

PSSRC Funding workshop

Denmark

Nele Hempel

KØBENHAVNS UNIVERSITET



Overview

- Introduction of the groups
 - SSP-group
 - M&M-group
 - PP-group
- Funding opportunities
 - DFF
 - Innovation Fund
 - Private Fonds
- Previous PSSRC students
- Contact details for the groups

Group 1: Solid-state pharmaceuticals (SSP-group)

- Research topic:
 - Amorphization of poorly soluble drugs
 - Co-amorphous, ASD, in situ amorphization, mesoporous silica, deep eutectic solvents
 - DoE, ball-milling, spray-drying, freeze-drying, electrospinning
- Instrumentation:
 - XRPD (nitrogen, temperature), DSCs, TGA, DMA, TMA, Rheometers, spectroscopy (NIR, FTIR)



Assoc. Prof. Holger Grohganz
Group leader



Prof. Thomas Rades



Assoc. Prof.
Korbinian Löbmann

Group 2: Manufacturing and materials (M&M-group)

- Research topic:
 - Traditional and future manufacturing of pharmaceuticals:
 - Crystallization, granulation, coating, semisolids, spray/freeze-drying, tableting
 - Printing (3D), Extrusion (HME), Electrospray, microfluidics, continuous manufacturing,
 - **Modelling**, materials and quality control
 - PAT and data analytics, process spectroscopy
- Instrumentation:
 - Raman spectroscopy, IR, NIR compaction simulator, HME, single-crystal X-Ray, DVS, printers,
 - Access to: atomic force microscopy
 - Computer cluster (molecular dynamics)



Assoc. Prof.
Lene Jørgensen



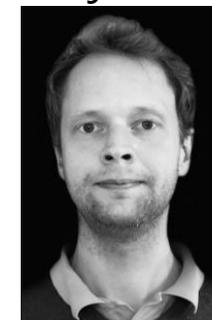
Prof. Jukka Rantanen
Group leader



Assoc. Prof.
Natalja Genina



Assoc. Prof.
Minghsi Yang



Assoc. Prof.
Johan Peter Bøtker



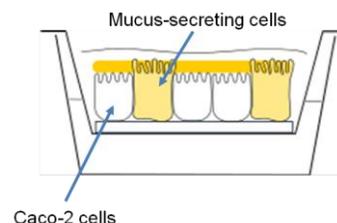
Assoc. Prof. Anders
Østergaard Madsen

Group 3: Physiological pharmaceuticals (PP-group)



Prof. Anette Muellertz

- Research topics:
 - Preformulation (small molecules and biologics)
 - Lipid-based drug delivery (f.ex. SEDDS)
 - Drug delivery for special populations
 - Drug delivery systems
 - In vitro/in vivo models
 - Absorption models
- Instrumentation:
 - μ Disc, lipolysis, gastroPlus/PKPlus, oCelloScope, incubators



Assoc. Prof.
Jette Jacobsen



Assoc. Prof. Daniel
Bar-Shalom

Assoc. Prof.
Ragna Berthelsen

Funding opportunities

- Nordic POP: University of Helsinki
 - Exchange of students, Visits of students etc. (fully funded)
 - <https://nordicpop.ku.dk/>
- EU: Marie Curie Fellowship
 - https://ec.europa.eu/research/mariecurieactions/actions/get-funding_en
- KU offers grant workshops: <https://health.easysignup.com/98/>
 - Marie Curie PF **online grant writing workshop 7-9 June 2021.**
- Danish funding:
 - Danmarks Frie Forskningsfond (DFF)
 - Innovation Fond DK
 - Carlsberg, Lundbeck, Novo Nordisk Foundation

Danmarks Frie Forskningsfond (DFF)

- Public funding
- Research Project 1: 3-years
- Research Project 2: 4.5 years (several research, e.g. PhD student plus PostDoc)
- Senior researcher needs to apply
- https://dff.dk/en/front-page?set_language=en

Innovation Fund DK

- Also possible to create a start-up in Denmark (spin-out company)
- Industrial PhD and Postdoc projects
- Collaboration between university and company
- Successrate around 20%
- <https://innovationsfonden.dk/en>

Private Fonds

- Carlsberg:
 - PostDoc fellow
 - <https://www.carlsbergfondet.dk/en>
- Lundbeck
 - Mostly focuses on neuroscience
 - PostDoc fellow
 - <https://lundbeckfonden.com/en>
- Novo Nordisk Foundation:
 - mostly focused on biomedical research;
 - project grants (senior researcher needs to apply) for PhD students/PostDocs possible (Project Grants in Natural and Technical Sciences).
 - <https://novonordiskfonden.dk/en/>

Previous PSSRC students

- M&M-group: Miriam Pein-Hackelbusch
 - From Duesseldorf
 - “Using 3D Printing for Rapid Prototyping of Characterization Tools for Investigating Powder Blend Behavior”

Contact details for the groups

- SSP-group:
 - Holger.grohganz@sund.ku.dk,
- M&M-group:
 - Jukka.Rantanen@sund.ku.dk;
- PP-group:
 - Anette.mullertz@sund.ku.dk;





