Through a collaboration with the SWISSPEDDOSE project, we could assess trough modelling and simulation concentration-effect relationships of several antibiotics and propose dosage recommendations to be integrated in Swiss harmonized dosing regimen recommendations. As part of an ongoing project with the HUG, several population pharmacokinetic and physiologically-based analyses of anticoagulants and antiplatelet drugs based on real-conditions of use have shown that possible improvement for the security of use of these at-risk drugs and new strategies for dosage individualization.

- **Tools for drug optimisation in clinical practice.** Funded by the SNF (Spirit), a project on the development of a clinical decision support system for an anti-tuberculosis medical drug in Tanzania is ongoing in collaboration with the School of Engineering and Management Vaud and the Kibong'Oto Infections Diseases Hospital in Tanzania. A development of a computer-based aid for drug dosage individualization of rifampicin has been made in parallel to the development of a Bayesian clinical decision support system to optimize rifampicin dosage regimen (www.tucuxi.ch). An electronic tool for drug-drug interaction for health care professionals involving antithrombotics is currently being developed as part of the SwissMADE project. In addition, we are developing a proof-of-concept point-of-care for imatinib dosage individualization as part of a collaboration with Innosuisse, which will enable the use such system for dosage optimisation in the clinical practice.

2024 at a glance

- Publications: 24
- Patents: 0
- Book and chapters: 0
- Congresses / conferences organisation: 0
- Posters presentations: 10
- Oral presentations: 2
- Invited oral presentations: 0
- Number of projects at FNRS and assimilated (Research funds): 1
- Service agreements and related activities: 0
- Ph.D. Theses presented in 2024: 0
- Awards and distinctions: 0
- Public outreach activities: 0

Research funds

Swiss National Science Foundation

Category: SNSF

SPIRIT TuberXpert project: *Clinical Decision support System for anti-tuberculosis medical drugs*

Main applicant CRISP : Dr Monia Guidi

Total funding of the project: CHF 174'958.-

Total duration of the project: 3 years

Allocation 2024: CHF 58'319.-

Starting date: 01.09.2022

Total amount for all research funds for 2024: CHF 58'319.-

Service agreements and related activities

None

Scientific publications

Thouelle, P.; Marzolini, C.; Guidi, M.; Cavassini, M.; Decosterd, L.A.
Is Non-Sustained Viral Suppression with Long-Acting Cabotegravir and Rilpivirine Really
Independent of Drug levels?

Clin Infect Dis 2024. Dec 13: ciae616. Ahead of print.

Thouelle, P.; Saldanha, S. A.; Schaller, F.; Choong, E.; Veuve, F.; Munting, A.; Cavassini, M.;
Braun, D.; Günthard, H. F.; Duran Ramirez, J. J.; Surial, B.; Furrer, H.; Rauch, A.; Ustero, P.;
Calmy, A.; Stöckle, M.; Di Benedetto, C.; Bernasconi, E.; Schmid, P.; Marzolini, C.; Girardin,
F. R.; Buclin, T.; Decosterd, L. A.; Guidi, M.

Population pharmacokinetics of rilpivirine following oral administration and long-acting
intramuscular injection in real-world people with HIV.

Front Pharmacol 2024; 15:1437400.

Petermann, Y. J.; Said, B.; Cathignol, A. E.; Sariko, M. L.; Thoma, Y.; Mpagama, S. G.; Csajka,
C.*; Guidi, M.*

State of the art of real-life concentration monitoring of rifampicin and its implementation
contextualized in resource-limited settings: the Tanzanian case.

JAC Antimicrob Resist 2024; 14;6(6): dlae182.

Seydoux, C.; Briki, M.; Wagner, A. D.; Choong, E.; Guidi, M.; Carrara, S.; Thoma, Y.; Livio, F.;
Girardin, F. R.; Marzolini, C.; Buclin, T.; Decosterd, L.A.

Importance of Sex-Dependent Differences for Dosing Selection and Optimization of
Chemotherapeutic Drugs.

Chemotherapy 2024; 7:1-10.

Melander, E.; Nielsen, E. I.; Lindqvist, A.; Hovd, M.; Gandia, P.; Panchaud, A.; Guidi, M.;
Annaert, P.; Baranczewski, P.; Spigset, O.; Nordeng, H.

Population pharmacokinetic modelling of cetirizine concentrations in human breast milk-A
contribution from the ConcePTION project.

Basic Clin Pharmacol Toxicol 2025; 136 (1): e14100.

Thoma, Y.; Cathignol, A. E.; Pétermann, Y. J.; Sariko, M. L.; Said, B.; Csajka, C.; Guidi, M.*;
Mpagama, S. G.*

Toward a Clinical Decision Support System for Monitoring Therapeutic Antituberculosis
Medical Drugs in Tanzania (Project TuberXpert): Protocol for an Algorithm' Development and
Implementation.

JMIR Res Protoc 2024; 13: e58720.

Bastian, S.; Joerger, M.; Holzer, L.; Bärtschi, D.; Guckenberger, M.; Jochum, W.; Koeberle, D.;
Siebenhüner, A. R.; Wicki, A.; Berger, M. D.; Winterhalder, R. C.; Largiadèr, C. R.; Löffler, M.;
Mosna-Firlejczyk, K.; Maranta, A. F.; Pestalozzi, B. C.; Csajka, C.; von Moos, R.

Neoadjuvant Treatment With Regorafenib and Capecitabine Combined With Radiotherapy in
Locally Advanced Rectal Cancer: A Multicenter Phase Ib Trial (RECAP)-SAKK 41/16.

Clin Colorectal Cancer 2024; 1:82-88.

Bartsch, R.; Aletaha, D.; Fuereder, T.; Aapro, M.; Jornayvaz, F. R.; Lang, P. O.; Migliorini, D.;
Csajka, C.; Aretin, M. B.; Dougoud-Chauvin, V.

Corticosteroid therapy in older adults with cancer: Expert recommendations from a task force
of the International Society of Geriatric Oncology.

J Geriatr Oncol 2024, 102077.

Monfort, A.; Cardoso, E.; Eap, C. B.; Ansermot, N.; Crettol, S.; Fischer Fumeaux, C. J.; Graz,
M. B.; Harari, M. M.; Weisskopf, E.; Gandia, P.; Allegaert, K.; Annaert, P.; Nordeng, H.;
Hascoët, J.M.; Claris, O.; Epiney, M.; Ferreira, E.; Leclair, G.; Csajka, C.; Panchaud, A.*; Guidi,
M.*; collaborators of the SSRI Breast Milk study.

A population pharmacokinetic model for sertraline in women during the perinatal period-A
contribution from the ConcePTION project.

British journal of clinical pharmacology 2024; 90 (11): 2849-2860.

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School of Pharmaceutical Sciences

Widmer, N.; Guidi, M.; Buclin, T.
Population Pharmacokinetics in Oncology and Its Clinical Applications.
Pharmaceutics 2024; 16 (6):711.

Ravix, A.; Bandiera, C.; Cardoso, E.; Lata-Pedreira, A.; Chtioui, H.; Decosterd, L. A.; Wagner, A. D.; Schneider, M. P.; Csajka, C.*; Guidi, M.*
Population Pharmacokinetics of Trametinib and Impact of Nonadherence on Drug Exposure in Oncology Patients as Part of the Optimizing Oral Targeted Anticancer Therapies Study. Cancers (Basel) 2024, 16 (12):2193.

Bandiera, C.; Cardoso, E.; Locatelli, I.; Zaman, K.; Diciolla, A.; Digkila, A.; Stravodimou, A.; Cristina, V.; Aedo-Lopez, V.; Dolcan, A.; Sarivalasis, A.; Bouchaab, H.; Pasquier, J.; Dotta-Celio, J.; Peters, S.; Wagner, D.; Csajka, C.; Schneider, M. P.
A pharmacist-led interprofessional medication adherence program improved adherence to oral anticancer therapies: The OpTAT randomized controlled trial.
PLoS One 2024; 19 (6): e0304573.

Gotta, V.; Bielicki, J. A.; Paioni, P.; Csajka, C.; Bräm, D. S.; Berger, C.; Giger, E.; Buettcher, M.; Posfay-Barbe, K. M.; Van den Anker, J.; Pfister, M.
Pharmacometric in silico studies used to facilitate a national dose standardisation process in neonatology - application to amikacin.
Swiss Med Wkly 2024;154: 3632.

Dao, K.; Buettcher, M.; Golhen, K.; Kost, J.; Schittny, A.; Duthaler, U.; Atkinson, A.; Haeffliger, D.; Guidi, M.; Bardinet, C.; Chtioui, H.; Boulekbache, A.; Buclin, T.; Huwyler, J.; Pfister, M.; Rothuizen, L.E.
Novel Patient-Friendly Orodispersible Formulation of Ivermectin is Associated With Enhanced Palatability; Controlled Absorption; and Less Variability: High Potential for Pediatric Use. Journal of clinical pharmacology 2024; 64 (10): 1295-1303.

Coumau, C.; Gaspar, F.; Terrier, J.; Schulthess-Lisibach, A.; Lutters, M.; Le Pogam, M. A.; Csajka, C.
Drug-drug interactions with oral anticoagulants: information consistency assessment of three commonly used online drug interactions databases in Switzerland.
Front Pharmacol 2024; 15:1332147.

Couchepin, J.; Reinhold, I.; Kronig, I.; Guidi, M.; Buclin, T.; Schreiber, P. W.; Neofytos, D.; Lamoth, F.
Isavuconazole for the Treatment of Fungal Infections: A Real-life Experience From the Fungal Infection Network of Switzerland (FUNGINOS).
Open Forum Infect Dis 2024; 11 (5), ofae223.

Briki, M.; Murisier, A.; Guidi, M.; Seydoux, C.; Buclin, T.; Marzolini, C.; Girardin, F. R.; Thoma, Y.; Carrara, S.; Choong, E.; et al.
Liquid chromatography coupled to tandem mass spectrometry (LC-MS/MS) methods for the therapeutic drug monitoring of cytotoxic anticancer drugs: An update.
J Chromatogr B Analyt Technol Biomed Life Sci 2024; 1236: 124039.

Thouelle, P.; Saldanha, S. A.; Schaller, F.; Choong, E.; Veuve, F.; Munting, A.; Cavassini, M.; Braun, D.; Günthard, H. F.; Duran Ramirez, J. J.; Surial, B.; Furrer, H.; Rauch, A.; Ustero, P.; Calmy, A.; Stöckle, M.; Di Benedetto, C.; Bernasconi, E.; Schmid, P.; Marzolini, C.; Girardin, F.R.; Buclin, T.; Decosterd, L.A.; Guidi, M.; Swiss HIV Cohort Study.
Population Pharmacokinetics of Cabotegravir Following Oral Administration and Long-Acting Intramuscular Injection in Real-World People with HIV.
Clin Pharmacol Ther 2024; 115 (6): 1450-1459.

Thoueille, P.; Cavassini, M.; Guidi, M.; Buclin, T.; Girardin, F. R.; Decosterd, L. A.; Marzolini, C.
Guidance for the Interpretation of Long-Acting Cabotegravir and Rilpivirine Concentrations Based on Real-World Therapeutic Drug Monitoring Data and Documented Failures.
Open Forum Infect Dis 2024; 11 (2): ofae023.

Thoueille, P.; Saldanha, S. A.; Schaller, F.; Choong, E.; Munting, A.; Cavassini, M.; Braun, D.; Günthard, H. F.; Kusejko, K.; Surial, B.; Furrer, H.; Rauch, A.; Rougemont, M.; Uster, P.; Calmy, A.; Stöckle, M.; Marzolini, C.; Di Benedetto, C.; Bernasconi, E.; Schmid, P.; Pisoni, R.J.; Andre, P.; Girardin, F.R.; Guidi, M.; Buclin, T.; Decosterd, L.A.; Swiss HIV Cohort Study.
Real-world trough concentrations and effectiveness of long-acting cabotegravir and rilpivirine: a multicenter prospective observational study in Switzerland.
Lancet Reg Health Eur 2024; 36:100793.

Thoueille, P.; Delarive, L.; Cavassini, M.; Buclin, T.; Decosterd, L. A.; Marzolini, C.; Girardin, F. R.*; Guidi, M.*; Swiss HIV Cohort Study.
Population pharmacokinetic analysis of doravirine in real-world people with HIV.
British journal of clinical pharmacology 2024; 90 (4): 1058-1065.

Terrier, J.; Abouir, K.; Gaspar, F.; Daali, Y.; Samer, C. F.
The Impact of Dexamethasone and Prednisone on Apixaban and Rivaroxaban Exposure in COVID-19 Patients: A Physiologically Based Pharmacokinetic Modeling Study.
Clinical Pharmacology & Therapeutics 2024; 117(2): 554-560.

Coumau, C.; Gaspar, F.; Terrier, J.; Schulthess-Lisibach, A.; Lutters, M.; Le Pogam, M. A.; Csajka, C.
Drug-drug interactions with oral anticoagulants: information consistency assessment of three commonly used online drug interactions databases in Switzerland.
Front Pharmacol 2024; 15: 1332147.

Csajka, C. ; Hannou, S. ; D'Amelio P.
La Chondroïtine : quelle efficacité dans l'arthrose ? La gazette médicale ; 2024 no 2.

Patents

N/A

Books or books chapters

N/A

Congresses / conferences and Symposia

- Congresses / conferences organisation: 0
- Posters presentations: 10
- Oral presentations: 2
- Invited oral presentations: 0

Ph.D. Theses presented in 2024

N/A

Awards and distinction

N/A

Public outreach activities (radio, television and other media, community service)

N/A

COMMUNITY PHARMACY PRACTICE CLINICAL COMMUNITY PHARMACY

Doctor Jérôme BERGER
Doctor Damien CATEAU
Doctor Philippe LAURENT
Doctor Anne NIQUILLE CHARRIERE
Doctor Clémence PERRAUDIN

General description of the Unit

The community pharmacy lab at the Institute of pharmaceutical sciences of western Switzerland is part of the community pharmacy of Unisanté (University center for primary care and public health). This is the only community pharmacy in Switzerland that is fully integrated into a university centre, covering both clinical and academic activities. Unisanté covers the entire healthcare chain, from primary care, care for vulnerable populations and occupational medicine, to health promotion and prevention, organisation of the healthcare system, research and university teaching. Its aim is to maintain and improve the health of the regional population. For more than 30 years, the community pharmacy of Unisanté has been working to “propose working methods for community pharmacies, test them and evaluate their impact in the context of research work, then teach them to pharmacy students and practitioners”, according to the 1993 mission statement of the ‘*Centre Universitaire Vaudois d’Enseignement et de Recherche en Pharmacie d’Officine*’, which was set up by *Société Vaudoise de Pharmacie*, *Policlinique Médicale Universitaire* (now Unisanté), CHUV, University of Lausanne and pharmaSuisse.

The community pharmacy is a key sector of the Department of ambulatory care in Unisanté. Its expertise is recognised at the regional, national and international levels for its clinical, research/development and educational activities. It is currently affiliated to, and participate in the missions of:

- Centre for Primary Care and Public Health (Unisanté), University of Lausanne
- Institute of Pharmaceutical Sciences of Western Switzerland (ISPSO), University of Geneva, University of Lausanne)
- School of Pharmaceutical Sciences, University of Geneva
- Centre for Research and Innovation in Clinical Pharmaceutical Sciences, University of Lausanne

The community pharmacy of Unisanté plays an essential role at the heart of the hospital complex in the care of clinically and/or bio-psycho-socially complex populations. Nearly 9,500 patients come for specific treatments requiring special pharmaceutical skills, particularly those developed as part of research projects, e.g. 800 patients undergoing antiretroviral treatment, 200 undergoing oral oncology treatment or 65% of the canton's patients with active tuberculosis. The pharmacy facilitates the hospital-city transition thanks to a stock of specific medicines and close collaboration with certain CHUV consultations that refer patients to it (e.g. oncology, infectiology, rare diseases, paediatrics, addictology). A large number of patients in socially vulnerable situations are also cared for there, including 200 from the ‘*Réseau de Santé et Migration*’ and 200 without valid insurance.

The two main areas of research concern:

- Innovative professional pharmacy services: its aim is to improve the responsible use of medicines and their health benefits for patients, and includes the development of new integrated service models, the use of new technologies and/or new tools, and the optimisation of the transition and continuity of care at interfaces, particularly between hospital and primary care.
- Optimisation of drug therapy; its aim is to ensure that the right drug is prescribed, in the right dose, at the right time, for each individual, in every primary care setting, be it a nursing home, pharmacy or GP practice. The interventions developed, implemented and evaluated currently focus on the de-prescribing of inappropriate drugs for the elderly, the establishment of local consensus on prescribing as part of quality circles, and medication reviews.

All of the activities of the community pharmacy of Unisanté form the basis of its teaching, which supports the responsible use of medicines in primary care, the role of pharmacists in the healthcare system and the training of the future pharmacists, through teaching and programme management in pre-graduate teaching, in the CAS '*pharmacie Clinique – prestations dans les soins de base*', post-graduate and continuing training in community pharmacy, supervising students and doctoral candidates, and acting on behalf of the health authorities and professional associations in various cantons.

