

# Nordic POP Workshop on Particle Based Formulations

## ABOUT THE EVENT

Barriers in drug delivery  
Mesoporous carriers  
Solid drug delivery systems  
Solubilized colloidal systems  
Emerging technologies  
Pharmaceutical powders  
Modeling of particulate systems

 27 - 29 April 2021

 Zoom



Register before 21 April 2021  
<http://doit.medfarm.uu.se/kurt20381>

# **Nordic POP Workshop on Particle Based Formulations**

**27-29 April, 2021**

**Department of Pharmacy, Uppsala University**

## **Workshop Description**

**Day 1:** Lectures: general introduction to particle based formulations used in drug delivery systems for various administration routes, mesoporous carriers and solid drug delivery systems. Meet the experts discussion.

**Day 2:** Continuation of lectures: solubilized colloidal systems and semisolids, emerging technologies, characterization and modeling of pharmaceutical powders.

**Day 3:** Virtual laboratory demonstrations and exercises of formulation technologies.

## **Registration**

Please follow the link to register:

<http://doit.medfarm.uu.se/kurt20381>

## **Deadline**

The deadline for registration is April 21, 2021.

## **Organizing Committee**

Christel Bergström  
Oliver Hedge  
Madlen Hubert  
Alexandra Teleki

## **Contact**

Alexandra Teleki, email: [alexandra.teleki@farmaci.uu.se](mailto:alexandra.teleki@farmaci.uu.se)

## **Tuesday 27.04.2021**

09.50-10.00 Alexandra Teleki, Uppsala University  
*Welcome to the participants and introduction to the workshop*

### **Session 1: Barriers around particle-based drug delivery**

10.00-10.20 Christel Bergström, Uppsala University  
*Oral drug delivery*

10.20-10.40 Natasa Skalko-Basnet, The Arctic University of Norway  
*Dermal drug delivery*

10.40-11.00 Ingela Niklasson Björn, Process Engineering, Astra Zeneca  
*Pulmonary drug delivery*

11.00-11.15 **Break**

11.15-11.35 Per Larsson, Uppsala University  
*Parenteral drug delivery*

11.35-11.55 Natasa Skalko-Basnet, The Arctic University of Norway  
*Vaginal drug delivery*

11.55-12.15 **Meet the experts (breakout rooms)**

12.15-13.15 **Lunch**

### **Session 2: Mesoporous carriers**

13.15-13.45 Jessica Rosenholm, Åbo Akademi University  
*Mesoporous silica*

13.45-14.00 Ocean Cheung, Uppsala University  
*Mesoporous inorganic carbonates*

### **Session 3: Solid drug delivery systems**

14.00-14.30 Georgios Sotiriou, Karolinska Institutet  
*Nanoparticles for drug delivery and theranostics*

14.30-15.00 **Break**

15.00-15.30 Kuldeep Bansal, Åbo Akademi University  
*Polymeric nanoparticles*

15.30-16.00 Huiling Mu, University of Copenhagen  
*Solid lipid microparticles*

16.00-16.30 Korbinian Löbmann, University of Copenhagen  
*Amorphous solid dispersions*

## Wednesday 28.04.2021

### Session 4: Solubilized colloidal systems and semisolids

- 10.00-10.30 Per Hansson, Uppsala University  
*Hydrogel-based colloidal systems*
- 10.30-11.00 Christel Bergström, Uppsala University  
*Lipid-based drug delivery vehicles*
- 11.00-11.15 **Break**
- 11.15-11.45 Gøril Eide Flaten, The Arctic University of Norway  
*Liposomes*
- 11.45-12.00 Alexandra Teleki, Uppsala University  
*Particle-stabilized emulsions*
- 12.00-13.00 **Lunch**