- **Extrusion/ Spheronization**
- **Continuous Granulation by Roll Compaction/Dry Granulation**
- **Continuous Granulation by Twin-Screw Granulation**
- **Solid Lipid Extrusion**
- **Tableting**
- **Coating Processes**
- **Melt Extrusion**



- **Paediatric formulations**
 - Minitablets
 - Orodispersible Tablets
 - Film formulations
 - Ion-exchange resonates
 - Devices for individual dosing
 - Pulmonary drugs and devices
- **Orphan drugs**
- **Taste assessment and masking**
- **Process analytical technologies**



- **Biodegradable Macromers**
- **Bioactive Hydrogels**
- **Bioprinting**



- **3D Printing in Pharmaceuticals**
- **FDM printing**
 - Filament extrusion for fused deposition modelling
 - Development of a one-step extrusion-printing technique
 - Drug printing for individual dosing
- **Rapid prototyping**
- **Powder printing**
- **Poorly soluble drugs**
 - Child appropriate formulations of poorly soluble drugs
 - Biopharmaceutical characterization of amorphous solid dispersion

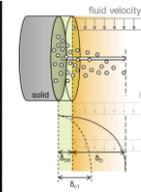
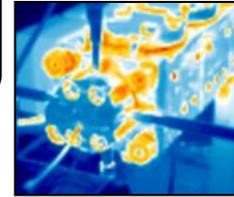
Organizational structure

	TU Dortmund University	Faculty Bio- and Chemical Engineering
Founded in	1968	1969
Area	172.000 m ²	15.000 m ²
Students	~33.000	~1200
Staff	6.200	188
Professors	300	13
Faculties/ Laboratories	16	13 (5 in pharmaceuticals)





Head of chair
Prof. Dr. M. Thommes



Working groups

Spray and dispersing processes
Dipl.-Chem. G. Schaldach

Particle separation from gases
Prof. Dr.-Ing. D. Pieloth

Extrusion
Dr.-Ing. J. Winck

Granulation and milling
Dr.-Ing. J. Bartsch

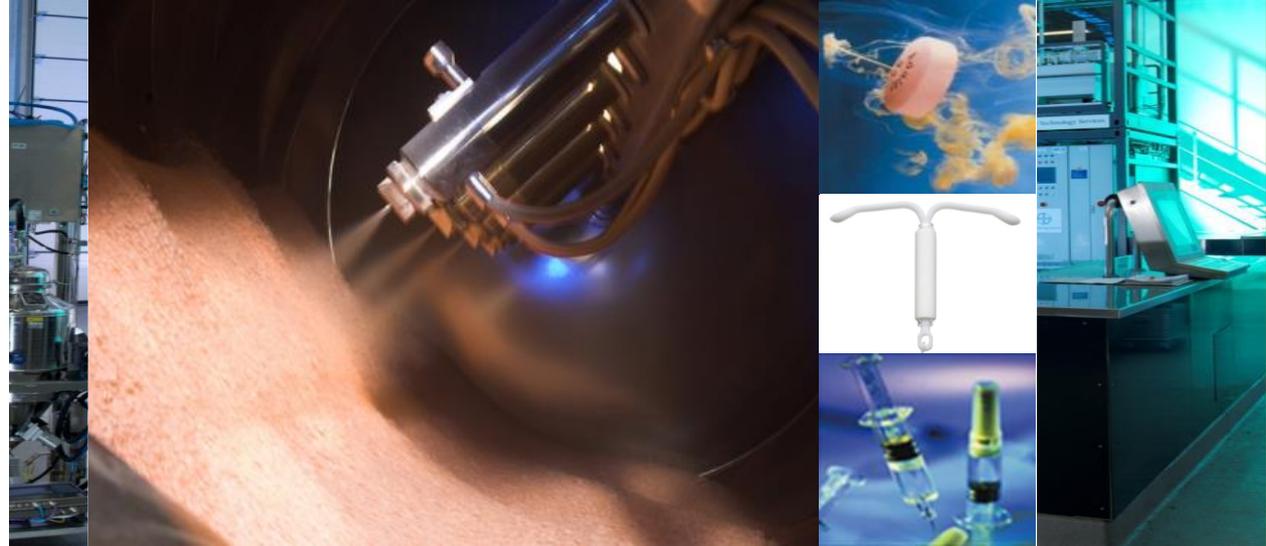
Projects

- production of SCS via spray drying
- production of sub-micron particles via spray drying
- continuous tablet coating

- performance improvement of fibrous filters
- production of sub-micron particles via precipitation

- hot-melt-extrusion
- comparing manufacturing techniques for ASDs
- molecular phenomena in polymeric systems

- continuous melt milling
- modelling of the drug dissolution behaviour
- direct compression
- modelling of FBG



invite.
■ innovations ■ innovations
■ visions ■ visions
■ technologie ■ technologies