2024 at a glance

- Publications: 19
- Patents: 0
- Book and chapters: 0
- Congresses / conferences organisation: 2
- Posters presentations: 6
- Oral presentations: 4
- Invited oral presentations: 0
- Number of projects at FNRS and assimilated (Research funds): 6
- Service agreements and related activities: 26
- Ph.D. Theses presented in 2024: 0
- Awards and distinctions: 1
- Public outreach activities: 34

Research funds

Institutional

Promotion Santé Suisse

Prise en charge de patient-e-s sous antalgiques addictifs (DépendAntalgie)

Main applicant: Jérôme Berger

Total funding of the project; CHF 574'390.-

Total duration of the project: 4 years

Allocation 2024: CHF 100'000.-

Starting date: 01.12.2022

GSASA - pharmaSuisse

Transition des soins entre l'hôpital et l'ambulatorio : coordination d'interventions pharmaceutiques de l'admission à l'hôpital à la 1ère consultation ambulatoire post-hospitalisation pour sécuriser la médication chez des patients à risque

Main applicants: Jérôme Berger, Farshid Sadeghipour

Total funding of the project; CHF 105'000.-

Total duration of the project: 3 years

Allocation 2024: CHF 0.-

Starting date: 01.01.2023

FEDERAL OFFICE OF PUBLIC HEALTH (FOPH)

Sustainable implementation of high-quality Interprofessional Deprescribing services for nursing home residents in multiple cantons - The Simple-ID project

Main applicants: Anne Niquille Charrière

Total funding of the project; CHF 630'022.-

Total duration of the project: 3 years

Allocation 2024: CHF 204'500.-

Starting date: 01.10.2023

FEDERAL OFFICE OF PUBLIC HEALTH (FOPH)
Digital platform for Hypertensive Patient Reported Outcomes – HYPROM
Main applicants: Alice Panchaud
Co-applicant: Jérôme Berger
Total funding of the project: CHF 327'936.-
Total duration of the project: 3 years
Allocation 2024: CHF 0.-
Starting date : 01.07.2023

SWISS NATIONAL SCIENCE FOUNDATION
Expériences et pratiques d'adaptation des usagers/-ères et des pharmaciens/ne.s d'officine face aux ruptures d'approvisionnement en médicaments : démarche interdisciplinaire et participative
Main applicant: Jérôme Berger
Co-applicant: Rose-Anna Foley
Total funding of the project: CHF 874'000.-
Total duration of the project: 4 years
Allocation 2024: CHF 255'439.-
Starting date: 01.09.2024

Industrial

CANTONAL OFFICE OF PUBLIC HEALTH – VAUD & Société Vaudoise de Pharmacie
“Médicaments à jour?”
Main applicants: Jérôme Berger
Total funding of the project: CHF 138'107.30.-
Total duration of the project: 3 years
Allocation 2024: CHF 0.-
Starting date: 01.01.2022

Total amount for all research funds for 2024: CHF 559'939.-

Service agreements and related activities

CANTONAL OFFICE OF PUBLIC HEALTH – VAUD
MENTORAT FPH
Main applicants: Jérôme Berger
Total amount 2024: CHF 100'000.-

CANTONAL OFFICE OF PUBLIC HEALTH – FRIBOURG
MEDICATION REVIEW IN NURSING HOMES
Main applicants: Jérôme Berger, Anne Niquille Charrière
Total amount 2024: CHF 42'000.-

CANTONAL OFFICE OF PUBLIC HEALTH – VAUD
Organisation and animation of a Quality Circle Physicians-Pharmacists-Nurses in the nursing homes of the « Fondation Donatella Mauri and Nursing Home Béthanie »
Main applicants: Muriel Schuetz Leuthod, Stéphanie Troxler
Allocation 2024: CHF 22'600.-

FEDERAL OFFICE OF PUBLIC HEALTH (FOPH) / Institute of pharmaceutical sciences of Western Switzerland (ISPSO), University of Geneva, University of Lausanne
Service agreement (Examen fédéral OSCE et QCM pharmacoéconomie en Pharmacie 2023)
Main applicant: Jérôme Berger
Total amount 2024: CHF 91'519.50.-

CP3
Service agreement
Total amount 2024: CHF 21'200.-

C4S
Service agreement
Total amount 2024: CHF 11'500.-

C8V
Service agreement
Total amount 2024: CHF 5'000.-

CR1
Service agreement
Total amount 2024: CHF 27'289.05.-

CSLB
Service agreement
Total amount 2024: CHF 12'842.30.-

CSLV
Service agreement
Total amount 2024: CHF 1'000.-

D6S
Service agreement
Total amount 2024: CHF 29'271.-

F0M
Service agreement
Total amount 2024: CHF 3'400.-

H3S
Service agreement
Total amount 2024: CHF 596.-

H8G Service agreement
Total amount 2024: CHF 924.-

IF4
Service agreement
Total amount 2024: CHF 1'500.-

MCS
Service agreement
Total amount 2024: CHF 554.10.-

PH4G3 Service agreement
Total amount 2024: CHF 600.-

PH4S
Service agreement
Total amount 2024: CHF 11'300.-

SIP Service agreement
Total amount 2024: CHF 3'650.-

S0C
Service agreement
Total amount 2024: CHF 220.-

SUS4

Service agreement

Total amount 2024: CHF 4'540.20.-

SYMS

Service agreement

Total amount 2024: CHF 10'500.-

SSP

Service agreement

Total amount 2024: CHF 1'160.-

SV3

Service agreement

Total amount 2024: CHF 14'050.-

U3

Service agreement

Total amount 2024: CHF 6'100.-

UN1

Service agreement

Total amount 2024: CHF 3'000.-

Total amount (for all service agreements and related activities) for 2024: CHF 426'316.15.-

Scientific publications

Schaad, S.; Dunaiceva, J.; Peytermann, A.; Gendolla, S.; Clack, L.; Plüss-Suard, C.; Niquille, A.; Nicolet, A.; Marti, J.; Boillat-Blanco, N.; Wolfensberger, A.; Mueller, Y.

Perception of antimicrobial stewardship interventions in Swiss primary care: a mixed-methods survey.

BJGP Open, 2024, December

Huneault, C.; Haeberli, P.; Mühle, A.; Philippe, L.; Berger, J.

Improving preparation for pharmacy entry-to-practice OSCE using a participatory action research.

Currents in Pharmacy Teaching and Learning, 2024, November.

Lo Russo, A.; Rudi, E.; Kabongo, R.; Poloni, B.; Niquille, A.

Trois perspectives professionnelles pour optimiser les traitements en EMS

Revue Médicale Suisse, 2024, October 9th

Roux, A.; Vu, D-L.; Niquille, A.; Rubli Tuchsars, E.; Bizzozzero, T.; Tahar, A.; Morlan, T.; Colin, J.;

Akpokavie, D.; Grandin, M.; Merkly, A.; Cassini, A.; Glampedakis, E.; Brahier, T.; Suttels, V.; Prendki, V.; Boillat-Blanco, N.

Factors associated with antibiotics for respiratory infections in Swiss long-term care facilities.

Journal of Hospital Infection, 2024, September 16th

Michiels, Y.; Belon, J-P.

Covid long, des symptômes aux hypothèses moléculaires.

Actualités Pharmaceutiques, 2024, September.

Vidonscky Lüthold, R.; Cateau, D.; Jenkinson, S P.; Streit, S.; Tabea Jungo, K.

Pharmacists' attitudes towards interprofessional collaboration to optimise medication use in older patients in Switzerland: a survey study.

BMC Health Services Research, 2024, July 26th

Amador-Fernández, N.; Villeien de Gabiole, T.; Steeb, D.; Berger, J.
The Postgraduate Community Pharmacy Education System: Commentary on the Swiss System.
Indian Journal of Pharmaceutical Education and Research, 2024, June.

Macé, F.; Peyron, C.; Cransac, A.; Pistre, P.; Boulin, M.
Oral anticancer medicine interventions: A cross-sectional study in French community pharmacies.
Journal of oncology Pharmacy Practice, 2024, March 7th

Perraudin, C.; Cohidon, C.; Maes, K.; Niquille, A.; Schuetz, M.; Berger, J.
Les pharmacies dans les soins de première ligne en Suisse.
Actualités Pharmaceutiques, 2024, January

Bandiera, C.; Dotta-Celio, J.; Locatelli, I.; Nobre, D.; Wuerzner, G.; Pruijm, M.; Lamine, F.; Burnier, M.; Zanchi, A.; Schneider, M-P.
The differential impact of a 6-versus 12-month pharmacist-led interprofessional medication adherence program on medication adherence in patients with diabetic kidney disease: the randomized PANDIA-IRIS study.
Frontiers in Pharmacology, 2024, January 24th

Amador-Fernández, N.; Botnaru, I.; Allemann, S.; Kälin, V.; Berger, J.
Clinical relevance and implementation into daily practice of pharmacist-prescribed medication for the management of minor ailments.
Frontiers in Pharmacology, 2024, January 24th

Tabea Jungo, K.; Weir, K R.; Cateau, D.; Streit, S.
Older adults' attitudes towards deprescribing and medication changes: a longitudinal sub-study of a cluster randomised controlled trial.
BMJ Open, 2024, January 10th

Muller Chabloz, Y.; Gouveia, A.; Berger, J.; Cohidon, C.
COVID-19 pandemic in Switzerland: a brief overview of the role and response of primary care.
La Presse Médicale Open, 2024, volume 5

Clinical practice guidelines

Revaclier, L.; Kälin, V.; Agostini-Ferrier, S.; Berger, J.
Prise en charge des patient·e·s vivant avec le VIH: quoi de neuf? / Behandlung von Patientinnen und Patienten mit HIV: Was gibt es Neues?
pharmaJournal, 2024, 12, 4-10

Rodrigues De Jesus, D.; Agostini-Ferrier, S.; Kälin, V.; Berger, J.
Laxatifs : « Mode d'emploi » pour conseiller un laxatif en pharmacie. / Laxativa: « Anleitung » für die Empfehlung eines Laxativums in der Apotheke.
pharmaJournal, 2024, 10, 4-11

Perraudin, C.; Bourdin, A.; Rossier, C. ; Dotta-Celio, J. ; Resenterra, E. ; Berger, J.
Aide à l'implémentation – TIPS : la boîte à outils opérationnelle / Implementierungshilfe – TIPS : die operative Toolbox.
pharmaJournal, 2024, 8, 24-25

Revaclier, L.; Kälin, V.; Agostini-Ferrier, S.; Berger, J.
Dispositifs d'inhalation - Sécurité d'utilisation : trucs et astuces / Inhalationsgeräte - Sichere Nutzung: Tipps und Tricks.
pharmaJournal, 2024, 8, 4-10

Perraudin, C.; Schneider, M-P.; Macé, F.; Gauthier, R.; Panchaud, A.; Allemann, S.; Erni, S.; Amador-Fernandez, N.; Berger, J.
Universités: Pharmacie d'officine académique : Qui ? Quoi ? Pourquoi ? / Universitäten : Akademische Offizinapotheke : Wer ? Was ? Warum ?
pharmaJournal, 2024, 6, 16-18

Charnaux, L.; Perraudin, C.; Berger, J.
Prise en charge: Les préférences de la population en cas de problèmes de santé mineurs
pharmaJournal, 2024, 5, 27-28

Rodrigues De Jesus, D.; Agostini-Ferrier, S.; Kälin, V.; Berger, J.
Vignette clinique Liste B1: Quel doit-être le raisonnement clinique pour une remise sans ordonnance d'IPP? / Klinisches Fallbeispiel Liste B+ : Welches «Clinical Reasoning» braucht es für eine rezeptfreie Abgabe von PPI?
pharmaJournal, 2024, 5, 4-10

Kälin, V.; Agostini-Ferrier, S.; Berger, J.
Biosimilaires: Bonnes pratiques de substitution des médicaments biologiques : de la théorie à la pratique / Biosimilars : Substitution von Biopharmazeutika: Gute Umsetzungspraxis
pharmaJournal, 2024, 4, 20-25

Patents

Books or books chapters

Congresses / conferences and Symposia

- Congresses / conferences organisation: 2
- Posters presentations: 6
- Oral presentations: 4
- Invited oral presentations: 0

Ph.D. Theses presented in 2024

Awards and distinction

Charnaux, L.
Exploration des préférences de la population romande dans la gestion de symptômes
1^{er} prix OFAC Awards 2024, 2024, November 22nd, Bern (Switzerland)

Public outreach activities (radio, television and other media, community service)

1. Radio, television and other media

Barablat, M-J.; Berger, J.
Que deviennent nos médicaments périmés?
Lausanne Citées, 2024, August 21st

Niquille, A.
50'000 résidents d'EMS reçoivent un cocktail de pilules
Le Matin Dimanche, 2024, April 7th

2. Public outreach activities -community service: continuous education for health professionals

Barbalat, M-J.

Comment mieux répondre à l'hésitation vaccinale ?

IFAK, November 28th, 2024, Fribourg (Switzerland).

Barbalat, M-J. ; Diana, A.

Comment mieux répondre à l'hésitation vaccinale ?

Colloque Médecins Généralistes, MSD, November 21st, 2024, Montreux (Switzerland)

Berger, J. ; Heritier, F.

Anamnèse pratique : Système uro-génital

CAP Centre d'Animation des Pharmaciens, November 21st, 2024, Morges (Switzerland).

Agostini-Ferrier, S. ; Maggi, P.

Prise en charge des pathologies respiratoires (en italien)

CAP Centre d'Animation des Pharmaciens, November 15th, 2024, Sant'Antonino (Switzerland).

Nayak, J. ; Zufferey, A. ; Bize, R.

Prise en charge des personnes transgenres à l'officine

CAP Centre d'Animation des Pharmaciens, November 7th, Morges (Switzerland).

Barbalat, M-J.

Refresh techniques d'injection

Société Vaudoise de Pharmacie, October 29th, 2024, Lausanne (Switzerland).

Barbalat, M-J. ; Pavon, V.

Ce qu'il faut savoir sur les vaccins – « Refresh vaccination »

CAP Centre d'Animation des Pharmaciens, October 8th, 2024, Lausanne (Switzerland).

Agostini-Ferrier, S. ; Kälin, V.

Formation continue des podologues : Pharmacologie et podologie

Société Suisse des Podologues, September 28th, 2024, Lausanne (Switzerland)

Savary, J.

Atelier : les infections sexuellement transmissibles

CAP Centre d'Animation des Pharmaciens, congrès pharmaMONTANA, September 28th, 2024, Lens (Switzerland).

Berger, J. ; Héritier, F.

Anamnèse pratique : système uro-génital, cours interprofessionnel

CAP Centre d'Animation des Pharmaciens, congrès pharmaMONTANA, September 27th, 2024, Lens (Switzerland).

Barbalat, M-J. ; Pavon, V.

Ce qu'il faut savoir sur les vaccins – « Refresh vaccination »

CAP Centre d'Animation des Pharmaciens, congrès pharmaMONTANA, September 26th, 2024, Lens (Switzerland).

Berger, J. ; Gouveia, A.

Anamnèse en soins primaires – Théorie Jour 2 : Approfondissement

CAP Centre d'Animation des Pharmaciens, September, 19th, 2024, Lausanne (Switzerland).

Berger, J. ; Gouveia, A.

Anamnèse en soins primaires – Théorie Jour 1 : Fondements

CAP Centre d'Animation des Pharmaciens, September 5th, 2024, Lausanne (Switzerland).

Kälin, V. ; Cateau, D. ; Dubuis, C-L. ; Macé, F.
Formation à l'assistance pharmaceutique d'institutions du système de santé
pharmaSuisse, August 29th – September 4th – September 5th, 2024, Bern (Switzerland)

Berger, J. ; Heritier, F.
Anamnèse pratique : Dermatologie – Pathologies infectieuses
CAP Centre d'Animation des Pharmaciens, May 16th, 2024, Lausanne (Switzerland).

Berger, J. ; Heritier, F.
Anamnèse pratique : Dermatologie – Pathologies non infectieuses
CAP Centre d'Animation des Pharmaciens, May 16th, 2024, Lausanne (Switzerland).

Agostini-Ferrier, S. ; Dumans, C.
Prise en charge des pathologies respiratoires
CAP Centre d'Animation des Pharmaciens, May 2nd, 2024, Lausanne (Switzerland).

Barbalat, M-J.
Refresh vaccination
Société genevoise des Pharmaciens, April 16th, 2024, Genève (Switzerland).

Agostini-Ferrier, S. ; Saccarello, L.
Anamnesi di base : parte teorica del certificato FPH – Giornata 2
CAP Centre d'Animation des Pharmaciens, March 22nd, 2024, Sant'Antonino (Switzerland).

Agostini-Ferrier, S. ; Saccarello, L.
Anamnesi di base : parte teorica del certificato FPH – Giornata 1
CAP Centre d'Animation des Pharmaciens, March 21st, 2024, Sant'Antonino (Switzerland).

Dotta-Celio, J.; Brajkovic, S.
Prise en charge des patients diabétiques à l'officine
CAP Centre d'Animation des Pharmaciens, March 14th, 2024, Neuchâtel (Switzerland).

Barbalat, M-J. ; Pavon, V.
Les vaccins et les maladies transmissibles : l'essentiel en une journée
CAP Centre d'Animation des Pharmaciens, March 12th, 2024, Vevey (Switzerland).

Barbalat, M-J. ; Pavon, V.
Ce qu'il faut savoir sur les vaccins – « Refresh vaccination »
CAP Centre d'Animation des Pharmaciens, March 5th, 2024, Neuchâtel (Switzerland).

Savary, J.
Prévention et traitements du VIH : mise à jour
Société Vaudoise de Pharmacie, February 29th, 2024.

Escaith, M.
Sortie d'hôpital CHUV
Société Vaudoise de Pharmacie, January 25th, 2024.

Berger, J. ; Gouveia, A.
Anamnèse en soins primaires – Théorie Jour 2 : Approfondissement
CAP Centre d'Animation des Pharmaciens, January, 25th, 2024, Lausanne (Switzerland).

Kälin, V.
Analyses synthétiques au programme d'assistance pharmaceutique en EMS
Société Vaudoise de Pharmacie, January 22th & January 15th, 2024.

Berger, J. ; Gouveia, A.
Anamnèse en soins primaires – Théorie Jour 1 : Fondements
CAP Centre d'Animation des Pharmaciens, January, 18th, 2024, Lausanne (Switzerland).

Expert report

Simic, G.; Charnaux, L.; Troxler, S. ; Baechler, T. ; Macé, F. ; Niquille, A.
Assistance pharmaceutique dans les établissements médico-sociaux du Canton de Vaud - Rapport d'activités 2023, December 2024.

Schütz, M. ; Bourdin, A. ; Bodenmann, P. ; Berger, J.
Prise en charge des patient.e.s en situation de vulnérabilité à la Pharmacie d'Unisanté, 2024, June 11th.

Resenterra, E. ; Gorgerat, S. ; Berger, J.
Programme vaudois de soutien aux pharmacien.ne.s formateurs et formatrices pour la formation postgrade FPH en pharmacie d'officine – Rapport d'activités 2023, June 2024.