### Session 5: Emerging technologies

- 13.00-13.30 Wei Li, University of Helsinki  
*Micro and nanoparticles by microfluidics*
- 13.30-14.00 En Te Hwu, Technical University of Denmark  
*3-D printed sub-micron drug delivery systems*
- 14.00-14.30 Ossi Korhonen, University of Eastern Finland  
*Continuous manufacturing*
- 14.30-14.45 **Break**

### Session 6: Characterization and modeling of pharmaceutical powders

- 14.45-15.15 Ingunn Tho, University of Oslo  
*Solid state characterization*
- 15.15-15.45 Per Hansson, Uppsala University  
*Soft matter characterization*
- 15.45-16.00 **Break**
- 16.00-16.25 Christel Bergström, Uppsala University  
*Dissolution, release, permeation*
- 16.25-16.45 Per Larsson, Uppsala University  
*API – excipient interactions*

## **Thursday 29.04.2021**

### **WS1: A small scale digestion–permeation assay for the study of enabling drug delivery systems**

*Lead: Caroline Alvebratt, Uppsala University*

In the workshop we will use the miroDiss/microFLUX system to study the performance of a model compound encapsulated in a lipid based formulation. In the microFLUX system, comprising of a two chambers separated by an artificial semi-permeable membrane, the concentrations in the two chambers will be monitored in real time using in situ UV-probes. This makes it possible to determine both donor concentrations and permeation of the drug. The workshop focuses on a lipid-based formulation however the assay can be used to study the performance of a variety of different types of formulation.

### **WS2: Hyperthermia exhibited by magnetic nanoparticles using the magneTherm™ system**

*Lead: Shaquib Rahman Ansari, Uppsala University*

Magnetic nanoparticles (MNPs) exposed to alternating magnetic fields (AMF) dissipate heat. This can be used in treatment of tumors (*NanoTherm*®) or for hyperthermia-triggered drug release. The hyperthermic effect of MNPs can be tested with the magneTherm™ system from nanoTherics as the heating capacity is evaluated for different AMF-frequencies. In this workshop, we will demonstrate the use of the magneTherm™ system to investigate the hyperthermic effect of MNPs for drug delivery applications. We will also describe flame synthesis of nanoparticles and demonstrate the color of small metal particles.

### **WS3: Microfluidics for the fabrication of nano- and micro-systems**

*Lead: Wei Li, University of Helsinki*

The aim of the course is to introduce to the students microfluidic techniques for pharmaceutical applications, and to demonstrate their importance in, e.g., controlled drug loading and release. The course focuses on droplet-based systems, capillary microfluidic techniques, and provides several examples on pharmaceutical and biomedical applications using such technologies for preparation of microemulsions/microparticles and nanoencapsulation/nanoprecipitation.

### **WS4: The importance of particle size and polydispersity: how to measure, how to read the data and most importantly what does this tell us about the formulation.**

*Lead: Lisa Myrseth Hemmingsen, The Arctic University of Norway*

The considerations related to sample preparation, selection of measuring conditions and interpretation will be discussed in more details. Some own examples of Gaussian and bimodal distribution data on liposomes will be presented.

**WS5: From designing to printing formulations and high precision structures with various techniques**

*Lead: Dhayakumar Rajan Prakash, Åbo Akademi University*

The objective of the workshop is to get insight on designing structures for 3DP and get to know what fabrication methods are available and how to eliminate the chaos and time by choosing right instruments and fabrication method for your applications. You will get to know different designing softwares which are opensource and different hardwares available in market to try your ideas. At end of workshop we will try to print a formulation, try printed microfluidic chip based on the time and resource available.

**WS6: Thermal behaviour of amorphous materials**

*Lead: Korbinian Löbmann, University of Copenhagen*

The workshop will give a short overview on theory and application of Differential Scanning Calorimetry (DSC) and modulated DSC (MDSC). Focus is in particular on the interpretation of the thermograms and practical tips on how to resolve thermal events in otherwise difficult to interpret thermograms. It is suggested that participants bring difficult to interpret data from their own experiments.