DDiC
Drug Delivery **innovation** Center

Started September 1, 2017

ddic.invite-research.com

demonstrating future production concepts

Academic Partners

HHU Düsseldorf: Prof. Dr. J. Breitzkreutz
Prof. Dr. Dr. h.c. P. Kleinebudde

TU Dortmund: Prof. Dr. G. Schembecker
Prof. Dr. G. Sadowski
Prof. Dr. M. Thommes

EMAU Greifswald: Prof. Dr. W. Weitschies*

LMU München: Prof. Dr. G. Winter*

* external academic partners

Industry Partners

TIER-1:	Bayer	TIER-2:	Ashland	Haver & Boecker
	Merck		Inosim	L.B. Bohle
	UCB		Parsum	Amofor
			Siemens	Nisso Chemical Europe

12 Ph.D. students were employed since September 2017
Also a number of Postdocs were hired!

National Funding Opportunities – PhD students

- **DAAD (German Academic Exchange Service)**
 - Full PhD programme in Germany
 - Bi-nationally Supervised Doctoral Degrees
 - One-Year and Short-Term Grants

- **DFG (German Research Foundation)**

 - Walter-Benjamin-Programme

 - You are in Germany and want to go abroad
 - Postdocs in early career phase
 - Applicants must have worked in Germany for the last three years

- **Humboldt-Foundation**

 - Humboldt Research Fellowship

 - You are in outside of Germany and want come to Germany
 - Postdocs in early career phase
 - Additional support in Germany: e.g. intensive language course

- **DAAD (German Academic Exchange Service)**

 - Bilateral Exchange of Academics (short term visits: up to 3 months)

- **DFG (German Research Foundation)**

Walter-Benjamin-Programme

https://www.dfg.de/en/research_funding/programmes/individual/walter_benjamin/index.html

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Humboldt Research Fellowship

(<https://www.humboldt-foundation.de/en/apply/sponsorship-programmes/humboldt-research-fellowship>)

- **DAAD (German Academic Exchange Service)**

Full PhD programme in Germany

(<http://www.research-in-germany.org/en/research-funding/funding-programmes/daad-research-grants-doctoral-programmes-in-germany.html>)

Bi-nationally Supervised Doctoral Degrees

(<http://www.research-in-germany.org/en/research-funding/funding-programmes/daad-research-grants-bi-nationally-supervised-doctoral-degrees.html>)

One-Year and Short-Term Grants

(<http://www.research-in-germany.org/en/research-funding/funding-programmes/daad-research-grants---one-year-and-short-term-grants.html>)

Great:

Visit <http://www.research-in-germany.org/en> for an excellent overview of all programmes!

Also great:

Marie Skłodowska-Curie European Postdoctoral Fellowships (EU funded)

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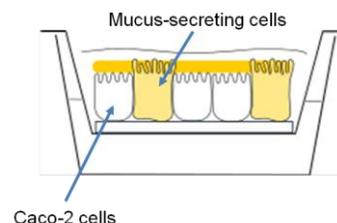
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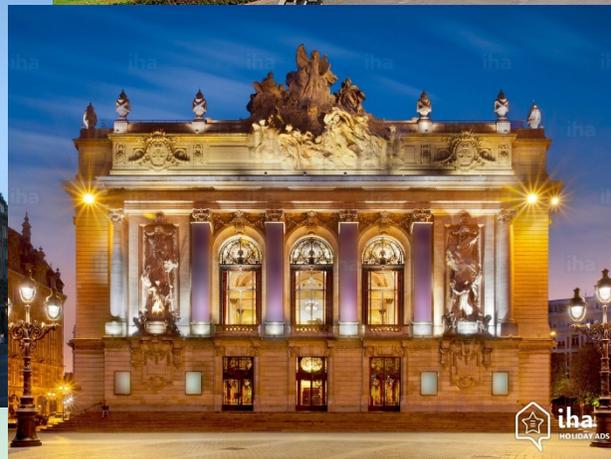
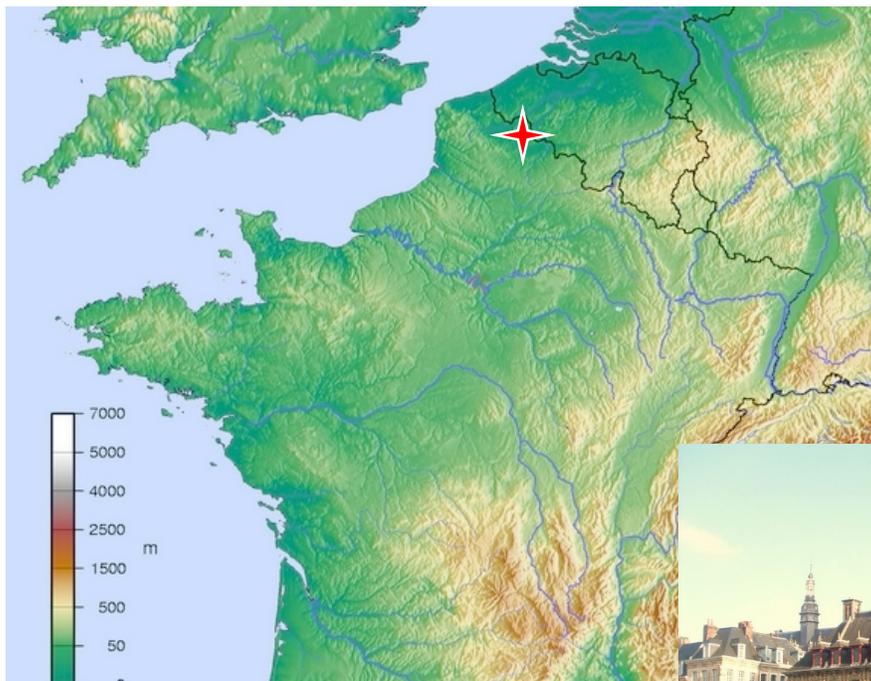
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 - Anette.mullertz@sund.ku.dk;