Cateau, D. ; Schneider, M-P.
Opti-Q Multimorbidité – Rapport d'évaluation du point de vue des pharmacien.ne.s, 2024

HOSPITAL PHARMACY

Professor Pascal BONNABRY, HUG (15%)
Professor Farshid SADEGHIPOUR, CHUV (15%)

PD Doctor Johnny BENEY, ICH, Sion
PD Doctor Sandrine FLEURY-SOUVERAIN, HUG
PD Doctor Pierre VOIROL, CHUV
PD Doctor Nicolas WIDMER, PHEL, Rennaz

Doctor Christel BRUGGMANN, CE, HUG (10%)
Doctor Nancy PERROTTET, CE, CHUV (10%)

General description of the Unit

The group is composed of two part-time professors, four privat-docent and two CE from several hospitals in the French-speaking part of Switzerland. We develop research and education activities in the different fields of hospital pharmacy (logistics and pharmacoeconomics, production, quality control, clinical pharmacy). The undergraduate education is mainly focused on hospital pharmacy modules in BUSP2, BUSP3 and MUP2. A post-graduate education (MAS) in hospital pharmacy is also proposed since 1999. This three-year program is a complete specialization in hospital pharmacy, associating theoretical and practical teachings, as well as a research project. Hospital pharmacy also proposes positions for PhD students. The unit is also involved in global pharmacy, mainly with the project Pharm-Ed (www.Pharm-Ed.net), in disaster pharmacy, by hosting the Specialised centre for emergency and disaster pharmacy (SEDIP, www.disaster-pharmacy.ch) and in the management of the CAS of Pharmacie Clinique (<https://www.unige.ch/formcont/cours/cas-pharmacie-clinique>) and the CAS in Medicines and Medical Devices in Emergency and Disaster (<https://www.unige.ch/formcont/en/courses/emergency-disaster>).

Specific research fields

To optimize the safety, the efficiency and the traceability of drug use in hospitals:

- Processes
 - o Optimization of clinical use of drugs
 - Securing the drug use process in high-risk care units
 - Detection, prevention, management and evaluation of drug incompatibilities
 - Therapeutic education
 - Continuity of care
 - o Economic evaluation of changes in therapeutic strategies in hospital
 - o Risk analysis
 - o Information technologies
 - o Human factors, ergonomics and process efficiency
 - o Organization in humanitarian, emergency and disaster situations (civil and military context)
- Persons
 - o Inter-professionality
 - o Innovative pedagogic approaches for knowledge transmission
 - o Decision support
- Products
 - o Development of hospital pharmaceutical forms, including ready-to-use products
 - o Stability studies
 - o Analysis of hazardous drugs

- Formulation of paediatric parenteral nutrition
- Development and validation of generic separation methods for the dosage of active ingredients contained in hospital pharmaceutical formulations.
- Study of content and containers interactions in leachable and extractable events of different pharmaceutical packaging

2024 at a glance

- Publications: 40
- Patents: 0
- Book and chapters: 0
- Congresses / conferences organisation: 6
- Posters presentations: 39
- Oral presentations: 7
- Invited oral presentations: 15
- Number of projects at FNRS and assimilated (Research funds): 4
- Service agreements and related activities: 3
- Ph.D. Theses presented in 2024: 3
- Awards and distinctions: 6
- Public outreach activities: 18

Research funds

Octopharma, Debiopharm

Pharm-Ed: une plateforme d'enseignement de la pharmacie hospitalière pour les pays en développement

Main applicant: Pascal Bonnabry

Total funding of the project: CHF 6'000.-

Total duration of the project: to be determined

Allocation 2024: CHF 6'000.-

Beckton-Dickinson

Development of an e-learning program to facilitate the implementation of automated dispensing cabinets

Main applicant: Pascal Bonnabry

Total funding of the project: CHF 21'750.-

Total duration of the project: 2024

Allocation 2024: CHF 21'750.-

Vifor, Labatec, Sandoz, TevaMepha, GSK, Bichsel

Development of a platform for the management of drug shortages (MaPui)

Main applicant: Pascal Bonnabry

Total funding of the project: CHF 30'000.-

Total duration of the project: 2024

Allocation 2024: CHF 30'000.-

FNRS LAAGP0-215787

Category: SNSF

Pharmascope: an interactive pedagogical approach to drive pharmaceutical sciences closer to secondary school students

Main applicants: Gerrit Borchard, Pascal Bonnabry

Total funding of the project: CHF 197'232.-

Total duration of the project: 3 years

Allocation 2024: CHF 63'744.-

Starting date: 01.11.2023

Total amount for all research funds for 2024: CHF 121'494.-

Service agreements and related activities

Confédération Helvétique, Département fédéral de la Défense, de la Protection de la Population et des Sports (DPPS)

Service – Development – Research : Centre de pharmacie d'urgence et de catastrophe

Main applicants: Pascal Bonnabry, Nicolas Widmer

Total funding of the project: max CHF 400'000.-

Total duration of the project: 4 years

Allocation 2024: CHF 83'480.-

B.Braun, Roche, AMGEN, Sanofi, Viatriis, pharmaSuisse

Pharmamobile – une plateforme de formation innovante autour du médicament, qui vient à la rencontre des patient.es, des professionnel.les de la santé et des étudiant.es

Main applicant: Pascal Bonnabry

Total funding of the project: to be determined

Total duration of the project: to be determined

Allocation 2024: CHF 110'000.-

B.Braun, Développement des formes hospitalière prêtes à l'emploi et à l'administration injectables.

Main applicant: Farshid Sadeghipour

Total funding of the project: 120'000.-

Total duration of the project: 4 years

Allocation 2024: CHF 30'000.-

Total amount (for all service agreements and related activities) for 2024: CHF 223'480.-

Scientific publications

Garnier, A.; Dubs, C.; Hearder, C.; Bonnabry, P.; Bouchoud, L.

Game-based training to improve hospital pharmacy operator's compliance with handwashing guidelines.

Journal of hospital infection 2024, 144, 37-43.

François, O.; Hufschmid Thurnherr, E.; Blatrie, C.; Cousein, E.; Herranz, A.; Sadeghipour, F.; Bonnabry, P.

Integrating automated dispensing cabinets into the medication dispensing process.

European Journal of Hospital Pharmacy 2024

doi: 10.1136/ejpharm-2024-004195.

Nguyen, N.; Vallet, V.; Bouchoud, L.; Falaschi, L.; Rudaz, S.; Bonnabry, P.

Assessment of the surface contamination of the primary packaging of oral antineoplastic drugs and secondary packaging of chemotherapy preparations at a Swiss hospital.

Journal of Oncology Pharmacy Practice 2024, 0

doi: 10.1177/10781552241250010.

Garnier, A.; Bonnabry, P.; Bouchoud, L.

Using simulation to improve pharmacy operators' handling of cytotoxic spills. Journal of Oncology Pharmacy Practice 2024, 0

doi: 10.1177/10781552241237441.

Jermi, M.; Fonzo-Christe, C.; Blondon, K.; Milaire, C.; Stirnemann, J.; Bonnabry, P.; Guignard, B.

Financial impact of medication reviews by clinical pharmacists to reduce in-hospital adverse drug events: a return-on-investment analysis.

International Journal of Clinical Pharmacy 2024, 46, 496-505.

Guignard, B.; Crevier, F.; Charlin, B.; Audétat, MC.

A graphical model to make explicit pharmacist clinical reasoning during medication review.

Research in Social and Administrative Pharmacy 2024

doi: 10.1016/j.sapharm.2024.09.005.

Borgeaud, M.; Perano, S.; Addeo, A.; Tsantoulis, P.
Rates of febrile neutropenia and its causes in the real world.
Future Oncology 2024
doi: 10.1080/147966942024.2349510.

Voidey, A.; Sommer, I.; Marino A.
When gravimetry is debated by sponsors of clinical studies.
European Journal of Hospital Pharmacy 2024
doi: 10.1136/ejhpharm-2024-004153.

Krstic, M.; Devaud, JC.; Sadeghipour, F.
Does the introduction of an infliximab biosimilar always result in savings for hospitals? A descriptive study using real-world data.
Health Economics review 2024
doi: 10.1186/s13561-024-00507-5.

Feka, A.; Cumin, M.; Sadeghipour, F.
Editorial commentary : in oral hydroquinidine a real alternative to intravenous quinidine for intubated patients in intensive care unit?
Trends in Cardiovascular Medicine 2024
doi:10.1016/j.tcm.2024.08.004

Bello, W.; Hosotte, C.; Stampfli, C.; Pierrot, A.; Munier, L.; Berger-Gryllaki, M.; Pezzatti, J.; Carrez, L.; Sadeghipour, F.
Stability study of topotecan in ophthalmic prefilled syringes for intravitreal delivery.
European Journal of Hospital Pharmacy 2024
doi: 10.1136/ejhpharm-2024-004346.

Bello, W.; Pezzatti, J.; Rudaz, S.; Sadeghipour, F.
Monitoring of leachable compounds in hospital pharmacy-compounded prefilled syringes, infusion bags and vials.
Journal of Pharmaceutical Science 2024
doi: 10.1016/j.xphs.2024.08.004.

Fournier, A.; Riand, M.; Perrottet, N.; Sadeghipour, F.; Pujol, E.
Management strategies of alteplase extravasation.
Neurological sciences 2024
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Fournier, A.; Fallet, C.; Sadeghipour F.; Perrottet, N.
Assessing the applicability and appropriateness of ChatGPT in answering clinical pharmacy questions.
Annales pharmaceutiques françaises.
doi: 10.1016/j.pharma.2023.11.001.

Stavropoulou, E.; Huguenin, A.; Caruana, G.; Opota, O.; Perrottet, N.; Blanc, DS.; Grandbastien, B.; Senn, L.; Bochud, PY.; Lamothe, F.
Investigations of an increased incidence of non-Aspergillus invasive mould infections in an onco-haematology unit.
Swiss medical weekly
doi: 10.57187/s.3730.

Dietz, M.; Kamani, CH.; Bousige, C.; Dunet, V.; Delage, J.; Rubimbura, V.; Nicod Lalonde, M.; Treglia, G.; Schaefer, N.; Nammias, W.
Natural History of Myocardial $\alpha\beta 3$ Integrin Expression After Acute Myocardial Infarction: Correlation with Changes in Myocardial Blood Flow.
Journal of Nuclear Medicine 2024, 65 (7) 1107-1112.

Loser, V.; Baumgartner, T.; Legardeur, H.; Panchaud, A.; Théaudin, M.
Patisiran exposure in early pregnancy: a case report.
Therapeutic Advances in Neurological Disorders 2024
doi: 10.1177/17562864241239755.

Maisonneuve, E.; Favre, G.; Boucoiran, I.; Dashraath, P.; Panchaud, A.; Baud, D.
Post-COVID-19 condition: recommendations for pregnant individuals.
The Lancet Regional Health – Europe 2024
doi: 10.1016/j.lanepe.2024.100916.

Noseda, R.; Bedussi, F.; Panchaud, A.; Ceschi, A.
Safety of Monoclonal Antibodies Inhibiting PCSK9 in Pregnancy: Disproportionality Analysis in VigiBase®.
Clinical Pharmacology and Therapeutics.
doi: 10.1002/cpt.3269

Dupuis, M.; Weir, K.R.; Vidonsky Lüthold, R.; Panchaud, A.; Baggio, S.
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Archives of Women's Mental Health 2024
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Ceulemans, M.; Damkier, P.; Panchaud, A.
SSRIs in Pregnancy - What Offspring Brain Volumes Can and Cannot Tell Us.
JAMA Psychiatry 2024
doi: 10.1001/jamapsychiatry.2023.5042.

Nordeng, H.; Wegler, C.; Lindqvist, A.; Melander, E.; Magnusson, M.; Gandia, P.; Panchaud, A.; Baranczewski, P.; Spigset, O.
Transfer of cetirizine/levocetirizine into human breast milk and estimation of drug exposure to infants through breastfeeding: A human lactation study from the ConcePTION project.
Basic and Clinical Pharmacology and Toxicology 2024.
doi: 10.1111/bcpt.13948.

Damkier, P.; Gram, EB.; Ceulemans, M.; Panchaud, A.; Cleary, B.; Chambers, C.; Weber-Schoendorfer, C.; Kennedy, D.; Hodson, K.; Grant, KS.
Acetaminophen in Pregnancy and Attention-Deficit and Hyperactivity Disorder and Autism Spectrum Disorder.
Obstetrics and gynecology 2024.
doi: 10.1097/aog.0000000000005802.

Melander, E.; Nielsen, EI.; Lindqvist, A.; Hovd, M.; Gandia, P.; Panchaud, A.; Guidi, M.; Annaert, P.; Baranczewski, P.; Spigset, O.
Population pharmacokinetic modelling of cetirizine concentrations in human breast milk-A contribution from the ConcePTION project.
Basic & clinical pharmacology & toxicology 2024
doi: 10.1111/bcpt.14100.

Damkier, P.; Shechtman, S.; Diav-Citrin, O.; Panchaud, A.; Weber-Schoendorfer, C.; Hodson, K.; Cleary B.
Drifting Too Far From Shore: Paternal Valproate Statement by the European Medicines Agency (EMA).
Pharmacoepidemiology and drug safety 2024.
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Swiss medical weekly 2024.
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Garey, JD.; Damkier, P.; Scialli, AR.; Lusskin, S.; Braddock, SR.; Chouchana, L.; Cleary, B.; Conover, EA.; Diav-Citrin, O.; Dragovich, RS.
Paternal Valproate Treatment and Risk of Childhood Neurodevelopmental Disorders: Precautionary Regulatory Measures Are Insufficiently Substantiated.
Birth defects research 2024.
doi: 10.1002/bdr2.2392.

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Inhibiting IgG in Hemolytic Disease of the Fetus.
The New England journal of medicine 2024
doi: 10.1056/nejme2401020.

Graber, M.; Panchaud, A.; Legardeur, H.; Derfuss, T.; Friedli, C.; Gobbi, C.; Zecca, C.; Granziera, C.; Jelcic, I.; Hammer, HN.
Recommendations for the Treatment of Multiple Sclerosis in Family Planning, Pregnancy and Lactation in Switzerland: Immunotherapy.
Clinical and Translational Neuroscience 2024
doi: 10.3390/ctn8030026.

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Swiss Medical Weekly 2024
doi: 10.57187/s.3751.

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Pharmaceutics 2024
doi: 10.3390/pharmaceutics16050678.

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Assessment of chemical stability of monoclonal antibody and antibody drug conjugate administered by pressurized intraperitoneal aerosol chemotherapy.
Journal of Pharmaceutical and Biomedical Analysis 2024.
doi: 10.1016/j.jpba.2024.116410.

Widmer, N.; Guidi, M.; Buclin, T.
Population Pharmacokinetics in Oncology and Its Clinical Applications.
Pharmaceutics 2024, 16, 711.

Bonnabry, P.,
Sécurité des patients: agissons ensemble pour une prise en charge sûre et efficace. Revue Médicale Suisse 2024, 20, 115-7.

Alameda, B.; Hannou, S.; Derême, J.; Tsilimidos, G. ; Alberio, L. ; D'Amelio, P.; Bosshard Taroni, W.,
Anticoagulants oraux directs chez la personne âgée polymorbide : quelles vigilances ? Revue médicale suisse 2024, doi : 10.53738/REVMED.2024.20.893.1978.

Csajka, C. ; Hannou, S. ; D'Amelio, P.
La Chondroïtine : quelle efficacité dans l'arthrose ? La gazette médicale 2024, doi : 10.23785/Gazette.2024.02.002.

Marçon, F.; Lagarce, F.; Roland, I. ; Brossard, D. ; Merienne, C. ; Chennell, P. ; d'Huart, E. ; Briot, T. ; Carrez, C. ; Podilsky, G. ; Rohrbach, P.; Lannoy, D.; Storme, T.; Guerrault-Moro, M.N.; Soulairol, I.; Crauste-Manciet, S.

Recommendations on training objectives and staff qualification for the manual preparation of capsules in pharmacy. Pharmaceutical Technology in Hospital Pharmacy 2024, doi: 10.1515/pthp-2023-0013.

Maisonneuve, É.; Panchaud, A.; Baud, D.; Gavillet, M.

[Neonatal Fc receptor: role and implications in maternal fetal medicine].

Revue médicale Suisse 2024, doi: 10.53738/revmed.2024.20.891.1869.

Tang, T.; Ben Azzouna, R.; Hyafil, F.; Delage, J.; Casagrande, K.; Costes, J.; Ganem, J.; Ly, C. Chaussard, M.,

Maladie coronaire chronique : utilisation des générateurs de Rubidium 82. Dossier du CNHIM 2024, 2024, XLV, 3.

Porzi, J.; Porzi, M.; Patonnier, M.; Macri, F.; Widmer, N.; Desmettre, T.; Platon, A.; Poletti, P.-A.; Gartner, B.A.

Diagnostic et prise en charge d'urgence en cas d'incidents radiologiques. Revue Médicale Suisse 2024, 20, 1418-21.

Patents

-

Books or books chapters

-

Congresses / conferences and Symposia

- Congresses / conferences organisation: 6
- Posters presentations: 39
- Oral presentations: 7
- Invited oral presentations: 15

Ph.D. Theses presented in 2024

Alexandra Garnier

Utilisation de techniques pédagogiques innovantes dans la formation en production hospitalière

Pr Pascal Bonnabry

Mégane Jermini

Évaluation de l'impact économique, clinique et humain des services de pharmacie clinique avancée en médecine interne générale

Pr Pascal Bonnabry

William Bello

Monitoring of Leachables in Hospital Pharmacy Compounding

Pr Farshid Sadeghipour

Awards and distinction

Charveys, A.; Defieuw, L.; Falaschi, L.; Bonnabry, P.; Bouchoud, L.

Trente minutes pour réchauffer une poche de perfusion réfrigérée: mythe ou réalité ? **Best research poster award, 2nd prize**. Congrès GSASA, 27-29 November 2024, Basel (Switzerland).

Vallet, V.; Bonnabry, P.; Fleury-Souverain, S.

Contamination chimique des flacons d'agents anticancéreux conventionnels commercialisés en Suisse: état des lieux 10 ans après la première évaluation. **Best research poster award, 1st prize**. Congrès GSASA, 27-29 November 2024, Basel (Switzerland).

Jermini, M.; Fonzo-Christe, C.; Blondon, K.; Milaire, C.; Stirnemann, J.; Bonnabry, P.; Guignard, B.

Financial impact of medication reviews by clinical pharmacists to reduce in-hospital adverse drug events: a return-on-investment analysis. **Best publication of the year**. International Journal of Clinical Pharmacy 2024, 46, 496-505.

Bertin, S.; Haefliger, D.; Schneider, AG.; Giraud, R.; Bechtold, X.; Di Paolo, ER.; Rothuizen, LE.; Girardin, F.; Buclin, T.; Livio, F.