Research funding in France: A guide through the jungle



Dr. Susanne Muschert, Associate Professor in Pharmaceutical Technology

But, where is Lille?





Pr M.P. Flament-Leterme, Pr F. Siepman, Pr J. Siepman,
Dr S. Muschert, Dr Y. Karrout, Dr M. Hamoudi, Mr. H. Florin,
Mr. M Fossart, M. J. Vérin

Formulation & characterization of innovative solid dosage forms



Parodontology

Pr E. Deveaux,
Dr K. Agossa



Plastic surgery

Pr P. Guerreschi

Ear Nose Throat Surgery

Pr C. Vincent

Vascular surgery

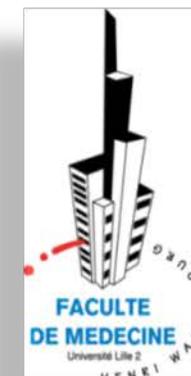
Pr J. Sobocinski



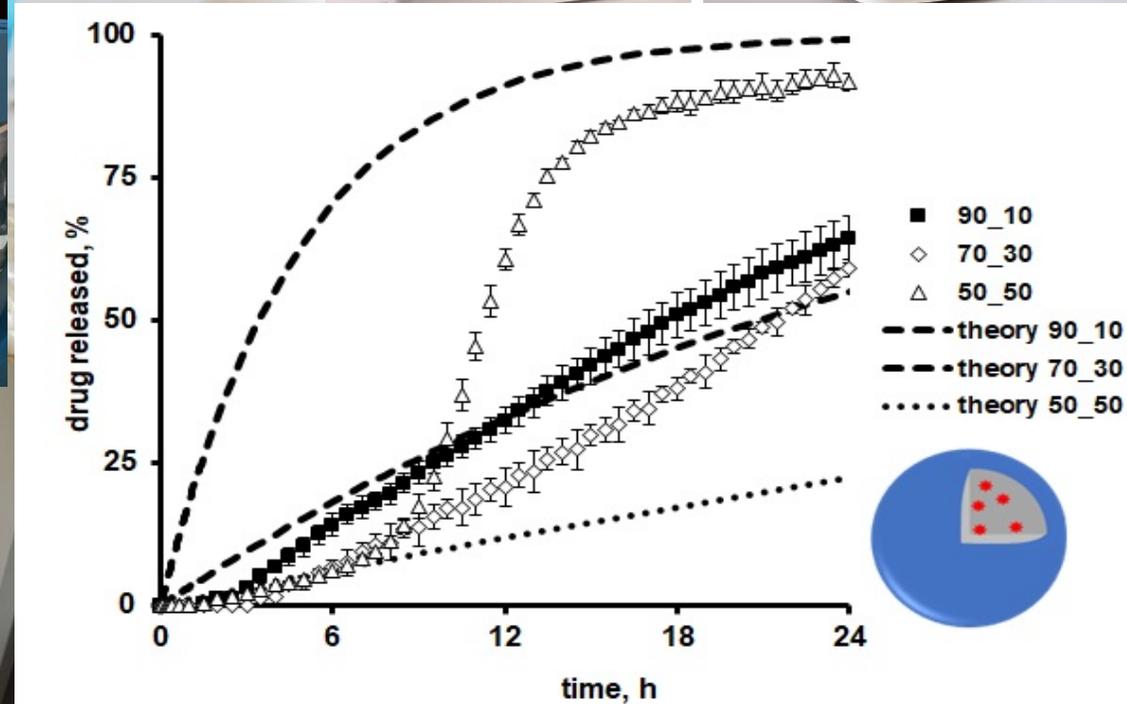
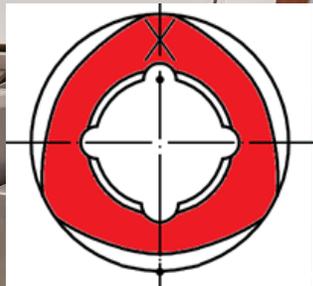
Maxillo-facial surgery-Stomatology

Pr J. Ferri, Pr G. Raoul

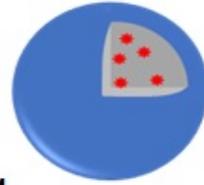
Pr N. Blanchemain, Dr F. Chai,
Dr M.J., Garcia Fernandez, Mr. M. Maton,
Mrs. A.S. Drucbert



Functionalization of biomaterials for medical devices, tissue engineering



$$\frac{M_t}{M_\infty} = 1 - \exp\left(-\frac{3DKR_0t}{(R_o - R_i) \cdot R_i^2}\right)$$



[UdL MobLilex](#)

For internships
3 to 10 months

**Master (MPhil, MSc) students:
Funded PhD positions**



[ISITE ULNE Graduate program](#)

M2 Biology Health
"Precision Health"
International mobility fellowship
& merit fellowship
Interactive seminars & practical training

[Cotutelles PESSOA](#)



[Proteus Program](#)



PhD Fellowship

["Tournesol" Program](#)



[Program Danube](#)



[Erasmus+](#)

Traineeship & study mobilities

[Bourses Eiffel](#)



[Erasmus+](#)
Doctoral mobilities

Young researchers (PhD & PostDocs):
Individual funding opportunities for secondments
or positions

[UdL MobLilex](#)
Outgoing & Ingoing
scientific mobilities
3 to 12 months

[Mermoz grant](#)
Mobility grant
12 to 26 consecutive weeks



Procope Mobility
Doctoral mobility
1 to 3 months
Information: [Mail](#)





(Partenariat Hubert Curien) ProCope
(bilateral submission)
 Projects of 2 years
 Only travelling costs are concerned
 (around 4000 €/y)

Confirmed researchers:
 Collaborations in international projects &
 International Events



UFA/DFH
 Université franco-allemande/
 Deutsch Französische Hochschule
 Via the University of Lille
(IR responsible)



Procope+
 Bilateral submission

3rd
 european
 partner



Maupertius Program

Workshops, Conferences & Summerschools





Introduction and funding opportunities

University of Ljubljana, Faculty of Pharmacy

PSSRC Funding Workshop 2021



Faculty of pharmacy University of Ljubljana (UL FFA)