Effects of extracorporeal membrane oxygenation circuits on drug sequestration: a review of ex vivo observations. **Best poster prize**. 8th Annual Spring Congress of the Swiss Society of General Internal Medicine, 29-31 May 2024, Basel (Switzerland).

Ratsimalahelo, N.; Feka, A.; Perrottet, N.; Sadeghipour, F.

Room of horrors 2.0: implementing and adapting error simulation workshops in Neurology and Cardiology. **Forum poster award**. Congrès GSASA, 27-29 November 2024, Basel (Switzerland).

Roth, E.; Evéquoz, S.; Anchisi, S.; Beney, J.

Fabrication anticipée des chimiothérapies dans un hôpital multi-sites : Analyse économique. **Junior prize Congrès GSASA**, 27-29 November 2024, Basel (Switzerland).

Public outreach activities (radio, television and other media, community service)

Voirol, P., Hirudothérapie - Se défaire du mauvais sang, RTS, Emission 19h30, March 24th, 2024, Geneva, (Switzerland)

Voirol, P., La pénurie d'anxiolytiques complique les suivis psy, Journal 14 Heures, April 27th, 2024, (Switzerland)

Voirol, P., Dein Medikament fehlt derzeit? Knappheit von Medikamenten wird wohl chronisch, Watson, June 25th, 2024, (Switzerland)

Voirol, P., Médicaments : les pénuries deviennent chroniques, la riposte tarde, Agence Keystone ATS, June 26th, 2024, (Switzerland)

Voirol, P., Medikamentenknappheit dürfte chronisch werden, Agence Keystone SDA, June 26th, 2024, (Switzerland),

Voirol, P., Médicaments : les pénuries deviennent chroniques, la riposte tarde, Journal La Côte, June 26th, 2024, (Switzerland)

Voirol, P., Les pénuries de médicaments deviennent chroniques en Suisse, Journal Blick, June 26th, 2024, (Switzerland)

Voirol, P., Les pénuries sont chroniques, Journal La Liberté, June 26th, 2024, (Switzerland)

Voirol, P., Pénuries chroniques des médicaments en Suisse, Site Frapp.ch, June 26th, 2024, (Switzerland)

Voirol, P., Gründe für Mangellage vielschichtig, Journal Appenzeller Volksfreund, June 26th, 2024, (Switzerland)

Voirol, P., Medikamentenmangel dürfte chronisch werden, Journal Südostschweiz, June 26th, 2024, (Switzerland)

Voirol, P., Médicaments : la pénurie devient chronique, site ARC Info, June 27th, 2024, (Switzerland)

Voirol, P., Les pénuries deviennent chroniques, Journal Le Nouvelliste, June 27th, 2024, (Switzerland)

Voirol, P., Medikamentenmangel dürfte chronisch werden, Journal die Botschaft, June 28th, 2024, (Switzerland)

Widmer, N. In Di Matteo, K. Depuis 40 ans, les pros de la santé ont leur pharmacie, 24 Heures, May 28th, 2024

Widmer, N. In Di Matteo, K. Depuis 40 ans, les pros de la santé ont leur pharmacie dédiée, Riviera-Chablais Hebdo, May 29th, 2024

Widmer, N. In Thierry Philbet, T. 40 ans de la PHEL : Surprises et projets à la pelle, pharmaJournal, August 23rd, 2024

André, M.; Crousaz, K.; Buclin, T.; Widmer, N. Quels remèdes contre l'insomnie infantile à l'époque moderne ? Laboratoire Histoire et Cité. Lausanne - UNIL. November 11th, 2024

IMMUNOPHARMACOLOGY OF CANCER

Professor Carole BOURQUIN

General description of the Unit

Our overall aim is to develop novel treatments to enhance the body's immune defences against cancer.

We aim to uncover new mechanisms leading to immune activation in cancer. Our goal is to identify novel targets to stimulate anticancer immunity and to demonstrate the impact of their pharmacological modulation. In this context, we have three main research axes focusing on innate immunity, immunometabolism and drug delivery.

Specific research fields

One focus of our research is the role of players involved in the innate immune recognition of nucleic acids, such as endosomal Toll-like receptors, HMGB1 and STING. We study the effect of the pharmacological modulation of these receptors and immune mediators. We address the following questions:

- What is the impact of these pathways on different aspects of anticancer immunity?
- Can we enhance migration of immune cells into the tumor with pharmacological modulators of these pathways?
- Can we decrease cancer-associated immunosuppression by targeting these pathways?

The second focus of our research is the implementation of drug delivery systems, such as nanoparticles, to improve the therapeutic efficacy of immune modulators in cancer. We address the following questions:

- Can we use nanoparticles as a delivery system to focus the action of Toll-like receptor 7 agonists and prevent unwanted side effects?
- What are the optimal characteristics of nanocarriers to deliver drugs that target anticancer immunity?

A third focus of our research is the impact of lipid metabolism on the anti-tumor immune response at different levels. At the systemic level, we study how a high-fat diet, obesity and steroid signalling may modify anticancer immunity and the response to immunotherapy. At the cellular level, we address the role of intratumoral lipid biosynthesis and steroid metabolism on the anti-tumor immune response. We address the following questions:

- What is the impact of gender and obesity on steroid-mediated immune modulation?
- Can we target steroid metabolism to enhance the anti-tumor immune response?

We address these scientific questions using translational approaches, starting with clinically relevant data to generate our hypotheses, which we then validate in preclinical models of cancer.

2024 at a glance

- Publications: 4
- Patents: 0
- Book and chapters: 0
- Congresses / conferences organisation: 2
- Posters presentations: 0
- Oral presentations: 0
- Invited oral presentations: 4
- Number of projects at FNRS and assimilated (Research funds): 9
- Service agreements and related activities: 0
- Ph.D. Theses presented in 2024: 1
- Awards and distinctions: 0
- Public outreach activities: 3

Research funds

Swiss National Science Foundation

Category: SNSF

SPIRIT Consortium "Gasotransmitters in triple negative breast cancer"
(IZSTZ0-198887)

Main applicant and coordinator: Carole Bourquin

Total funding: CHF 498'880.-

Duration: 3 years

Allocation 2024: CHF 0.-

Starting date: 01.09.2021

Swiss National Science Foundation

Category: SNSF

"HMGB1 and Gasdermin D: intratumoral targets to improve the response to cancer immunotherapy"
(310030_182317/1)

Main applicant: Carole Bourquin

Total funding: CHF 700'000.-

Duration: 5 years

Allocation 2024: CHF 0.-

Starting date: 01.01.2019

Swiss National Science Foundation

Category: SNSF

"Synergistic targeted drug combinations for induction of sensitivity to immune checkpoint
Inhibitors".

(310030_197878)

Main applicant: Patrycja Nowak-Sliwinska

Total funding: CHF 46'000.-

Duration: 4 years

Allocation 2024: CHF 10'000.-

Starting date: 01.01.2021

Swiss National Science Foundation

Category: SNSF

R'Equip "Building the future of radiation oncology in Geneva".
(316030_221602)

Main applicant: Pelagia Tsoutsou

Total funding: CHF 418'622.-

Duration: 4 years

Allocation 2024: CHF 418'622.-

Starting date: 01.12.2023

Cell Migration

Category: Institutional

Doctoral Program SwissUniversities

Main applicant: Carole Bourquin

Total funding: CHF 24'000.-

Duration: 6 years

Allocation 2024: CHF 0.-

Starting date: 01.07.2018

Novartis Foundation

Category: Institutional

"Exploring the tumorigenic role of stomach microbiota in a spontaneous mouse model of gastric cancer"

Main applicant: Carole Bourquin

Total funding: CHF 60'000.-

Duration: 3 years

Allocation 2024: CHF 0.-

Starting date: 01.08.2020

Debiopharm IDEAL

Category: Institutional

"A new immunotherapeutic strategy for the treatment of Her2+ breast cancer"

Main applicant: Aurélien Pommier

Total funding: CHF 51'103.65.-

Duration: 1 year

Allocation 2024: CHF 0.-

Starting date: 01.07.2022

Doctoral Program Cell Migration

Category: Institutional

Doctoral Program SwissUniversities

Main applicant: Carole Bourquin

Total funding: CHF 8'000.-

Duration: annual

Allocation 2024: CHF 8'000.-

Starting date: 01.11.2020

Innogap Fusion Prot

Category: Institutional

"Fusion protein for the treatment of cancer"

Main applicants: Carole Bourquin, Aurélien Pommier, Bart Boersma

Total funding: CHF 30'000.-

Duration: 1 year

Allocation 2024: CHF 0.-

Starting date: 01.07.2023

Total amount for all research funds for 2024: CHF 436'622.-

Scientific publications

Boersma B, Puddinu V, Huard A, Fauteux-Daniel S, Wirapati P, Guedri S, Tille JC, McKee T, Pittet M, Palmer G, Bourquin C.

GSDMD is associated with survival in human breast cancer but does not impact anti-tumor immunity in a mouse breast cancer model.

Front Immunol. 2024 Aug 19;15:1396777.

doi: 10.3389/fimmu.2024.1396777

Dawoud, A., Youness, RA., Nafea, H., Manie, T., Bourquin, C., Szabo, C., Abdel-Kader, RM., Gad, MZ.

Pan-inhibition of the three H₂S synthesizing enzymes restrains tumor progression and immunosuppression in breast cancer.

Cancer Cell Int. 2024 Apr 16;24(1):136.

doi: 10.1186/s12935-024-03317-1.

Youness, RA., Habashy, DA., Khater, N., Elsayed, K., Dawoud, A., Hakim, S., Nafea, H., Bourquin, C. Abdel-Kader, RM., Gad, MZ.

Role of Hydrogen Sulfide in Oncological and Non-Oncological Disorders and Its Regulation by Non-Coding RNAs : A Comprehensive Review.

Noncoding RNA. 2024, 18;10(1):7.

doi: 10.3390/ncrna10010007

Dawoud, A., Youness, RA., Elsayed, K., Nafea, H., Allam, H., Saad, HA., Bourquin, C., Szabo, C. Abdel-Kader, R., Gad, MZ.

Emerging roles of hydrogen sulfide-metabolizing enzymes in cancer.

Redox Rep. 2024 Dec;29(1):2437338.

doi: 10.1080/13510002.2024.2437338. Epub 2024 Dec 6.

Congresses / conferences and Symposia

- Congresses / conferences organisation: 2
- Posters presentations: 0
- Oral presentations: 0
- Invited oral presentations: 4

Ph.D. Theses presented in 2024

Bart Boersma

Cancer Therapeutics: Harnessing Cytokine Dynamics for Targeted Inhibition or Delivery

Prof. Carole Bourquin

Prof. Gaby Palmer-Lourenço

Public outreach activities (radio, television and other media, community service)

Bourquin C. Organization of a workshop for a primary school class "How to develop a cancer drug" (with Prof. M. Cuendet and Prof. P. Nowak), January 19, 2024

Bourquin C., Women and girls in science and technology, February 6, 2024, Ecole des Promenades, Carouge (Switzerland)

Bourquin C. Organization of a workshop for a primary school class "How to develop a cancer drug" (with Prof. M. Cuendet and Prof. P. Nowak), October 18, 2024

CANCER SYSTEMS PHARMACOLOGY

Professor Patrycja NOWAK-SLIWINSKA

General description of the Unit

Paradoxically, the growing arsenal of therapeutics, yielded by biomedical research and development, does not bring the degree of effectiveness that is necessary for the treatment of cancer. It is generally expected that the combination of drugs will bring the needed improvement of cancer therapy. Although promising personalized cancer treatment approaches are starting to find clinical utility, personalized design of optimized drug combinations (ODCs) is still in its infancy.

The overall aim of the *Molecular Pharmacology Group's* research is the discovery of ODCs for the treatment of complex diseases, mainly cancer, and at the fundamental level discovery of mechanism of action leading to design of new treatment strategies. Optimally combining drugs that are already clinically used holds the potential for rapid translation into the clinic, especially when used at low doses. We use a phenotypic statistics-based technology combined with data modelling to identify ODCs with a minimal *in vitro* experimental effort. The results are subsequently translated and validated in appropriate *in vivo* models.

The major clinical relevance of this strategy can be highlighted as follows: (i) the approach is personalized, resulting in patient-tailored individualized treatment, (ii) ODC treatment may be applicable to patients that failed conventional treatment, (iii) ODC treatment can be quickly adapted during the course of treatment addressing temporal tumor heterogeneity, when tumors get more aggressive or develop resistance. Moreover, our strategy uses fundamental research to reveal the ODC action mechanisms. The latter, in turn, may identify novel signaling pathways, unexpected mechanisms of resistance and may lead to new drug discovery alleys.

Specific research subfields

- Phenotypic multidrug combinations optimization for cancer treatment
- Cell fate and acquired drug resistance mechanisms
- Multidrug combinations to boost the activity of immune checkpoint inhibitors
- Complex *in vitro* platforms to mimic tumor microenvironment

2024 at a glance

- Publications: 5
- Patents: 0
- Book and chapters: 0
- Congresses / conferences organisation: 17
- Posters presentations: 15
- Oral presentations: 22
- Invited oral presentations: 12
- Number of projects at FNRS and assimilated (Research funds): 8
- Service agreements and related activities: 0
- Ph.D. Theses presented in 2024: 0
- Awards and distinctions: 5
- Public outreach activities: 8

Research funds

Fondation privée des HUG

Institutional

Projet Booster

Main applicant: Valentin Miéville

Total funding of the project: CHF 5'000.-

Total duration of the project: 1 year

Allocation 2024: CHF 5'000.-

Starting date: 01.08.2024

Fondation recherche suisse contre le cancer

Institutional

Targeting multipolar spindles in cancer cells with a synergistic drug combination

Main applicant: Patrick Meraldi

Co-applicant: Patrycja Nowak-Sliwinska

Total funding of the project: CHF 346'650.-

Total duration of the project: 3.5 years

Allocation 2024: CHF 0.-

Starting date: 01.01.2021

Fondation Valery

Developing new personalized treatments for colorectal cancer patients

Main applicants: Patrycja Nowak-Sliwinska, Patrick Meraldi

Total funding of the project: CHF 400'000.-

Total duration of the project: 3 years

Allocation 2024: CHF 133'000.-

Starting date: 01.02.2023

FNRS 310030_197878

SNSF

Synergistic targeted drug combinations for induction of sensitivity to immune checkpoint inhibitors

Main applicant: Patrycja Nowak-Sliwinska

Total funding of the project: CHF 599'329.-

Total duration of the project: 4 years

Allocation 2024: CHF 144'669.-

Starting date: 01.01.2021

FNRS CRSII—222823

SNSF Sinergia Making tumors vulnerable to immunity

Main applicant: Patrycja Nowak-Sliwinska

Total funding of the project: CHF 2'955'200.-

Total duration of the project: 4 years

Allocation 2024: CHF 73'000.-

Starting date: 01.09.2024

DIP Mentorat

Title of the research project: Programme égalité UNIGE

Main applicant: Patrycja Nowak-Sliwinska

Total funding of the project: CHF 40'000.-

Total duration of the project: 3 years

Allocation 2024: CHF 40'000.-

Starting date: 15.05.2021

DIP Egalité

Title of the research project: Programme égalité UNIGE

Main applicant: Patrycja Nowak-Sliwinska

Total funding of the project: CHF 40'000.-

Total duration of the project: 3 years

Allocation 2024: CHF 40'000.-

Starting date: 15.05.2021

SCAHT

Institutional

Pathways of toxicity – mapping the underlying cell metabolism to support toxicant mixture effect investigations.

Main applicant: Isabelle Meister

Total funding of the project: CHF 120'000.-

Total duration of the project: 2 years

Allocation 2024: CHF 40'000.-

Starting date: 01.01.2023

Total amount for all research funds for 2024: CHF 475'669.-

Scientific publications

Kowolik, E.; Szczygieł, D.; Szczygieł, M.; Drzał, A.; Vemuri, K.; Olsson, A.K.; Griffioen, A.; Nowak-Sliwinska, P.; Wolnicka-Glubisz, A.; Elas, M.

Preclinical AGUIX® Theranostic Nanoparticles for PDT Tar-get-ing Blood Vessels.

Cancers, 16(23):3924.

doi: 10.3390/cancers16233924., 2024.

Benboubker, V.; Ramzy, G.M.; Jacobs, S.; Nowak-Sliwinska, P.

Challenges in validation of combination treatment strategies for CRC using patient-derived organoids, J Exp Clin Cancer Res, 2024 Sep 11;43(1):259.

doi: 10.1186/s13046-024-03173-x.

Gubala, J.; Miéville, V.; Benamran, D.; Valerio Tille, J.C.; Nowak-Sliwinska, P.

Generation and maintenance of kidney and kidney cancer organoids from patient-derived material for drug development and precision oncology.

Molecular Therapy – Methods & Clinical Development, Volume 32, Issue 4, 12 December 2024, 101368.

doi.org/10.1016/j.omtm.2024.

Zebret, S.; Hadiji, M.; Romano-deGea, J.; Bornet, A.; Ortiz, D.; Fadaei, T.D.; Stathopoulos, C.; Nowak-Sliwinska, P.; Munier, F.; Dyson, P.J.

New melphalan derivatives for the treatment of retinoblastoma in combination with thermotherapy.

RSC Med. Chem., 2024, 15, 2300.

doi: 10.1039/d4md00211c.

Dugershaw-Kurzer, B.; Bossart, J.; Buljan, M.; Hannig, Y.; Zehnder, S.; Gupta, G.S.; Kissling, V.S.; Nowak-Sliwinska, P.; van Beijnum, J.R.; Griffioen, A.W.; Masjosthusmann, S.; Zühr, E.; Fritsche, E.; Hornung, R.; Rduch, T.; Buerki-Thurnherr, T.

Uncovering the role of nanoparticles in disrupting placental secretome and its consequences on angiogenesis and neurodevelopment.

Advanced Science. (2024) May 20:e2401060.

doi: 10.1002/adv.202401060

Congresses / conferences and Symposia

- Congresses / conferences organisation : 17
- Posters presentations: 15
- Oral presentations: 22
- Invited oral presentations: 12

Awards and distinctions

Mathis Fiault : awarded with the 1st poster award during Journées Scientifiques du Réseau Francophone de Métabolomique et Fluxomique (RFMF), 3-6 June 2024, Saint-Malo, France.

Mathis Fiault: awarded the 1st poster award during Symposium on Pharmaceutical and Biomedical Analysis (PBA), 9-12 September 2024, Geneva, Switzerland.

Valentin Miéville: awarded the best poster competition during the ULLA summer school 2024, Leiden, The Netherlands.

Valentin Miéville: awarded the Booster Prize 2024, UNIGE, Geneva, Switzerland.

George M. Ramzy: best oral presentation award during the spring Meeting of the Swiss Society of Pharmacology and Toxicology, 19 April 2024, Bern, Switzerland.

Public outreach activities (radio, television and other media, community service)

Interview with Patrycja Nowak-Sliwinska and Olivier Michielin in “19.30” news of the Radio Television Swiss.

Patrycja Nowak-Sliwinska, within the Equality and Diversity Commission of the Faculty of Sciences, contributed to the development and diffusion of the book “Toutes les grandes personnes ont d’abord été des enfants”. 12 stories for children aged 8 to 12, to inspire them and help to discover science. Distributed to local schools.

Patrycja Nowak-Sliwinska has accepted a position on the Strategic Board of the Swiss 3R Competence Center as a representative of UNIGE.

Patrycja Nowak-Sliwinska has accepted a position as Secretary to the Board of Directors of the Swiss Society for Experimental Pharmacology.

Patrycja Nowak-Sliwinska joined the General Assembly, UNIGE.

Patrycja Nowak-Sliwinska joined the Commission for Animals in Experimental Research (CARE), UNIGE.

Patrycja Nowak-Sliwinska took part in the program “Woman and Girls in Science and Technology” (lectures in two primary schools in Geneva).

Patrycja Nowak-Sliwinska (with Carole Bourquin and Muriel Cuendet) organized practical workshops (CMU, UNIGE) dedicated to primary school children on *How to find a medication to cure cancer*.

MOLECULAR THERAPEUTICS DELIVERY GROUP

Professor Yogeshvar KALIA

General description of the Unit

The principal field of interest is drug delivery and the development of physiologically relevant ex vivo models. The group focuses on developing and investigating methods to increase molecular transport across biological barriers using chemical, formulation and technology-based enhancement techniques. Areas of interest include (i) topical and transdermal delivery of therapeutic agents by investigating the effect of molecular properties on both passive and active transport processes into and across the skin, (ii) use of formulation and technology-based methods to improve drug delivery to the eye, (iii) development of an ex vivo model using the Ussing chamber and porcine intestine to investigate drug absorption in the gastrointestinal tract and (iv) development of ex vivo models using porcine and human skin to investigate the subcutaneous administration of biomacromolecules.

Specific research fields

The research in the field of drug delivery includes:

- Development of new formulations and physical enhancement techniques to increase topical and transdermal delivery of low and high molecular weight therapeutics.
- Development and optimization of quantitative and visualization methods to understand the spatio-temporal biodistribution of both low and high molecular weight therapeutics in the skin and other tissues.
- Development of an ex vivo model using porcine and human skin to investigate subcutaneous administration of biomacromolecules – including hyaluronic acid and therapeutic proteins.
- Investigation into the use of formulation and technology-based methods to improve drug delivery to both the anterior and posterior segments of the eye.
- Developing a physiological ex vivo porcine intestine model to investigate drug absorption in the gastrointestinal tract.
- Optimization of passive and iontophoretic drug delivery to the oral cavity for targeted local therapy.

2024 at a glance

- Publications: 7
- Patents: 1
- Book and chapters: 1
- Congresses / conferences organisation: 0
- Posters presentations: 7
- Oral presentations: 1
- Invited oral presentations: 0
- Number of projects at FNRS and assimilated (Research funds): 2
- Service agreements and related activities: 0
- Ph.D. Theses presented in 2024: 0
- Awards and distinctions: 0
- Public outreach activities: 1

Research funds

INDUSTRY 1

“Preclinical evaluation of a supramolecular carrier system for intestinal absorption”

Main applicant: Yogeshvar KALIA

Total funding of the project: CHF 90'000.-

Total duration of the project: 12 months

Allocation 2024: CHF 30'000.-

Starting date: 01.06.2022

INDUSTRY 2

“Understanding the delivery of RNA-based therapeutics and developing methods to improve bioavailability and efficacy.”

Main applicant: Yogeshvar KALIA

Total funding of the project: CHF 434'000.-

Total duration of the project: 48 months

Allocation 2024: CHF 110'997.12.-

Starting date: 01.11.2022

Total amount for all research funds for 2024: CHF 140'997.12.-

Service agreements and related activities

N/A

Scientific publications

V. Tyagi, V. Suter, S. Kandekar, M. Lapteva, Y. N. Kalia.

Development and biopharmaceutical evaluation of aqueous polymeric micelle-based corticosteroid formulations for topical treatment of oral lichen planus.

Int Pharm, 2024; 667(Pt B):124949.

P.F. Sahraoui, O. Vadas, Y. Kalia.

Non-invasive delivery of negatively charged nanobodies by anodal iontophoresis: when electroosmosis dominates electromigration.

Pharmaceutics 2024; 16(4): 539.

W. Shatz-Binder, B. Leonard, I. Vuong, J. Sudhamsu, P. Liu, W. Sandoval, K. Bol, S. Izadi, P. G. Holder, C. Blanchette, R. Perozzo, R. F. Kelley, Y. Kalia.

Adapting ferritin, a naturally occurring protein cage, to modulate intrinsic agonism of OX40.

Bioconjug Chem, 2024; 35(5): 593-603.

P. Micheels, A. Porcello, T. Bezzola, D. Perrenoud, P. Quinodoz, Y. Kalia, E. Allémann, A. Laurent, O. Jordan.

Clinical perspectives on the injectability of cross-linked hyaluronic acid dermal fillers: standardized methodology for commercial product benchmarking with inter-injector assessments.

Gels. 2024; 10(2): 101.

M. Lapteva, J. Faro Barros, Y. N. Kalia.

Cutaneous delivery and biodistribution of cannabidiol in human skin after the topical application of colloidal formulations.

Pharmaceutics 2024; 16(2): 202.

S. Masloh, A. Chevrel, M. Culot, A. Perrocheau, Y. N. Kalia, S. Frehel, R. Gaussin, F. Gosselet, S. Huet, M. Zeisser Labouebe, L. Scapozza.

Enhancing oral delivery of biologics: a non-competitive and cross-reactive anti-leptin receptor Nanofitin demonstrates a gut-crossing capacity in an ex vivo porcine intestinal model.

Pharmaceutics. 2024 Jan 16; 16(1): 116.

Y. Boulaguiem, J. Quartier, M. Lapteva, Y. N. Kalia, M.-P. Victoria-Feser, S. Guerrier.

Finite sample corrections for average equivalence testing.

Stat Med. 2024 Feb 28;43(5):833-854

Patents

M. Hug; J. Cazares Delgadillo; A. Venturato; W. Hoffmann; H. Abivardi Brönner; G. Abivardi Signer; D. A. Lysek; Y. Kalia; I Panchenko; M. Tufeu, Oral film with multiple regions for therapy of periodontal and dental diseases or disorders, EP4385458A1; WO2024126751A1

Books or books chapters

M. Lamrani, M. Moghadas. Y. Kalia, V. Santer. Smart sensor-based point-of-care diagnostics in ophthalmology: the potential for theranocloud as combination of theragnostic and cloud computing. In K. Mitsubayashi (ed). Wearable Biosensing in Medicine and Healthcare, Springer Singapore (2024), pp. 439-473.

Congresses / conferences and Symposia

- Congresses / conferences organisation: 0
- Posters presentations: 7
- Oral presentations: 1
- Invited oral presentations: 0

Ph.D. Theses presented in 2024

N/A

Public outreach activities (radio, television and other media, community service)

Y. N. Kalia, Member, Executive Committee of BioAlps « the Life Sciences cluster of Western Switzerland ».

PHARMACEUTICAL BIOCHEMISTRY

Professor Leonardo SCAPOZZA

The report of this unit has not been received and is available upon request from Prof. Leonardo Scapozza.

MEDICAL IMAGING

Professor Norbert LANGE

General description of the Unit

Norbert Lange leads research in photodetection, photodynamic therapy and enzymatically activated prodrugs.

Specific research fields

Modified nanoparticles for active targeting
Perivascular formulation for the prevention of restenosis
Development of drug formulations for intra articular delivery
Enzymatically activated prodrugs and supramolecular constructs
Antiviral agents
Development of new contrast agent for MRI
Formulation of microbiota
Polymer photosensitizers projects
Cancer targeted drug delivery systems
Synthesis of biopolymers

2024 at a glance

- Publications: 1
- Patents: 0
- Book and chapters: 0
- Congresses / conferences organisation: 0
- Posters presentations: 3
- Oral presentations: 0
- Invited oral presentations: 0
- Number of projects at FNRS and assimilated (Research funds): 0
- Service agreements and related activities: 0
- Ph.D. Theses presented in 2024: 0
- Awards and distinctions: 0
- Public outreach activities: 1

Research funds

None

Total amount for all research funds for 2024: CHF 0.-

Service agreements and related activities

None

Total amount (for all service agreements and related activities) for 2024: CHF 0.-

Scientific publications

Sansaloni Pasteur S., Haussmann E., Lange N.

New Targets for Cancer Therapy and Diagnosis after Proteomic Analysis of T24 cells after Exogenous 5-ALA Administration.

International Journal of Molecular Sciences, p 1, 2024

Patents

None

Books or books chapters

None

Congresses / conferences and Symposia

- Congresses / conferences organisation: 0
- Posters presentations: 3
- Oral presentations: 0
- Invited oral presentations: 0

Ph.D. Theses presented in 2024

none

Awards and distinction

None

Public outreach activities (radio, television and other media, community service)

Lange N., Mise en place du Pharmascope, groupe de travail production, printemps-été 2024

PHARMACEUTICAL TECHNOLOGY

Professor Eric ALLEMANN
Doctor Florence DELIE-SALMON

General description of the Unit

Research at the unit of Pharmaceutical Technology is focusing on the delivery of therapeutic agents for cancer, rheumatic, vascular applications and contrast agents for medical imaging at the right site at the right time. Eric Allémann has activities in nanomedicine, micro particles, and targeted contrast agents for medical imaging. Florence Delie leads research in nanomedicine and drug targeting. In 2024, various collaborations were continued with the University Hospital of Geneva, the University Hospital of Lausanne, and the Faculty of Medicine in Geneva as well as with established companies.

Specific research fields

Modified nanoparticles for active targeting
Perivascular formulation for the prevention of restenosis
Development of drug formulations for intra articular delivery
Development of new contrast agent for MRI
Synthesis of biopolymers

2024 at a glance

- Publications: 9
- Patents: 0
- Book and chapters: 0
- Congresses / conferences organisation: 1
- Posters presentations: 5
- Oral presentations: 2
- Invited oral presentations: 1
- Number of projects at FNRS and assimilated (Research funds): 3
- Service agreements and related activities: 1
- Ph.D. Theses presented in 2024: 1
- Awards and distinctions: 0
- Public outreach activities: 9

Research funds

FNRS – IZSEZO-220726

Category: SNSF

Omega-3 polyunsaturated fatty acid liposomes functionalized with hyaluronic acid for the delivery of cisplatin against brain tumors

Main applicant: Florence Delie

Total funding of the project: CHF 22'200.-

Total duration of the project: 6 months

Allocation 2024: CHF 22'200.-

Starting date: 01.03.2024

FNRS – 205321-192350

Category: SNSF

Synthesis of biopolymers and their applications as glucose carriers for osteoarthritis stem cell therapy

Main applicant: Florence Delie

Total funding of the project: CHF 493'114.-

Total duration of the project: 4 years

Allocation 2024: CHF 0.-

Starting date: 01.09.2020

NOVARTIS-ALLE

Category: Industry

Main applicant: Eric Allémann

Total funding of the project: 75'000.-

Total duration of the project: 4 years

Allocation 2024: CHF 25'349.-

Starting date: 01.01.2021

Total amount for all research funds for 2024: CHF 47'549.-

Service agreements and related activities

LTA (Jérémy Tessier)

Total amount for 2024: CHF 955.-

Total amount (for all service agreements and related activities) for 2024: CHF 955.-

Scientific publications

Iqbal F.M., Rodrigues-Nogales C., Boulens N., Delie F.

Formulation and optimization of transferrin-modified genistein nanocrystals: In vitro anti-cancer assessment and pharmacokinetic evaluation.

Int. J. Pharm. 2024, 667(partA), 124863.

Iqbal F.M., Delie F., Iqbal M.O, Gul S., Kanwal S., Muzammal M., Ahmad A., Munawar N.

New insights in nanocrystal technology chemotherapeutic drugs targeting cancer with a translational research paradigm.

Am J Transl Res 2024;16(8).

Morici L., Gonzalez-Fernandez P., Jenni S., Porcello A., Allémann E., Jordan O., Rodríguez-Nogales C. Nanocrystal-chitosan particles for intra-articular delivery of disease-modifying osteoarthritis drugs.

Int. J. Pharm., 2024.

doi.org/10.1016/j.ijpharm.2023.123754

Cayron A.F., Bejuy O., Vargas M.I., Colin D.J., Aoki T., Lövblad K.O., Bijlenga P., Kwak B.R., Allémann E., Morel S.

Time-of-flight and black-blood MRI to study intracranial arteries in rats.

Eur. Radiol. Experimental, 2024.

doi.org/10.1186/s41747-023-00407-z

Micheels P., Porcello A., Bezzola T., Perrenoud D., Quinodoz P., Kalia Y., Allémann E., Laurent A., Jordan O.

Clinical perspectives on the injectability of cross-linked hyaluronic acid dermal fillers: A standardized methodology for commercial product benchmarking with inter-injector assessments.

Gel, 2024.

doi.org/10.3390/gels10020101

Rossier B., Jordan O., Allémann E., Rodriguez-Nogales C.
Nanocrystals and nanosuspensions: an exploration from classic formulations to advanced drug delivery systems.
Drug Delivery Translational Res., 2024.
doi.org/10.1007/s13346-024-01559-0

Gonzalez-Fernandez P., Simula L., Jenni S., Jordan O., Allémann E.
Hyaluronan-based hydrogel delivering glucose to mesenchymal stem cells intended to treat osteoarthritis, Int. J. Pharm., 2024.
doi.org/10.1016/j.ijpharm.2024.124139

Bonelli M., Allémann E., Di Stefano M.
An orthogonal analytical platform for determining critical material attributes for in situ formation of thermosensitive hyaluronic acid-poly (N-isopropylacrylamide) copolymers.
Polymer, 2024.
doi.org/10.1016/j.polymer.2024.127728

Morici L., Allémann E., Rodríguez-Nogales C., Jordan O.
Cartilage-targeted drug nanocarriers for osteoarthritis therapy.
Int. J. Pharm.
doi.org/10.1016/j.ijpharm. 2024..124843

Patents

None

Books or books chapters

None

Congresses / conferences and Symposia

- Congresses / conferences organisation: 1
- Posters presentations: 5
- Oral presentations: 2
- Invited oral presentations: 1

Ph.D. Theses presented in 2024

Mirko Bonelli
Rational Design of Thermosensitive Drug Delivery Systems for Biologics - a Roadmap Towards Industrialization
Allémann Eric

Awards and distinction

None

Public outreach activities (radio, television and other media, community service)

Furrer P., Reception of 70 schoolchildren (Collège Voltaire, Geneva), presentation of the ISPSO, the Cyclotron and Nuclear Medicine, tour of the labs in small groups. March 18th and 22nd 2024, Geneva (Switzerland).

Furrer P., Reception of pharmacy students from Caen-University May 29th, 2024, Geneva (Switzerland).

Furrer P., Hôpital des nounours, preparation of 10 kg of hydrogel, April 10th, 2024, Geneva (Switzerland)

Delie F., Participation à l'activité « Women in Science » organisée par le CERN, interventions dans 3 écoles (4 classes), Février 2024

Delie F., Accueil étudiants boussole, printemps 2024

Delie F., Visite étudiants de Caen, printemps 2024

Delie F., Mise en place du Pharmascope, groupe de travail production, printemps-été 2024

Gonzalez Fernandez Paula, Quels remèdes contre l'arthrose ? TDG (Tribune de Genève), September 30, 2024

Gonzalez Fernandez Paula, Des cellules souches dopées au glucose pour combattre l'arthrose, RTS (Radio Télévision Suisse), émission CQFD, June 04, 2024

PHARMACOGNOSY

Professor Muriel CUENDET

General description of the Unit

The pharmacognosy research unit mainly focuses on the study of the pharmacological activity of bioactive natural products. Compounds with anticancer activity are of particular interest. For this, the development of new and better drugs remains a principal need. 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. A particular interest is set on multiple myeloma and lung adenocarcinoma models. Some plant extracts and pure compounds showed good in vitro and in vivo activity. Therefore, derivatives (synthesized by collaborators) are currently being investigated to improve their physicochemical properties. The absorption, metabolism and efficacy of those compounds are being evaluated in vitro and in vivo.

Specific research fields

- To identify plant extracts and natural products capable of inhibiting one or several of the major stages of carcinogenesis (initiation, promotion and progression)
- To characterize the mechanism of action of compounds that inhibit carcinogenesis by studying cellular pathways and cancer hallmarks, such as proliferation, angiogenesis, migration, and invasion
- To rationally optimize the molecules regarding their activity and selectivity

2024 at a glance

- Publications: 1
- Patents: 0
- Book and chapters: 0
- Congresses / conferences organisation: 0
- Poster presentations: 11
- Oral presentations: 4
- Invited oral presentations: 2
- Number of projects at FNRS and assimilated (Research funds): 4
- Service agreements and related activities: 1
- Ph.D. theses presented in 2024: 2
- Awards and distinctions: 1
- Public outreach activities: 3

Research funds

FNS

Grant No 310030-184790: HDAC6 ZnF-UBP domain inhibition in multiple myeloma

Main applicant within the research unit: Muriel Cuendet

Total funding of the project: CHF 530'880.-

Total duration of the project: 60 months

Allocation 2024: CHF 0.-

Starting date: 01.01.2020

Institutional

Debiopharm - IDEAL Project 103: Antiproliferative activity of withanolide derivatives

Main applicant within the research unit: Muriel Cuendet

Total funding of the project: CHF 43'600.-

Total duration of the project: 29 months

Allocation 2024: CHF 0.-

Starting date: 01.02.2022

Institutional

Ligue Pulmonaire Genevoise : Evaluation de la pharmacocinétique et de la toxicité de formulations intrapulmonaires de resvératrol

Main applicant within the research unit: Muriel Cuendet

Total funding of the project: CHF 58'000.-

Total duration of the project: 36 months

Allocation 2024: CHF 0.-

Starting date: 01.08.2022

Institutional

INNOGAP: Withanolides against multiple myeloma

Main applicant within the research unit: Muriel Cuendet

Total funding of the project: CHF 30'000.-

Allocation 2024: CHF 30'000.-

Total amount for all research funds for 2024: CHF 30'000.-

Service agreements and related activities

Medibiotix

Total amount for 2024: CHF 3'800.-

Total amount for all service agreements and related activities for 2024: CHF 3'800.-

Scientific publications

Rincón, R.; Coira, I.F.; Richieu, A.; Attana, F.; Urwyler, M.; Haider, S.; Bourquin, C.; Bertrand, P.; Cuendet, M.