The Chair of Pharmaceutical Technology

Head: Prof. Mirjana Gašperlin

University teachers: 8 + 2

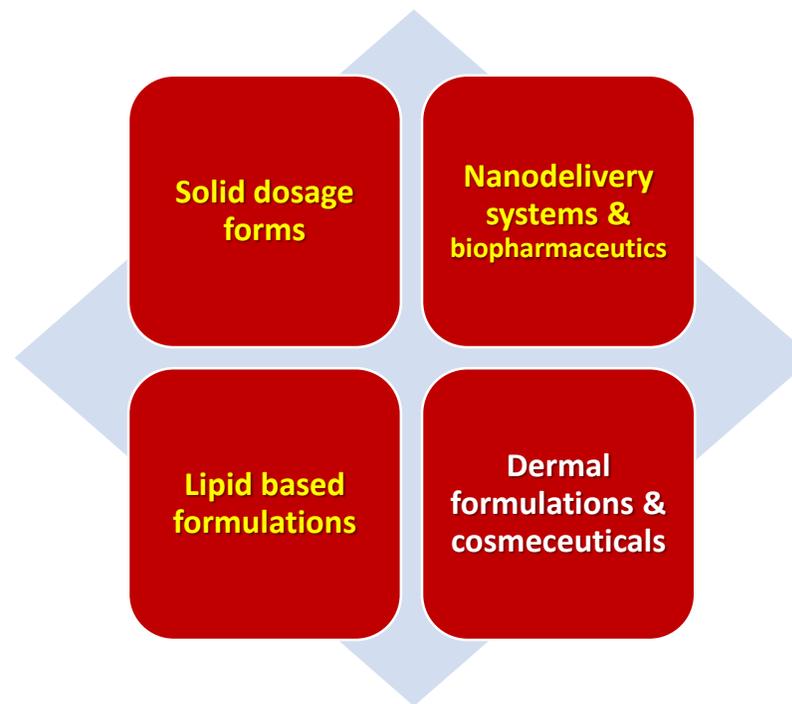
Assistants: 7

Researchers: 1

Young researchers: 2 + 2

Technical staff: 3

Research associates: 2

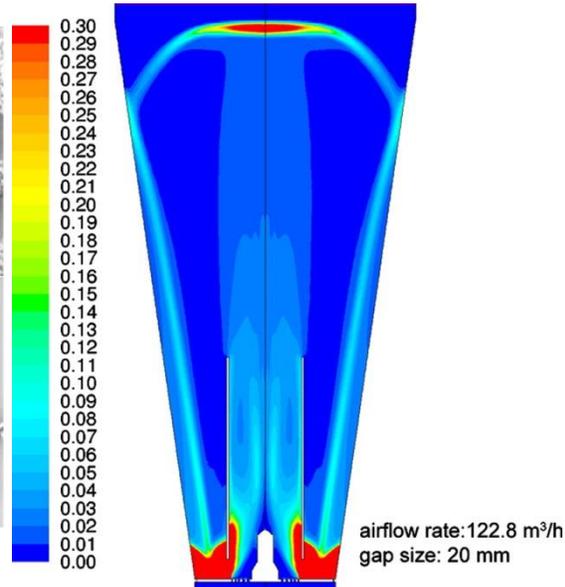
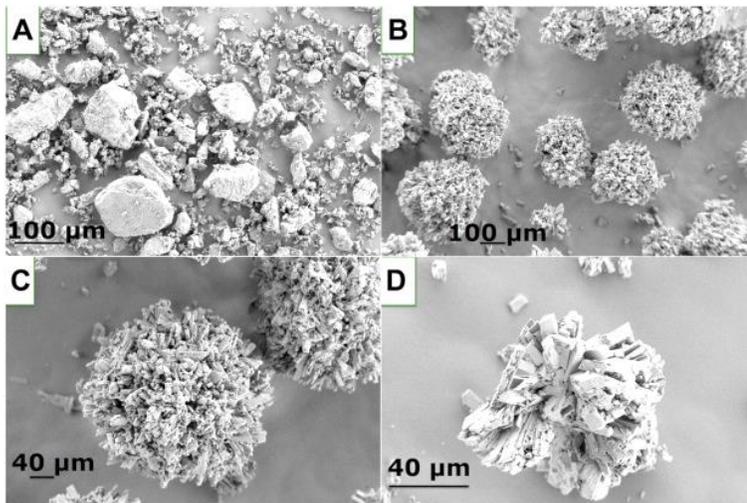




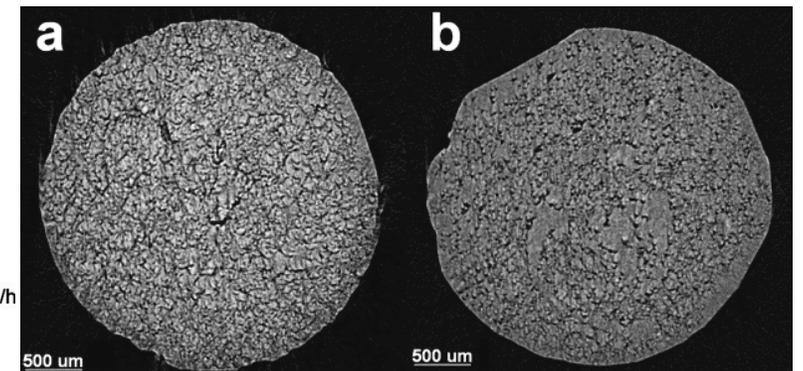
Characterisations, troubleshooting, studies of...

Solid dosage forms and process development:

- solid surface
- flow properties, segregation
- amorphous state stability
- solubility and dissolution rate
- investigation of mechanical properties of materials
- influence of mechanical characteristics of solids on tablet compression, chipping
- particle and tablet coating
- crystallization, tableting
- extrusion and 3D printing
- granules, pellets, capsules and tablets
- patient friendly dosage forms (mini and (oro)dispersible tablets, medicated wafers, films, straws)
- modified release
- microcapsules



Team: Prof. dr. Stane Srčič
Prof. dr. Odon Planinšek
Assoc. Prof. dr. Rok Dreu
Assoc. Prof. dr. Ilija German Ilić



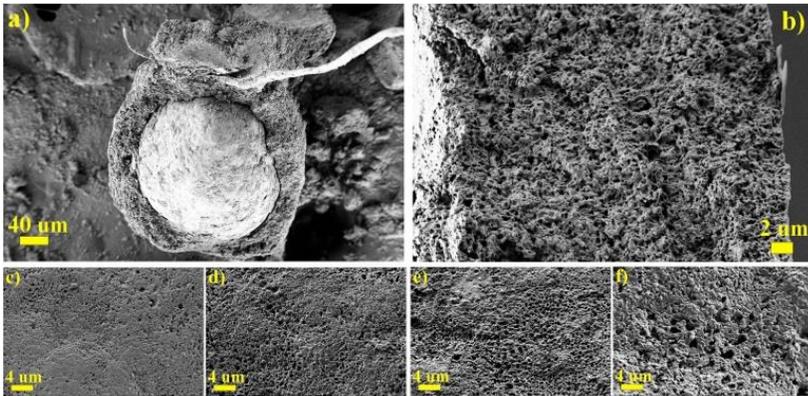


Characterisations, troubleshooting, studies of...