Selective molecular inhibition of the HDAC6 ZnF-UBP binding domain impairs multiple myeloma cell proliferation.

BioRxiv 2024

doi: <https://doi.org/10.1101/2024.05.14.594071>.

Congresses / conferences and symposia

- Congress / conferences organisation: 0
- Posters presentations: 11
- Oral presentations: 4
- Invited oral presentations: 2

Ph.D. theses presented in 2024

Angelica Ferro

Synthetic, natural and semi-synthetic compounds against multiple myeloma: insights into the antiproliferative activity and mechanism of action

Director: Prof. Muriel Cuendet

Rafael Rincón

Exploring epigenetic dysregulations: The role of histone deacetylases in multiple myeloma pathogenesis

Director: Prof. Muriel Cuendet

Award and distinction

Zingg, A., Wijeratne, K., Gunatilaka, L., Cuendet, M., Insights into the antiproliferative activity of a withanolide derivative in multiple myeloma. **Max Zeller Söhne AG award for the best poster in Pharmaceutical Biology**. Swiss Pharma Science Day 2024, August 21, 2024, Bern (Switzerland).

Public outreach activities (radio, television and other media, community service)

Media interventions :

Cuendet, M., « Compléments alimentaires : un marché florissant. » RTS, le 19h30, February 2, 2024.

Cuendet, M., « Les compléments alimentaires, c'est vraiment sans risque ? » RTS, le Point J, October 17, 2024.

Activities for the public :

Cuendet, M., "Femmes et filles de science et technologie": presentation to children from 3 classes of Geneva schools, February 5, 2024.

PHYTOCHEMISTRY AND BIOACTIVE NATURAL PRODUCTS

Professor Jean-Luc WOLFENDER
Doctor Emerson FERREIRA-QUEIROZ

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 and 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 the LC peak in crude extracts, quantitative estimation of the well content, and further structural determination by sensitive NMR. 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, antibacterial, and antiviral 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 metabolomics 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
- Investigation of methods for isolation of natural products using preparative chromatographic techniques
- Exploring microbial whole-cell biotransformation as a tool for discovering new lead compounds
- Chemical modification and diversification of natural products via semi-synthetic organic synthesis and enzymatic techniques

2024 at a glance

- Publications: 13
- Patent: 0
- Book and chapters: 0
- Congresses / conferences organisation: 1
- Posters presentations: 9
- Oral presentations: 7

- Invited oral presentations: 17
- Workshops: 3
- Number of projects at FNRS and assimilated (Research funds): 9
- Service agreements and related activities: 3
- Ph.D. Theses presented in 2023: 1
- Awards and distinctions: 1
- Public outreach activities: 1

Research funds

FNS

Grant No CRSII5-189921/1: An in silico and chemo-biological approach to identify anti-infective and pro-metabolic natural products.

Main applicant within the research unit: Jean-Luc Wolfender

Total funding of the project: CHF 3'198'673.- (for the whole consortium but received at UNIGE)

Total duration of the project: 60 months

Allocation 2024: CHF 0.-

Starting date: 01.04.2020

FNS BRIDGE

Grant No 40B2-0-211759: Identification of antimicrobial and anti-virulence lead compounds from biodiverse microorganisms through a platform integrating metabolomics and innovative bioassays.

Main applicant within the research unit: Jean-Luc Wolfender

Total funding of the project: CHF 1'263'693.-

Total duration of the project: 48 months

Allocation 2024: CHF 312'924.- (for the whole consortium but received at UNIGE)

Starting date: 01.09.2023

FNS

Grant No 205320-215078: Improving natural products chemical biodiversity for drug discovery by fungal (assistée) biotransformation; acronyme BIOTRANSFO.

Main applicant within the research unit: Emerson Ferreira-Queiroz

Total funding of the project: CHF 595'976.-

Total duration of the project: 48 months

Allocation 2024: CHF 209'040.- (for the whole consortium but received at UNIGE)

Starting date: 01.02.2024

Institutional

CHUV – ANDROGRAPHIS

Main applicant within the research unit: Emerson Ferreira Queiroz

Total funding of the project: CHF 60'000.-

Total duration of the project: 17 months

Allocation 2024: CHF 0.-

Starting date: 01.04.2023

Institutional

Institut Louis Malardé: Chimiodiversité et valorisation des micro-algues polynésiennes – CEWAMAP.

Main applicant within the research unit: Jean-Luc Wolfender

Total funding of the project: CHF 19'502.-

Total duration of the project: 24 months

Allocation 2024: CHF 0.-

Starting date: 01.09.2023

Confidential project

Industry

Development of methods for obtaining plant extracts containing bitter compounds.

Main applicant for the research unit: Jean-Luc Wolfender

Total funding of the project: CHF 284'868.-

Total duration of the project: 83 months

Allocation 2024: CHF 0.-

Starting date: 01.03.2017

Confidential project

Industry

Exploration de la composition en métabolites primaires et spécialisés d'extraits végétaux.

Main applicant for the research unit: Jean-Luc Wolfender

Total funding of the project: CHF 247'786.-

Total duration of the project: 48 months

Allocation 2024: CHF 48'367.-

Starting date: 01.06.2021

Confidential project

Industry

Analysis of different plant-based beverages.

Main applicant for the research unit: Jean-Luc Wolfender

Total funding of the project: CHF 200'000.-

Total duration of the project: 60 months

Allocation 2024: CHF 40'000.-

Starting date: 01.04.2024

Confidential project

Industry

Thesis project in development of new approach methodologies to assess a potential hazard in complex matrices.

Main applicant for the research unit: Jean-Luc Wolfender

Total funding of the project: CHF 207'900.-

Total duration of the project: 48 months

Allocation 2024: CHF 5'000.-

Starting date: 01.10.2024

Total amount for all research funds for 2024: CHF 615'331.-

Service agreements and related activities

Industry Partner, Vaud, (HPTLC)

Total amount for 2024: CHF 42'774.-

Industry, Vaud (LEGACY)

Total amount for 2024: CHF 13'625.-

Divers mandats

Total amount for 2024: CHF 5'125.-

Total amount (for all service agreements and related activities) for 2024: CHF 61'524.-

Scientific publications

Afzan, A., Marcourt, L., Abd Karim, H. A., Kasim, N., Queiroz, E. F., Osman, C. P., Ismail, N. H. and Wolfender, J.-L. (2024).

Chemical characterizations dataset of flavonoid glycoside isomers and other constituents from *Ficus deltoidei* Jack.

Data in Brief, 54, 2024.

Gaudry, A., Pagni, M., Mehl, F., Moretti, S., Quiros-Guerrero, L.-M., Cappelletti, L., Rutz, A., Kaiser, M., Marcourt, L., Queiroz, E. F., Ioset, J.-R., Grondin, A., David, B., Wolfender, J.-L., Allard, P.-M.

A Sample-centric and knowledge-driven computational framework for natural products drug discovery.

ACS Central Science 2024.

Huber, R., Marcourt, L., Michellod, E., Wolfender, J.-L., Scapozza, L., Gindro, K., Queiroz E. F.

Study of phenoxy radical couplings using the enzymatic secretome of *Botrytis cinerea*.

Frontiers in chemistry, Organic chemistry, 12, 2024.

Le Scanff, M., Marcourt, L., Rutz, A., Albertin, W., Wolfender, J.-L. and Marchal, A.

Untargeted metabolomics analyses to identify a new sweet compound released during post-fermentation maceration of wine.

Food Chem 461, 2024.

Marcellin-Gros, R., Hévin, S., Chevalley, C., Boccard, J., Hofstetter, V., Gindro, K., Wolfender, J. L. and Kehrli, P.

An advanced metabolomic approach on grape skins untangles cultivar preferences by for oviposition.

Frontiers in Plant Science 15, 2024.

Nitschke, J., Huber, R., Vossio, S., Moreau, D., Marcourt, L., Gindro, K., Queiroz, E. F., Nabil, H., Soldati, T.

Discovery of anti-infective compounds against *Mycobacterium marinum* after biotransformation of simple natural stilbene scaffolds by a fungal secretome.

Frontiers in Microbiology, 15, 1439814, 2024.

Queiroz, E. F., Guillarme, D., Wolfender, J.-L.

Advanced high-resolution chromatographic strategies for efficient isolation of natural products from complex biological matrices: from metabolite profiling to pure chemical entities.

Phytochemistry Reviews, 2024.

Quiros-Guerrero, L.-M., Allard, P.-M., Nothias, L.-F., David, B., Grondin, A., Wolfender, J.-L.

Comprehensive mass spectrometric metabolomic profiling of a chemically diverse collection of plants of the Celastraceae Family.

Scientific Data, 11 (1), 415, 2024.

Quiros-Guerrero, L., Marcourt, L., Chaiwangrach, N., Koval, A., Ferreira Queiroz, E., David, B., Grondin, A., Katanaev, V., Wolfender, J.-L.

Integration of wnt-inhibitory activity and structural novelty scoring results to uncover novel bioactive natural products: new bicyclo[3.3.1]non-3-ene-2,9-diones from the leaves of *Hymenocardia Punctata*.

Frontiers in chemistry, 2024.

Vahekeni, N., Brillatz, T., Rahmaty, M., Cal, M., Maerki, S., Rocchetti, R., Kaiser, M., Sax, S., Mattli, K., Wolfram, E., Marcourt, L., Queiroz, E. F., Wolfender, J.-L., Mäser, P.

Antitrypanosomal constituents from *Brasenia schreberi* and *Nymphaea lotus* used in a single herbal preparation against sleeping sickness in Angola.

Molecules, 29(7), 1611, 2024.

Zuffa, S., Schmid, R., Bauermeister, A., Wender, P., Gomes, P., Caraballo-Rodriguez, A. M., El Abiead, Y., Aron, A. T., Gentry, E. C., Zemlin, J., Meehan, M. J., Avalon, N. E., Cichewicz, R. H., Buzun, E., Carrillo Terrazas, M., Hsu, C.-Y., Oles, R., Vasquez Ayala, A., Zhao, J., Chu, H., Kuijpers, M. C. M., Jackrel, S. L., Tugizimana, F., Pertunia Nephali, L., Dubery, I. A., Madala, N. E., Antunes Moreira, E., Veras Costa-Lotufo, L., Peoporine Lopes, N., Rezende-Teixeira, P., Jimenez, P. C., Rimal, B., Patterson, A. D., Traxler, M. F., de Cassia Pessotti, R., Alvarado-Villalobos, D., Tamayo-Castillo, G., Chaverri, P., Escudero-Leyva, E., Quiros-Guerrero, L., Bory, A. J., Joubert, J., Rutz, A., Wolfender, J.-L., and all
MicrobeMASST: a taxonomically informed mass spectrometry search tool for microbial metabolomics data. *Nature Microbiology*, 9 (2), 336–345, 2024.

Kirchhoffer, O., Quiros-Guerrero, L., Nitschke, J., Nothias, L.-F., Burdet, L., Marcourt, L., Hanna, N., David, B., Grondin, A., Queiroz, E. F., Pagni, M., Soldati, T., Wolfender, J.-L., Prioritization of novel anti-infective stilbene derivatives by combining metabolomic data organization and a stringent 3R-infection model in a knowledge graph. *ChemRxiv*, 2024.

Gaudry, A., Marcourt, L., Kaiser, M., Flückiger, J., David, B., Grondin, A., Ioset, J.-R., Mäser, P., Queiroz, E. F., Allard, P.-M., Wolfender, J.-L., Efficient constitution of a library of rotenoid analogs active against *Trypanosoma cruzi* from a digitalized plant extract collection. *ChemRxiv*. 2024.

Congresses / conferences and symposia

- Congresses / conferences organisation: 1
- Posters presentations: 9
- Oral presentations: 7
- Invited oral presentations: 17
- Workshops: 3

Ph.D. Theses presented in 2024

Olivier Kirchhoffer

“Development of chemo-biological workflows integrating in silico approaches to identify anti-infective natural products of plant origin”.

Director: Prof. Jean-Luc Wolfender, co-director: Dr Emerson Ferreira Queiroz

Awards and distinctions

Kirchhoffer, O., Award for best oral presentation in Metabolomics. 2nd Iloilo International Conference on Advanced Natural Products Technologies (I2CANProTech II), March 8, 2024, Iloilo (Philippines).

Public outreach activities

Queiroz, E.F., La nature, source inestimable pour la découverte de nouveaux médicaments. Organized by the University of Geneva (UNI3), November 1, 2024, Théâtre de l'Espérance, Geneva, Switzerland. (Invited pres

MEDICATION ADHERENCE AND INTERPROFESSIONALITY

Professor Marie Paule SCHNEIDER VOIROL
Doctor Anne-Laure BLANC
Doctor Alexandra GARNIER (CE, since 01.07.2024)
Doctor Erik PAUS

General description of the Unit

The associate professorship (0.75 FTP) in medication adherence and interprofessionality, and its research and teaching unit was launched in August 2018. Medication adherence is the core research area of the unit. Medication adherence is a key determinant of the ambulatory healthcare system. It is defined as the process by which patients take their medications as prescribed. It is characterized by three components: medication initiation, medication implementation and medication discontinuation (Vrijens et al. 2012). As described by the World Health Organization (WHO) in 2003, around 50% of chronic patients are nonadherent to their treatment worldwide. This creates an endemic, medical and economic threat on the healthcare systems, which needs to be addressed. Research is needed to better document the issue and the contextual and human contributing factors as well as assess cost-effective, interprofessional adherence-enhancing programs to be implemented in clinical practice. Therefore, the research plan of the unit aims to achieve a comprehensive understanding of factors, implementation strategies and pathway, and intervention components in preparation for new models of care through implementation science. The unit is a core member of the Swiss Implementation Science Network (IMPACT) and hosted the 3rd IMPACT conference at the University of Geneva, in collaboration with the University of Lausanne, on the 7 and 8 November 2024 with a large national and international attendance.

The head of the unit is also the scientific director of pharma24 (0.25 FTE), an outpatient pharmacy located at the exit of the Geneva University Hospitals (HUG). The team consists of 16 FTE pharmacists, including two PhDs, 12.5 FTE pharmacy technicians and 2 FTE administrative positions. Pharma24 is an academic outpatient pharmacy, where research on medication adherence and other interprofessional pharmaceutical services has been launched in 2019. Pharma24, as research partner, supports a steady collection of routine-based adherence and patient data.

In terms of teaching, the unit is in charge of the interprofessional curriculum of the School of Pharmaceutical Sciences since 2019 in close collaboration with the Interprofessional Simulation Centre (CIS) of the University of Geneva, especially with Dr Thomas Fassier, Faculty of Medicine, head of the centre, and Patricia Picchiottino, University of Applied Sciences Western Switzerland, deputy head. Since 2022, at the invitation of CIDPHARMEF, *la Conférence Internationale des Doyens des facultés de PHARMacie d'Expression Française*, Pr. Marie Schneider and Pr. Marie-Claude Vanier, University of Montreal, Canada, have been leading the Working Group on Interprofessional Education, which involves French-speaking faculties of pharmacy worldwide.

The medication adherence unit has been actively involved in the reform of the teaching curriculum of the school of pharmacy (Bachelor and Master levels), with a focus in harnessing the teaching of communication in health to ensure medication adherence, patient security, treatment cost-effectiveness and to decrease the pressure of pharmaceuticals on the environment. Since 2023, Pr. M. Schneider initiated the development of teaching labs in clinical pharmacy and she is an active member of the core group of teachers implementing the change. Pr. M. Schneider with colleagues represent the School of pharmacy in the Education Pharmaceutical Sciences Switzerland working group (*Ausbildung Pharmazeutische Wissenschaften Schweiz, APhWS*), which has been working on a new catalogue of objectives for the academic training of pharmacists as health professionals. The unit medication adherence and interprofessionality is in charge of the 20-week training course in community pharmacy for Master's students in collaboration with pharmaSuisse, the Swiss association of pharmacists.

Specific research fields

- To implement and evaluate medication adherence support programs in long-term diseases in primary and secondary care.
- To develop robust medication adherence measurement and data analysis, in particular digital monitoring in routine care.
- To investigate how long-term patients self-adjust their prescribed medications, and how this behaviour can be better supported in the context of a patient-professional partnership and shared decision-making throughout the patient journey.
- To implement and analyse the cost-benefit of teleconsultations between patients, pharmacists and physicians in primary care.
- To investigate how interprofessional collaborations could support a more efficient and secure medication use, especially at the interface between the hospital and the community.