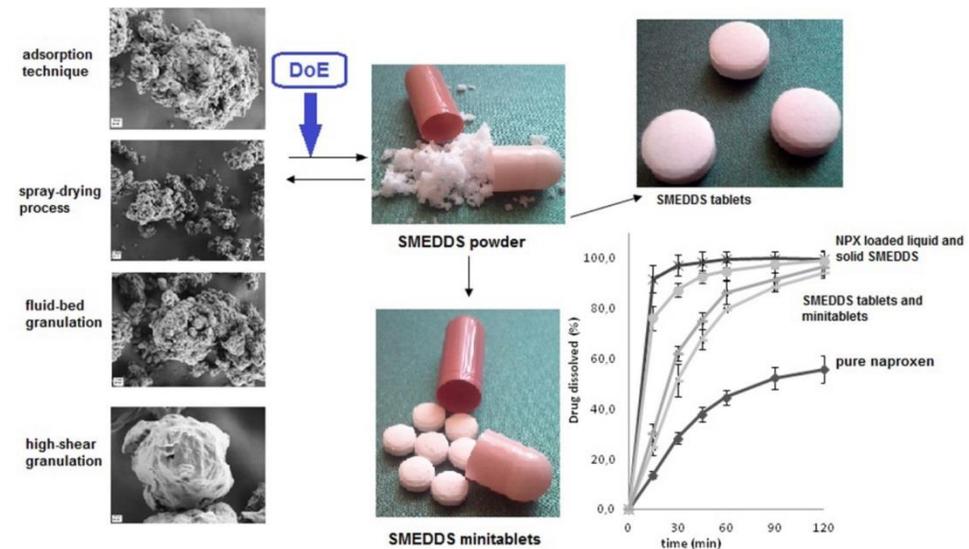
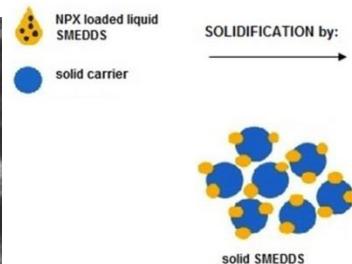
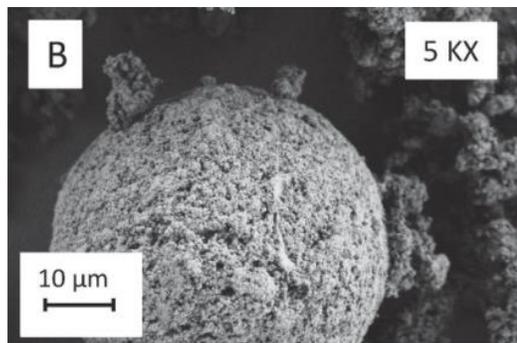
Lipid based formulations and process development:

- pseudo ternary phase diagrams construction
- *in vitro* cell toxicity
- penetration & permeability studies
- solidification of liquid SMEDDS
- evaluation of liquid and solid SMEDDS

- microemulsions
- dry emulsions
- SMEDDS – Self Micro Emulsifying Drug Delivery Systems
- hot-melt technologies (granulation, spray conegealing)



Team: Prof. dr. Mirjana Gašperlin
Assoc. Prof. dr. Alenka Zvonar Pobirk
Assoc. Prof. dr. Rok Dreu



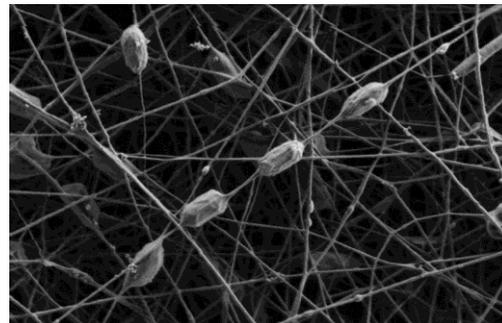
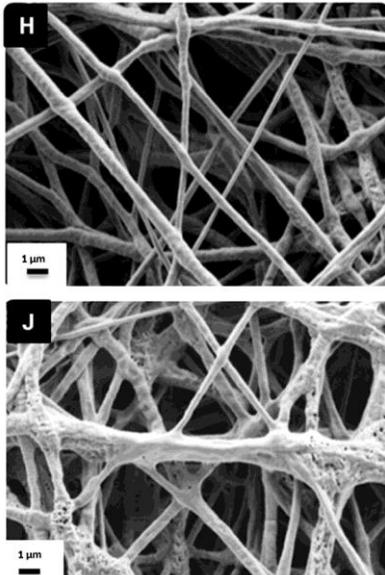


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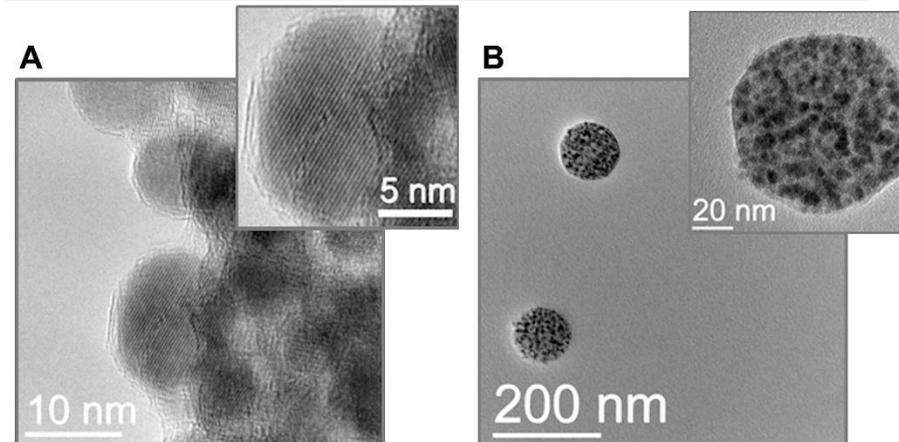
- characterization of nanomaterials
- development of mild condition based technologies for preparation of nanomedicines with biopharmaceutics or probiotics (lyophilization, electrospinning)
- safety and toxicity of nanomedicines (in vitro biological characterization)