2024 at a glance

- Publications: 13
- Patents: 0
- Book and chapters: 1
- Congresses / conferences organisation: 3
- Posters presentations: 13
- Oral presentations: 7
- Invited oral presentations: 8
- Number of projects at FNRS and assimilated (Research funds): 8
- Service agreements and related activities: 1
- Ph.D. Theses presented in 2024: 0
- Awards and distinctions: 3
- Public outreach activities: 6

Research funds

Category: SNF

Title of the research project: Implementation of a new model of care for supporting adherence in people starting a new medication for a long-term condition (myCare Start project) – An implementation-effectiveness science study

Main applicant : Marie Paule Schneider Voirol

Total funding of the project: CHF 319'683.-

Total duration of the project: years

Allocation 2024: CHF 79'284.-

Starting date: 01.06.2022

Commission Fédérale de la Qualité (CFQ)

Category: Institutional

Title of the research project: Implementation of a new model of integrated care for supporting adherence in people starting a new medication for a long-term condition (myCare Start project)

Main applicant: Marie Paule Schneider Voirol

Total funding of the project: CHF 305'811.-

Total duration of the project 4 years

Allocation 2024: CHF 68'127.-

Starting date: 01.11.2022

Pharmasuisse

Category: Institutional

Title of the research project: Clinical Study Agreement for the project myCare Start

Main co-applicants: Marie Paule Schneider Voirol, Alice Panchaud, Université de Bern, Suisse

Total funding of the project: CHF 213'771.-

Total duration of the project: 3 years

Allocation 2024: CHF 0.-

Starting date: 01.09.2023

Programme Santé numérique (PSN), Canton de Genève

Category: Institutional

Title of the research project: Implémentation de la téléconsultation médicale assistée en pharmacies ambulatoires dans le canton de Genève

Main applicant: Marie Paule Schneider Voirol

Total funding of the project: CHF 290'000.-

Total duration of the project: 4 years

Allocation 2024 (FACIP): CHF 62'000.-

Starting date: 01.02.2024

SNF

Category: Institutional

Title of the research project: Benefits of in-prison OROS-methylphenidate vs. placebo treatment in detained people with attention-deficit/hyperactivity disorder: A randomized controlled trial

Main applicant: Stéphanie Baggio, University of Bern

Total funding of the project: CHF 969'805.-

Total duration of the project: 4 years

Allocation 2024 (FACIP): CHF 14'818.-

Starting date: 01.02.2024

Francophone University Agency (Agence Universitaire de la Francophonie - AUF)

Category: Institutional

Title of the research project: Teaching interprofessionality (IP) in the French-speaking world and sharing teaching methods

Main co-applicants: Marie Paule Schneider Voirol, Marie-Claude Vanier, University of Montreal, Canada

Total funding of the project: CHF 9'540.-

Total duration of the project: 1 year

Allocation 2024: CHF 9'540.-

Starting date: 01.09.2023

SNF

Category: Institutional

Title of the research project: The value of implementation science in health & social care

Main applicant: Marie Paule Schneider Voirol

Total funding of the project: CHF 5'800.-

Total duration of the project: 3 months

Allocation 2024 (FACIP): CHF 4'212.-

Starting date: 01.10.2024

SACAD (Société académique de Genève)

Category: Institutional

Title of the research project: La valeur des sciences de l'implémentation pour le système de santé et les services sociaux

Main applicant: Marie Paule Schneider Voirol

Total funding of the project: CHF 6'088.-

Total duration of the project: 3 months

Allocation 2024 (FACIP): CHF 6'088.-

Starting date: 01.10.2024

Total amount for all research funds for 2024: CHF 244'069.-

Service agreements and related activities

Total amount (for all service agreements and related activities) for 2024: 2'483.-

Scientific publications

Ravix, A.; Bandiera, C.; Cardoso, E.; Lata-Pedreira, A.; Chtioui, H.; Decosterd, L. A.; Wagner, A. D.; Schneider, M. P.; Csajka, C.; Guidi, M.

Population Pharmacokinetics of Trametinib and Impact of Nonadherence on Drug Exposure in Oncology Patients as Part of the Optimizing Oral Targeted Anticancer Therapies Study.

Cancers 2024, 16 (12), 2193.

DOI: 10.3390/cancers16122193.

Bandiera, C.; Dotta-Celio, J.; Locatelli, I.; Nobre, D.; Wuerzner, G.; Pruijm, M.; Lamine, F.; Burnier, M.; Zanchi, A.; Schneider, M. P.

The differential impact of a 6-versus 12-month pharmacist-led interprofessional medication adherence program on medication adherence in patients with diabetic kidney disease: the randomized PANDIA-IRIS study.

Frontiers in pharmacology 2024, 15, Original Research.

DOI: 10.3389/fphar.2024.1294436.1

Braillard, O.; Mazouri Karker, S.; Djarmouni, R.; Lafaix, R.; Guessous, I.; Schneider, M. P.

Assisted teleconsultation in an outpatient pharmacy: Results of a pilot study in Geneva, Switzerland.

Journal of Telemedicine and Telecare 2024, 1357633X231223269.

DOI: 10.1177/1357633X231223269.

Bandiera, C.; Cardoso, E.; Locatelli, I.; Zaman, K.; Diciolla, A.; Digklia, A.; Stravodimou, A.; Cristina, V.; Aedo-Lopez, V.; Dolcan, A.; Sarivalasis, A.; Bouchaab, H.; Pasquier, J.; Dotta-Celio, J.; Peters, S.; Wagner, D.; Csajka, C.; Schneider MP.

A pharmacist-led interprofessional medication adherence program improved adherence to oral anticancer therapies: The OpTAT randomized controlled trial.

PLOS ONE 2024, 19 (6), e0304573.

DOI: 10.1371/journal.pone.0304573.

Temedda, M. N.; Haesebaert, J.; Viprey, M.; Schott, A. M.; Dima, A. L.; Papus, M.; Schneider, M. P.; Novais, T.

Motivational interviewing to support medication adherence in older patients: Barriers and facilitators for implementing in hospital setting according to healthcare professionals.

Patient Education and Counseling 2024, 124, 108253.

DOI: <https://doi.org/10.1016/j.pec.2024.108253>.

Solh Dost, L.; Gastaldi, G.; Schneider, M. P.

Patient medication management, understanding and adherence during the transition from hospital to outpatient care - a qualitative longitudinal study in polymorbid patients with type 2 diabetes.

BMC health services research 2024, 24 (1), 620.

DOI: 10.1186/s12913-024-10784-9.

Solh Dost, L.; Gastaldi, G.; Dos Santos Mamed, M.; Schneider, M. P.

Navigating outpatient care of patients with type 2 diabetes after hospital discharge - a qualitative longitudinal study.

BMC health services research 2024, 24 (1), 476.

DOI: 10.1186/s12913-024-10959-4.

Picchiettino, P.; Paignon, A.; Hesse, L.; Bos, S.; Wiesner Conti, J.; Schneider, M. P.; Fassier, T.

Large-scale, mobile and technology-enhanced serious game for interprofessional education: pilot study and lessons learnt.

Journal of Interprofessional Care 2024, 1-5.

DOI: 10.1080/13561820.2024.2339291.

Bandiera, C.; Pasquier, J.; Locatelli, I.; Schneider, M. P.
Using a Semiautomated Procedure (CleanADHdata.R Script) to Clean Electronic Adherence Monitoring Data: Tutorial.
JMIR Form Res 2024, 8, e51013.
DOI: 10.2196/51013.

Baggio, S.; Billieux, J.; Dirkzwager, A.; Iglesias, K.; Moschetti, K.; Perroud, N.; Schneider, M.; Vernaz, N.; Wolff, H.; Heller, P.
Protocol of a monocentric, double-blind, randomized, superiority, controlled trial evaluating the effect of in-prison OROS-methylphenidate vs. placebo treatment in detained people with attention-deficit hyperactivity disorder (BATIR).
Trials 2024, 25 (1), 23.
DOI: 10.1186/s13063-023-07827-7.

Santos, B.; Boulaguiem, Y.; Baysson, H.; Pullen, N.; Guessous, I.; Guerrier, S.; Stringhini, S.; Schneider, M. P.
Patient-Perceived Impact of the COVID-19 Pandemic on Medication Adherence and Access to Care for Long-Term Diseases: A Cross-Sectional Online Survey.
COVID 2024, 4 (2), 191-207.

Perraudin, C.; Schneider M.P.; Macé, F.; Gauthier, R.; Panchaud, A.; Allemann, S.; Erni, S.; Amador-Fernandez, N.; Berger, J.
Pharmacie d'officine académique: Qui? Quoi ? Pourquoi ?
pharmaJournal 2024, 6-7 ,16-18

La collaboration interprofessionnelle.
pharmActuel 2024, 3 <https://pharmactuel.ch/fr/cahiers/>

Books or books chapters

Goetzinger, C.; Schneider, M.P., Interventions to improve medication adherence, Chap. 3.5.4 Monique Elseviers, Björn Wettermark, Ria Benkó et al, Editors, Wiley, 2024, 406-418

Congresses / conferences and Symposia

- Congresses / conferences organisation: 3
- Posters presentations: 13
- Oral presentations: 7
- Invited oral presentations: 8

Awards and distinction

Godot, C.; Backes, C.; Gujer, C.Y.; Obegi, N.; Perez, A.; Gervais, A.; Schneider, M.P.
Digital healthcare services in Community pharmacies: the Pneumoscope™ case study
2nd poster award from the Swiss Society of Industrial Pharmacists (GSIA), 17th Swiss Pharma Science Day, August 21, 2024, Bern (Switzerland)

Bardet, J.D.; Schneider M.P.; Kaufmann, B.; Flora, Luigi.; Standaert, A.; Youl, E.; Janoly-Dumenil, A.; Vanier, M.C.
Advancing interprofessional education in pharmacy in French-speaking countries: insights from CIDPharmef survey.
Best poster award of the Academic Pharmacy Section, 82nd FIP World Congress, September 1-4, 2024, Cape Town (South Africa)

Serhal, S.; Mielke, J.; Shamuratova, K.; Boisier, T.; Allemann, S.; Barbat, S.; Wält, L.S.; Haller, D.; Pfarrwallner, E.; Lanier, C.; Mulder, F.; Maes, K.; Dupuis, M.; Jenkinson, S.P.; Panchaud, A.; Dima, A.L.; De Geest S.; Schneider M.P.
Annual Report 2024

Contextual analysis of the Swiss primary care ecosystem for delivery of the myCare Start service using a convergent mixed methods design – The myCare Start-Implementation project.
Award for the best oral communication, 3rd Conference of the Swiss Implementation Science Network IMPACT, November 7-8, 2024, Geneva (Switzerland).

Public outreach activities (radio, television and other media, community service)

Schneider, M.P.

Les maîtres d'œuvres de la mise en œuvre.

Le Journal de l'UNIGE, 31.10.2024

<https://www.unige.ch/lejournel/recherche/automne-2024/implementation/>

Schneider, M.P.; Bugnon, B.; Godot, C.

T-Day: La télésanté dans le canton de Genève, Vision 2030, 12.11.2024, Palexpo, Geneva, Switzerland

<https://www.hug.ch/cybersante-telemedecine/telesante-day>

<https://www.youtube.com/watch?v=lrJRM8fmCt0>

Mazouri, S.; Braillard, O.; Solh Dost, L.; Mabire, C.; Gauthier, R.; Mouchet B.; Rugli, M.;

Schneider M.P.

Escape game interprofessionnel .

Les Assises de la Médecine Romande, 14.11.2024, Beaulieu, Lausanne, Switzerland

Solh Dost, L.; Gauthier, R.; Schneider, M.P.

Comment mieux accompagner les patients à la sortie de l'hôpital ? Ressources et stratégies en pharmacie d'officine (2,5-hour workshop)

pharmaMontana Congress for community pharmacists, 29.09.2024, Crans Montana, Switzerland

Solh Dost, L.; Gastaldi, G.; Schneider, M.P.

Le parcours des patients avec un diabète de type 2 à la sortie de l'hôpital

5th SWICA Symposium; 30.05.2024, Bern, Switzerland

Schneider, M.P.

Is There a Place for Me at a Swiss University? A Round Table for Pharmacy Researchers on Academic Life and Careers jointly organized by the Swiss Academy of Pharmaceutical Sciences (SAPhW) and The Swiss Association of Public Health Administration and Hospital Pharmacists (GSASA).

GSASA annual congress, 27.11.2024, Basel, Switzerland

DATA ANALYTICS LAB

Professor Stéphane GUERRIER

General description of the Group

The Data Analytics Lab aims at contributing to the development of new methodologies for data analysis and decision-making that allow to respond to the ever-increasing data size and model complexity while achieving desirable statistical properties and performance. These fundamental developments make use of the latest advances in (applied) computer sciences, in particular machine learning. We also aim at making these developments broadly available through open-source statistical packages (e.g. the R platform) and scientific publications and/or reports in applied statistics. To ensure added-value and tangible impact of our work, we aim at confirming and expanding our interdisciplinary approach to research. Therefore, our work includes not only collaborations with established researchers in computer and mathematical sciences but also in areas such as pharmaceutical development (bioequivalence studies) and clinical trials, for whom data analysis has become an important and very demanding challenge, as is also the case for disciplines such as experimental and behavioural sciences, life sciences, population health, engineering (signal processing), economics, management and others. We also aim at collaborating with (semi-)private institutions that face the challenges of analysing the data they collect in order to improve their products and/or services as well as their strategic decision-making.

Specific research fields

- Computational statistics and simulation methods
- Life sciences analytics
- Signal processing and time series analysis
- Machine learning
- Data analytics in engineering
- Applied statistics

2024 at a glance

- Publications: 10
- Patents: 0
- Book and chapters: 0
- Congresses / conferences organisation: 1
- Posters presentations: 0
- Oral presentations: 7
- Invited oral presentations: 5
- Number of projects at FNRS and assimilated (Research funds): 3
- Service agreements and related activities: 0
- Ph.D. Theses presented in 2024: 0
- Awards and distinctions: 1
- Public outreach activities: 0

Research funds

SNSF Professorships

Title: New Challenges for Statistical Methods in Large and Complex Data Settings: Analysis of Dependent Data and Model Selection

Main applicant: Stéphane Guerrier

Main discipline: Mathematics

Total funding of the project: CHF 816'508.-

Total duration of the project: 2.5 years

Allocation 2024: CHF 423'308.10.-

Starting date: 01.01.2022

Link: <https://data.snf.ch/grants/grant/176843>

Innosuisse

Title: Multi-Sensor Adjustment of Raw LiDAR, Visual and Inertial Measurements in Kinematic Laser Scanning Devices

Main applicants: Stéphane Guerrier, Jan Skaloud (EPFL), Elmar van der Zwan (Hexagon)

Main discipline: Engineering

Total funding of the project: CHF 815'265.40.- (CHF 257'690.20.- allocated to the University of Geneva)

Total duration of the project: 2 years

Allocation 2024: CHF 140'621.20.-

Starting date: 01.10.2022

SNSF Sinergia

Title: Data-driven imaging of volcanic plumbing systems

Main applicants: Stéphane Guerrier, Luca Caricchi (University of Geneva), Chiara Montagna (Istituto Nazionale di Geofisica e Vulcanologia Sezione di Pisa, Italy)

Main discipline: Interdisciplinary

Total funding of the project: CHF 2'313'234.-

Total duration of the project: 4 years

Allocation 2024: CHF 0.-

Starting date: Fall 2024

Total amount for all research funds for 2024: CHF 563'929.30.-

Scientific publications

Guerrier, S., Kuzmics, C. and Victoria-Feser, M.-P.

Assessing COVID-19 Prevalence in Austria with Infection Surveys and Case Count Data as Auxiliary Information.

Journal of the American Statistical Association, 119(547), 1722-1735, 2024.

Karemera, M., Voirol, L., Cucci, D. A., Chu, W., Molinari, R. and Guerrier, S.

Accounting for Vibration Noise in Stochastic Measurement Errors.

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Santos, B., Boulaguiem, Y., Baysson, H., Pullen, N., Guessous, I., Guerrier, S., Stringhini, S. and Schneider, M., *Impact of the Covid-19 Pandemic on Medication Adherence and Access to Care in Patients with Long-term Diseases: A Cross Sectional Online Survey*, *COVID*, 4(2), 191-207, 2024.

Congresses / conferences and Symposia:

- Congresses / conferences organisation: 1
- Posters presentations: 0
- Oral presentations: 7
- Invited oral presentations: 5

Awards and distinction:

JASA Reproducibility Award 2024, American Statistical Association (<https://jasa-acsgithub.io/repro-award/awardees>).

Public outreach activities (radio, television and other media, community service)

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Center for Research and Innovation in Clinical Pharmaceutical Sciences (CRISP)

Professor Chantal CSAJKA
Professor Farshid SADEGHIPOUR
Professor Michel PRUDENT

PD MER Doctor Jérôme BERGER
PD Doctor Monia GUIDI
Doctor Gregory RESCH
Doctor Jean-François BRUNET

General Description

The Center for Research and Innovation in Clinical Pharmaceutical Sciences (CRISP) is the Lausanne entity of the Institute of Pharmaceutical Sciences of Western Switzerland.

The CRISP networks academic groups from the CHUV, Unisanté and the School of Pharmaceutical Sciences of the University of Geneva around two areas of expertise: "Real-Life Medicines" that focuses on the optimization of therapies under real-life conditions in target populations, "Innovative Biological and Cellular Therapies" that focuses on translational research of new types of cellular or biological drugs. The third center of competence in "Digital Pharmacy" that aims at developing research and education at the interface of pharmacy and technologies will be opened in 2025. The poles of competence work in synergy to improve the coherence and efficiency of research and the translation of results into care.

The vision of the CRISP is to promote training, clinical research and care related to drugs of chemical, cellular or biological origin. The missions of the poles of expertise are the following:

- To develop coordinated research to address public health challenges related to the safety, efficacy, efficiency, and cost effectiveness of conventional and innovative medicines.
- To work to support the implementation of innovative therapeutic strategies and care delivery in the clinic.
- To consolidate the training of students, health professionals and scientists in the field of clinical pharmaceutical sciences, opening it to cellular and biological therapies.

2024 Highlights

The year 2024 has been notably transformative at the Centre for Research and Innovation in Clinical Pharmaceutical Sciences (CRISP), especially in the advancement of innovative biological therapies. A significant milestone was the Swissmedic accreditation for good manufacturing practices (GMP) awarded to the Laboratory of Bacteriophages and the Cellular Production Center at CHUV. These are the first academic facilities globally to receive GMP accreditation to produce phages, paving the way for a program that collaborates with clinicians on the treatment of patients with challenging bacterial infections at CHUV. This accreditation underscores the practical viability of using bacteriophages in a rigorously controlled environment. Amidst this rapidly evolving field, several phage-related projects have secured funding from the Leenaards Foundation, the Swiss National Foundation, the renewal of the NCCR Microbiome, and InnoSuisse. The network fostered by the Advanced Therapies Competence Centre of the CRISP has been instrumental in spotlighting ongoing developments at CHUV concerning these novel drug types, as well as identifying the challenges and enablers that must be addressed to enhance coherence and synergies.

Furthermore, multiple initiatives are underway to develop and implement clinical decision support tools that enhance therapeutic drug monitoring in resource-limited settings (i.e. Tanzania for rifampicin) and such associated with point-of-care for richer settings (Swiss Hospital and community practices). The automatic detection pipeline of haemorrhages associated with antithrombotic use is expected to significantly improve the management of specific medical conditions.