Nanodelivery systems development:

- nanofibers
- polymeric & solid lipid nanoparticles
- nanosuspensions
- liposomes
- thermoresponsive micelles and hydrogels
- SPION-based nanotheranostics



Team: Prof. dr. Julijana Kristl
Assoc. Prof. dr. Petra Kocbek
Assoc. Prof. dr. Pegi Ahlin Grabnar



Processing equipment

- mixing (*Bioengineering Inversina*)
- high shear granulation (*4M8-TriX, ProCept*)
- fluid bed granulation (*top-spray, GPCG1, Glatt*)
- fluid bed hot-melt granulation (*BX-CGD1, Brinox, Tornado chamber*)
- fluid bed pelletization and powder layering (*rotor chamber, GPCG1, Glatt*)
- film coating and layering of pellets, granules, mini-tablets (*Wurster and swirl-Wurster chamber; GPCG1, Glatt and BX-CGD1, Brinox*)
- Capsule filling granules, pellets, multicomponent; (*MG Futura, MG2*)
- Twin screw Extruder/granulator (*Leistritz ZSE 12 HP-PH – 40T*)
- tableting (conventional, mini-tablets, of pellets, bilayer) (*SP300, IMA Killian*)
- pan coating of tablets (*Glatt GMPC I, Glatt*)
- spray drying/congealing (*B-290, Büchi*)
- high pressure homogenisation (*APV-2000, Invensys*)
- ultrasound homogenisation (*CV33, Omni*)
- separation (*Ultracentrifuge Sorwall WX 100*)
- lyophilisation (*Beta 1-8K, Martin Christ*)
- microencapsulation (*IE 50R, Inotech*)
- electrospinning/electrospraying (*Fluidnatek LE100, Bioinicia*)

Analytical tools

Resident analytical instruments

- DSC and TGA (*Mettler Toledo*)
- ATR-FTIR (*Nexus, Nicolet*)
- contact angle meter (*DSA 100, Krüss GmbH*)
- UV/VIS spectrophotometer (*HP 8453, Agilent*)
- chromatography systems (*1100, Agilent; UPLC, Waters*)
- IGC- Inverse Gas Chromatography (*Gas Chromatograph, Agilent*)
- modular rheometer (*Physica MCR 301, Anton Paar*)
- particle sizing instruments (*Mastersizer 3000, Malvern; Zetasizer Nano ZS, Malvern*)
- FT- IR spectrometer (*1600 FTIR, Perkin–Elmer*)
- Coupled RAMAN and AFM (*XploRA PLUS (Horiba Scientific) + OmegaScope (AIST-NT)*)
- PAT equipment:

FBRM probe C35, Mettler Toledo

PATVIS APA, Sensum

Accessible research tools

- ^{14}N NQR - Nuclear Quadrupole Resonance
- AFM - Atomic Force Microscopy (*Nanoscope IIIa system, Veeco*)
- Nanoindentation
- SEM (*Supra 35 VP, Carl Zeiss*)
- TEM (*CM100, Philips*)
- fluorescence microscopy,
- XRPD (*PANalytical X'Pert PRO MPD*)

SI - funding opportunities

3rd cycle study – PhD candidates:

- Erasmus+ KA131 doctoral mobility in a form of Studies or Traineeship

Both type of mobility support thesis research.

Study mobility depends on a call, traineeship type can be applied anytime (at your University or national coordinator).

Is currently limited to minimum of 3 months, shorter mobility will be available from September 2021 onwards.

University of Ljubljana, Faculty of Pharmacy has currently Erasmus inter-institutional agreements that include 3rd cycle signed with the following PSSRC members:

University of Helsinki and University of Lille (this is not limiting Traineeship mobility).

SI - funding opportunities

Post-Doc position:

- MSCA COFUND EUTOPIA-SIF postdoctoral fellowship

Eligibility: recognised Researchers (stage 2), PhD holders without permanent research position

Duration: 2 years, with a monthly average gross salary of 4.350 € and a supplementary budget for research and travel expenses.

Key Research areas: materials engineering, health

Application selection: rigorous two-stage selection process including an external review of all eligible proposals by renowned experts and interviews with short-listed candidates

Next call for applications: Autumn 2021

Past PSSRC collaborations

PhD student:

Aleksander Aleksovski (2014, Ghent)

Academic exchange:

Assoc. prof. dr. Rok Dreu (2014, Düsseldorf)

Assoc. prof. dr. Ilija German Ilić (2018, Graz)

Alexander von Humboldt Research Fellowship

Dr. Rok Šibanc (2017-18, Düsseldorf)

Collaborations resulted in 8 papers with Düsseldorf, Graz and Ghent.

Collaborations & visits in the past



2020:
Vanessa DUEPHANS
Anna JUSTEN

2014:
Sabrine SMEDEGAARD JENSEN

2013:
Petra PRIEMEL

2020:
Susanne MUSCHERT