In terms of education, the inaugural edition of the CAS on Advanced Therapy Medicinal Products offered by UNIL and UNIGE was a resounding success, attracting 15 participants from diverse academic and professional backgrounds. Additionally, a two-week training program in clinical and community pharmacy conducted at the University of Antananarivo, Madagascar, in collaboration with Pharmaciens sans Frontières, was highly appreciated by both the academic staff and students of the University.

Pole in Real-Life Medicines

The primary research objective of this pole is to tackle health challenges concerning the safety, efficacy and cost effectiveness of medications within the target population. It aims to systematically address the risks and benefits of drugs for at-risk populations systematically excluded from studies and for specialised high-cost medications. The specific 2024 accomplishments of the CRISP network groups, include the Clinical pharmacy sciences group (Prof C. Csajka), the Hospital pharmacy group (Prof F. Sadeghipour) and the Community pharmacy group (Dr J. Berger) are detailed in their respective sections of the 2024 annual report.

Beyond research, a key objective of this center of competence led by Dr Monia Guidi is to foster the exchange of expertise and the training of master's and doctoral students across different academic groups. Regular joint meetings for doctoral and master's students have been conducted, enhancing the students' expertise, and identifying senior scientists' skills that can support their research endeavours.

The "Réseau Universitaire Romand de Pharmacie Pratique" (R2P2), which includes pharmacists from CHUV, HUG, Unisanté, Pharma24, Valais Hospitals, and Riviera Chablais Hospitals, continued to advance its mission in 2024. This network promotes scientific exchange through structured seminars accredited by pharmauisse, presented by each group. Moreover, the annual one-day scientific conference organized by the group of community and hospital pharmacy, held in October at the CHUV, focused on the topic of "Pharmacoeconomics and Scientific Communication," showcasing the latest developments and fostering collaboration within the field.

Innovative Biological and Cellular Therapies

CRISP's bacteriophage laboratory (Dr G. Resch), in close collaboration with the CHUV pharmacy's cell therapy centre (Dr J.F. Brunet), has developed a process for producing therapeutic bacteriophages in accordance with GMP. This represents a major step forward in the conduct of clinical trials evaluating the benefits of phage therapy in the treatment of difficult-to-treat bacterial infections, and in their future clinical use. <https://www.chuv.ch/fr/crisp/therapies-innovantes-biologiques-et-cellulaires/laboratoire-des-bacteriophages-et-de-phagothérapie>.

As previously mentioned, 2024 has seen the initiation and funding of several projects, leading to new national and international collaborations. In the field of transfusion medicine (Pr Prudent), one such project has facilitated the establishment of a GMP-compliant platelet labelling method. This development offers the opportunity to study the effects of different platelet concentrate preparations and storage techniques in vivo following transfusion. Furthermore, an FNS-ANR Proteage project focusing on the mechanisms of red blood cell aging in β -thalassemic patients and irradiated red blood cells for transfusion has been granted. Collectively, these research initiatives are set to provide valuable clinical and laboratory data that will enhance or refine existing clinical practices. These projects are being conducted in close collaboration with Transfusion Interrégionale CRS, ensuring a comprehensive approach to advancing the field.

2024 at a glance

Pole of Innovative biological and cellular therapies

- Publications: 5
- Patents: 0
- Book and chapters: 0
- Congresses / conferences organisation: 3
- Posters presentations: 4

- Oral presentations: 10
- Invited oral presentations: 3
- Number of projects at FNRS and assimilated (Research funds): 5
- Service agreements and related activities: 0
- Ph.D. Theses presented in 2024: 1. (Transfusion medicine)
- Awards and distinctions: 1
- Public outreach activities: 1

Research funds of the Pole of Innovative Biological and Cellular Therapies

Swiss National Science Foundation
Category: Consortium NCCR Microbiome, phase 2
Main applicant: Grégory Resch
Total funding of the project: CHF 728'000.-
Total duration of the project: 4 years
Allocation 2024: CHF 182'000.-
Starting date: 01.07.2024

Swiss National Science Foundation
Category: SNSF
SUPPLY: SUPERfast Photonic detection of Phage
LYsis »
Main applicant: Grégory Resch
Total funding of the project: CHF 687'531.-
Total duration of the project: 4 years
Allocation 2024: CHF 266'195.-
Starting date: 01.01.2023

Fondation Leenaards
Category: Foundation
Prix Leenaards pour la recherche médicale translationnelle 2024
Project "Streamlining personalized phage therapies against antibiotic-resistant *Pseudomonas aeruginosa* respiratory infections"
Main applicant (co-investigator): Grégory Resch
Total funding of the project: CHF 204'707.-
Total duration of the project: 3 years
Allocation 2024: CHF 57'120.-
Starting date: 01.05.2024

Eurostars, project RAMST-CF
Category: Innosuisse
Main applicant (co-investigator): Grégory Resch
Total funding of the project: CHF 183'256.-
Total duration of the project: 3 years
Allocation 2024: CHF 137'442.-
Starting date: 01.05.2024

Swiss National Science Foundation
Category: SNSF Lead Agency (ANR)
PROTEAGE: Determining the role of PROTEostasis dysfunction in premature AGing of irradiated and thalassemic Erythrocytes
Main applicant: Michel Prudent
Total funding of the project (Swiss part): CHF 543'462.-
Total duration of the project: 4 years
Allocation 2024: na
Starting date: 15.04.2025

Total amount for all research funds for 2024: CHF 642'757.-

Scientific publications of the Pole Innovative Biological and Cellular Therapies

Prudent, M.

How to digest gargantuan data on red cell aging.

Blood, 2024; 24: 2448-2449.

Muret, C.; Crettaz, D.; Alberio, L.; Prudent, M.

Increase of phosphoprotein expressions in Amotosalen/UVA-treated Platelet Concentrates.

Transfus Med Hemother, 2024; 2:101-110.

Bardyn, M.; Crettaz, D.; Rappaz, B.; Hamelin, R.; Armand, F.; Tissot, J-D; Turcatti, G.; Prudent, M.

Phosphoproteomics and Morphology of Stored Human Red Blood Cells Treated by Protein-Tyrosine-Phosphatases Inhibitor.

Blood advances, 2024; 1:1-13.

Villa, N.*; Tartari, E.*; de Villiers de la Noue, H.; Picard, E.; Marcoux, P.R.; Zelsmann, M.; Hadji, E.; Houdré, R.*; Resch, G.*.

Monitoring of single-cell bacterial lysis by phages within integrated optical traps.

Submitted to Advanced Optical Materials. 2025 Jan 25: <https://doi.org/10.1002/adom.202402586>.

Villa, N.; Tartari, E.; Glicenstein, S.; de Villiers de la Noue, H.; Picard, E.; Marcoux, P.R.; Zelsmann, M.; Resch, G.; Hadji, E.; Houdré, R.

Optical Trapping and Fast Discrimination of Label-Free Bacteriophages at the Single Virion Level.

Small. 2024 Jan 28:e2308814.

Congresses / conferences and Symposia

- Congresses / conferences organisation: 3
- Posters presentations: 4
- Oral presentations: 10
- Invited oral presentations: 3

Ph.D. Theses presented in 2024

Muret, C

Cold platelets and biotin labelling

Director: Prof Michel Prudent, co-director: Prof. Lorenzo Alberio

Awards and distinction

Prudent, M.: « Superviseurs étoilés » in 2024 (35 over 1547 supervisors) from Polytechnique Montréal (Canada).

Public outreach activities (radio, television and other media, community service)

Prudent, M ; Des plaquettes universelles créées in vitro pour épauler le don de sang, 24 Heures, Interview de Alain Détraz, 21.05.2024

PhD PROGRAM

Professor Yogeshvar KALIA, Director
Doctor Béatrice KAUFMANN, Coordinator
Mrs Florence VON OW, Secretary

General description of the Unit

The PhD Programme in Pharmaceutical Sciences promotes a solid theoretical and practical training in all aspects of the Pharmaceutical Sciences, fosters interdisciplinary research and provides opportunities for scientific exchange via lectures, symposia and networking activities. The PhD Programme also aims to increase awareness of career opportunities outside academia for graduates from the School of Pharmaceutical Sciences.

Our doctoral programme continues to consolidate its integration into the new inter-faculty Doctoral School in Life Sciences created by the Faculty of Science and the Faculty of Medicine in June 2018 (PSLS), of which the School of Pharmaceutical Sciences is a founding member. An administrative management platform has been set up, which allows doctoral students to manage their administrative files, and also to validate the various key stages of their thesis, such as the TAC or obtaining credits. The PhD Programme in Pharmaceutical Sciences provides approximately 24% of the total number of PhD students enrolled in the PSLS (48% of the Faculty of sciences PhD students enrolled in the PSLS).

This doctoral programme, a pioneer since 2004, is in fact a special case. Indeed, there is only one pharmaceutical sciences program in French-speaking Switzerland. The doctoral studies are generally done in Geneva or Lausanne, with a few exceptions for extramural theses. For any doctoral student doing a thesis with a specialization in "pharmaceutical sciences", registration and participation in the doctoral programme is mandatory in order to be able to defend the thesis and a minimum number of 30 ECTS credits is required before the thesis defence can take place. All our doctoral students (as well as all doctoral students affiliated to the PSLS) must follow and validate an awareness-raising module on ethics in scientific research, which is a prerequisite for the validation of their thesis credits. These measures are clearly detailed in the regulations for the Doctoral Programme in Pharmaceutical Sciences.

The programme covers all aspects of pharmaceutical sciences, from basic research at the molecular level through to clinical pharmaceutical sciences and the patient. Five types of activities make up the programme: courses, specialized conferences, symposia, networking activities and extramural seminars.

The activities of our doctoral programme are primarily organised for doctoral students enrolled in the Pharmaceutical Sciences Doctoral Programme, but we accept enrolments from other doctoral programmes from the Life Sciences Doctoral School, or from other CUSO doctoral programs, as long as there are places available.

In addition to the activities proposed by the programme ("core training"), we also recognize some external activities, which are also granted credits. This is especially useful for "extramural" PhD students who are sometimes far from Geneva and cannot participate in the "local" courses and events. Our program being CUSO-affiliated, our PhD students have also access to the Soft skills program proposed by the CUSO, and also to the activities organised by other PSLS groups.

The credits granted vary but as a general rule, 1 credit is awarded for 6 hours of activity (internal activities) or 1 credit for 10 hours of participation (external activities). It should be noted that most of the PhD students acquire more than the minimum 30 credits indicating their active participation in the PhD programme. Despite the fact the UNIGE does not allow the award of credits twice for different formations, completion of a CAS or MAS is recognized with the award of 3 credits (in the "course" part of the credits table). The minimum number of credits to be obtained by attending courses is 20, plus 6 credits minimum awarded for the attendance to conferences or symposia, the sum of both positions (courses and conferences) must reach 30 credits minimum.

The introduction of the TAC, which takes place 12-15 months after the start of the doctorate, by the PhD Programme commission, enables an evaluation of the progress of the PhD thesis. This is organized with the objective of harmonizing levels of excellence of the PhD candidates from the different component disciplines in the School of Pharmaceutical Sciences and indeed the Doctoral School in Life Sciences. This is done with respect to: (i) efficient time-planning and organization of the thesis project, (ii) enthusiasm and ability to perform interesting projects and (iii) optimization of thesis project progression. The TAC system is valid for all PhD candidates beginning their thesis as of 15 September 2015. In 2024, 15 successful TAC were held.

Courses and symposia

A total of 276 hours could be given within the 2024 PhD programme (including all activities; see Tables 1-3 below for detailed information). Unfortunately, some activities had to be cancelled or postponed, due to a lack of participants (CUSO allows us to engage a budget when at least 6 PhD Students are registered). Holding certain courses via videoconferencing tools provides greater flexibility and also allows participants to benefit from the teachings of remote speakers without having to travel. Some activities could unfortunately not be organised, due to the very busy schedules of some external speakers working in the health field.

Extra-muros seminar

The Pharmaceutical Sciences 2024 seminar was held in Leysin at the Alpine Classic hotel. The hotel has several seminar rooms that can accommodate either all participants or small group activities (workshops). Some participants pointed out that the screen in the main room was too small.

The theme chosen for this seminar was: 'PhD in Pharmaceutical Sciences, what's next?' with a view to introducing participants to the current research of renowned researchers working either in academia or in the pharmaceutical industry. As well as presenting their research work, the speakers were asked to present their career paths in order to open the minds of the doctoral and post-doctoral students present to the different career paths in the pharmaceutical sciences. This aspect/process was well received by the doctoral and post-doctoral students, enabling them to project themselves into a future career. Two half-days were devoted to the pharmaceutical sciences, with one half-day devoted to entrepreneurship, with presentations by researchers who had set up a company in the pharmaceutical field, and an afternoon devoted to innovative therapies, with speakers from Lausanne's CHUV.

Two half-days were devoted to interactive seminars. The first led participants to reflect on their career paths, guided by their values, aspirations and intentions, using a game called 'Reflectory: a playful game with serious questions'. This workshop took place in the absence of the 'seniors' to allow the young researchers to express themselves freely. The second seminar was entitled: 'Navigating the job search process - practical tips and strategies for finding your dream job after graduation'. Both seminars were greatly appreciated by the participants. Ms Tardieux, organiser of the 2nd seminar, will be offering a follow-up, and participants will be offered dates for a personalised CV analysis.

All but one of the speakers (Zoom presentation) stayed in Leysin for at least one day and one night, to encourage contact with the participants (networking).

All our doctoral students (as well as all doctoral students affiliated to the PSLs) must follow and validate an awareness-raising module on ethics in scientific research, which is a prerequisite for the validation of their thesis credits. The module chosen is the "Research Integrity Training (EPIGEUM)", but equivalences are accepted for other courses, in particular our "Ethics in research" module, including the e-learning modules TRREE (TRAINING AND RESOURCES IN RESEARCH ETHICS EVALUATION).

The PhD students also attended the specialized seminars ("conférences spécialisées") proposed within the PhD programme; 7 seminars were given face to face by international researchers from academia and industry, for a total of 14 teaching hours. A total of 112 participants attended these lectures including 44 PhD students.

The Doctoral Program Commission held a meeting on February 14th, 2024, other topics needing a debate/decision were managed by e-mail during the year.

Table 1

List of courses organized within the PhD Program in Pharmaceutical Sciences 2024 and number of participants

Name of course 2024	Course No.	Course Organizer	Total no. of hours	Credits	No. of PhD students (total no. of attendees)
Pharmacie hospitalière et communautaire 1	19H003	P. Bonnabry	18	3	13 (80)
Pharmacie hospitalière et communautaire 2	19H012	F. Sadeghipour	18	3	2 (28)
Pharmacie hospitalière et communautaire 4		R. Pichon, F. Sadeghipour	18	3	3 (31)
Design drugs with a computer	19H053	A. Daina, V. Zoete	16	2	5 (last-minute cancellation of the 6 th PhD Student)
Introduction to pharmaceutical industry: History, structures and Challenges	19H017	B. Baumeister	30	5	6
Initiation aux méthodes d'analyse multivariées en sciences pharmaceutiques	19H046	S. Rudaz, J. Boccard	12	3	12 (14)
Ethics in research	19H092	Y. Kalia, D. Sprumont	12	2	7
Biotechnology development	19H070	Various speakers from NovImmune	20	3	CANCELLED
Personal genomics & predictive genetics	19H069	D. Kraus, G. Tanackovic, T. Abbas-Terki	10	1.5	8

Pharmaceutical regulatory affairs: an introduction	19H088	G. Sbihi-Bouvier, P. Humbert-Droz	20	3	5 (last-minute cancellation)
Combination therapies for cancer and personalized medicine	19H080	P. Nowak-Sliwinska	6	1	CANCELLED
Quality in pharmaceuticals	19H065	F.-X. Abellan, J. Boccadoro, A. Stroemberg	20	3	POSTPONED TO 2025
Pharmaceutical project and portfolio management	19H075	A. Poulet	6	1	6
Portfolio Management and Business Development: How a Pharma Company Builds, Maintains and Integrates Its Portfolio	19H097	L. Lauciello	6	1	POSTPONED TO 2025
Patenting procedures in life sciences and intellectual property	19H018	K. Houchangpour, D. Kraus, R. Flückiger	24	4	8
Challenges in clinical oncology	19H094	C. Bourquin, P. Nowak-Sliwinska, I. Labidi-Galy	12	2	11
Drug Discovery: DNA Encoded Libraries and Their Role	19H095	A. Satz	6	1	8
TOTAL	17		254 (202 effective)		94 PhD students

Table 2

List of symposia organized within the PhD Program in Pharmaceutical Sciences 2024 and number of participants.

Name of course 2024	# Course no.	Course organizer	Total no. of hours	Credits	# No. of participants
PhD Day	19H020	Y. Kalia	8	1 or 2	41 (51 total)
Conférences sur des sujets spécialisés		Y. Kalia	10 days (20 hrs)	1,5 for 5 conf.	44 PhD student (112 total)
37 th « extra-muros » meeting, ("PhD in pharmaceutical sciences, what's next?")	19H025	E. Allémann, F. Delie-Salmon, C. Csajka	4 days (24 hrs)	1 or 2	17 (32 total)
Work-life balance for scientists: can it be done?		C. Bourquin	4	0.5	2
Symposium Unisanté		M. Salomon, J. Dotta-Celio	6	0.5	1 (76 total)

Table 3

List of networking activities organized within the PhD Program in Pharmaceutical Sciences 2024 and number of participants.

Name of course 2024	Course no.	Course organizer	Total no. of hours	Credits	No. of PhD students
7 th Forum of the PhD School of Life Sciences		PSLS	8	0.5/1	15 from ISPSO (136 total)

Public research funds - Conférence Universitaire de Suisse Occidentale (CUSO)

The CUSO announced a 2024 budget similar to the 2023 budget. The programme and the budget for 2024 were submitted to the CUSO in Sep 2023 and they were duly accepted. The total budget in 2024 for the five activities (Seminar Extra-Muros, Conférences spécialisées, Cours, Symposia as well as Networking activities) was CHF 40'500.-.

At the end of the year, the effective costs for 2024 for all the activities were CHF 34'703.65.-.

We would like to thank all our external lecturers for their flexibility and their willingness to find solutions to keep almost all the essential courses given remotely, and hope that this sanitary emergency will continue to give place to more normal days.

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